

SIPRI
YEARBOOK
1989

WORLD
ARMAMENTS
AND
DISARMAMENT

SIPRI Yearbook 1989
World Armaments and Disarmament



Stockholm International Peace Research Institute

SIPRI is an independent international institute for research into problems of peace and conflict, especially those of arms control and disarmament. It was established in 1966 to commemorate Sweden's 150 years of unbroken peace.

The Institute is financed mainly by the Swedish Parliament. The staff, the Governing Board and the Scientific Council are international.

The Governing Board and Scientific Council are not responsible for the views expressed in the publications of the Institute.

Governing Board

Ambassador Dr Inga Thorsson, Chairman (Sweden)

Egon Bahr (Federal Republic of Germany)

Professor Francesco Calogero (Italy)

Dr Max Jakobson (Finland)

Professor Dr Karlheinz Lohs (German Democratic Republic)

Professor Emma Rothschild (United Kingdom)

Sir Brian Urquhart (United Kingdom)

The Director

Director

Dr Walther Stützle (Federal Republic of Germany)



Stockholm International Peace Research Institute

Pipers väg 28, S-171 73 Solna, Sweden

Cable: PEACERESEARCH STOCKHOLM

Telephone: 46 8/55 97 00

SIPRI Yearbook 1989

World Armaments and Disarmament

sipri

Stockholm International Peace Research Institute

OXFORD UNIVERSITY PRESS
1989

SIPRI
STOCKHOLM INTERNATIONAL
PEACE RESEARCH INSTITUTE

Oxford University Press, Walton Street, Oxford OX2 6DP

Oxford New York Toronto

Delhi Bombay Calcutta Madras Karachi

Petaling Jaya Singapore Hong Kong Tokyo

Nairobi Dar es Salaam Cape Town

Melbourne Auckland

and associated companies in

Berlin Ibadan

Oxford is a trade mark of Oxford University Press

Published in the United States

by Oxford University Press, New York

© SIPRI 1989

Yearbooks before 1987 published under title

'World Armaments and Disarmament:

SIPRI Yearbook [year of publication]'

*All rights reserved. No part of this publication may be reproduced, stored
in a retrieval system, or transmitted, in any form or by any means,
electronic, mechanical, photocopying, recording, or otherwise, without the
prior permission of Oxford University Press*

British Library Cataloguing in Publication Data

*SIPRI yearbook of world armaments and
disarmament.—1989—*

I. Arms control—Periodicals 2. Disarmament—Periodicals

3. Arms and armour—

*I. Stockholm International Peace Research Institute II. World armaments
and disarmament.*

ISSN 0953-0282

327.1'74'05 JX1974

ISBN 0-19-827751-2

Library of Congress Cataloguing in Publication Data

Data available

Set by Wyvern Typesetting, Bristol

Printed and bound in Great Britain by

Biddles Ltd., Guildford and King's Lynn

Contents

Foreword	xiii
<i>Walther Stützle</i>	

Glossary and conventions	xvii
---------------------------------	------

Part I. Weapons and technology

Chapter 1. Nuclear weapons	3
<i>William M. Arkin, Andrew S. Burrows, Thomas B. Cochran, Richard W. Fieldhouse and Robert S. Norris</i>	

I. Introduction	3
II. US nuclear weapon programmes	4
ICBMs—Strategic submarine programmes—Strategic bomber programmes—Theatre nuclear forces—Naval nuclear weapons—Problems with the nuclear weapon production complex	
III. Soviet nuclear weapon programmes	11
ICBMs—Strategic submarine programmes—Strategic bomber programmes—Strategic defence developments—Cruise missile programmes—Non-strategic nuclear forces—Naval nuclear forces—The Soviet military and <i>perestroika</i>	
IV. British nuclear weapon programmes	27
British–French nuclear co-operation—The WE-177 tactical nuclear bomb and its replacement—Trident—Britain and arms control	
V. French nuclear weapon programmes	29
Defence budget—Force Océanique Stratégique—S4 IRBM—‘Pre-strategic’ weapons—Mirage 2000N—Naval aviation—France and arms control	
VI. Chinese nuclear weapon programmes	33
Nuclear test—SLBM test—Nuclear exercises—Missile and rocket developments—Aerospace developments	
Notes and references	38
Table 1.1. US strategic nuclear forces, 1989	12
Table 1.2. US theatre nuclear forces, 1989	13
Table 1.3. US nuclear warheads in Europe, 1965–92	14
Table 1.4. Soviet strategic nuclear forces, 1989	15
Table 1.5. Soviet theatre nuclear forces, 1989	16
Table 1.6. British nuclear forces, 1989	18
Table 1.7. French nuclear forces, 1989	19
Table 1.8. Chinese nuclear forces, 1989	20

Appendix 1A. Agreement between the United States of America and the Union of Soviet Socialist Republics on Notifications of Launches of Intercontinental Ballistic Missiles and Submarine-Launched Ballistic Missiles	46
--	----

Chapter 2. Nuclear explosions	49
<i>Ragnhild Ferm</i>	
I. Introduction	49
II. Nuclear explosions in 1988	49
US explosions—Soviet explosions—French explosions—The Chinese explosion	
III. The Joint Verification Experiment and other bilateral initiatives	52
The Joint Verification Experiment—The US—Soviet nuclear testing negotiations—Other initiatives	
IV. Conclusions	56
Notes and references	57
 Appendix 2A. Nuclear explosions, 1945–88	58
Table 2A.1. Registered nuclear explosions in 1988	58
Table 2A.2. Estimated number of nuclear explosions 16 July 1945–5 August 1963 (the signing of the Partial Test Ban Treaty)	59
Table 2A.3. Estimated number of nuclear explosions 6 August 1963–31 December 1988	59
Table 2A.4. Estimated number of nuclear explosions 16 July 1945–31 December 1988	60
 Appendix 2B. Agreement between the United States of America and the Union of Soviet Socialist Republics on the Conduct of a Joint Verification Experiment	61
 Chapter 3. Military use of outer space	65
<i>John Pike</i>	
I. Introduction	65
II. Strategic defence systems	65
Soviet ballistic missile defence—The US Strategic Defense Initiative—SDI and the ABM Treaty	
III. Anti-satellite weapon systems	69
Soviet anti-satellite developments—US anti-satellite developments—Anti-satellite arms control	
IV. Soviet and US military satellite developments	72
Soviet photographic reconnaissance satellites—US imaging intelligence satellites—Soviet electronic intelligence satellites—US electronic intelligence satellites—Soviet ocean surveillance satellites—US ocean surveillance satellites—Soviet military communications satellites—US military communications satellites—Soviet early-warning satellites—US early-warning satellites—Soviet navigation satellites—US navigation satellites—Soviet weather satellites—US weather satellites	
V. Launch vehicles	82
First flight of the Soviet shuttle—US shuttle returns to flight status	
VI. Military satellite programmes of other countries	84
China—France—The United Kingdom—Israel	
Notes and references	85

Appendix 3A. Military satellites launched in 1988	88
Appendix 3B. Operational military satellites in orbit on 31 December 1988	94
Chapter 4. Chemical and biological warfare: developments in 1988	99
<i>S. J. Lundin</i>	
I. Introduction	99
II. Allegations of and non-compliance with the CW treaties	100
III. Chemical weapons	104
Developments in CW armament—Measures to hinder the spread of chemical weapons—Spread of chemical weapons—Bilateral visits—Chemical weapon-free zones	
IV. Developments related to the Biological Weapons Convention	114
V. Developments influencing the CWC negotiations	115
VI. Conclusions	119
Notes and references	121
Table 4.1. The 1988 UN investigations of allegations of use of chemical weapons in the Iraq–Iran War	102
Table 4.2. US chemical-weapon munitions as presented in the official material for the 1987 Tooele visit	106
Table 4.3. Size and holdings of CW agent in the US stockpiles	107
Appendix 4A. Final Declaration of the Paris Conference	129

Part II. Military expenditure, the arms trade and armed conflicts

Chapter 5. World military expenditure	133
<i>Saadet Deger</i>	
I. Introduction	133
II. The USA	134
The budget—The past—The future	
III. European NATO	141
The burden-sharing debate—FR Germany—The UK	
IV. The USSR	150
What does the 19 per cent defence burden mean?—Which way now?	
V. The Asian-Pacific region	155
New Soviet initiatives—China—Japan—North and South Korea	
VI. The Third World	164
Conflict resolution—The debt crisis	
VII. Conclusion	171
Notes and references	172
Table 5.1. US national defence expenditure, outlays, FYs 1986–89	136
Table 5.2. US budget and trade deficits, 1980–89	138
Table 5.3. NATO mobilizable defence personnel as a share of the labour force, 1988 projections	143

Table 5.4.	Military expenditure as a share of GDP, selected NATO countries with volunteer armed forces, 1985–88	145
Table 5.5.	Direct and indirect costs of the military burden of the FRG, 1983–88	147
Table 5.6.	Estimated Soviet defence expenditure, 1987	152
Table 5.7.	Chinese military expenditure and budgets, 1985–88	158
Table 5.8.	Current and forecasted military expenditure for Japan, FYs 1986–90	160
Table 5.9.	Third World debt, 1982 and 1988	169

Appendix 5A. Tables of world military expenditure, 1979–88 178
Gerd Hagmeyer-Gaverus, Saadet Deger, Somnath Sen and Rita Tullberg
assisted by Frederik Wetterqvist and Carl-Gustaf Lagergren

Table 5A.1.	World military expenditure, in current price figures	178
Table 5A.2.	World military expenditure, in constant price figures	183
Table 5A.3.	World military expenditure as a percentage of gross domestic product	188

Chapter 6. The trade in major conventional weapons 195
Ian Anthony

I.	Introduction	195
II.	The Iraq–Iran War	196
III.	The major suppliers	198
	The Soviet Union—The United States—France, the FRG and the UK—China	
IV.	The economics of arms transfers in 1988	208
V.	The major recipients	210
	India—Saudi Arabia—Japan	
VI.	Arms trade control	217
VII.	Conclusion	218
	Notes and references	218
Table 6.1.	Patterns of arms exports to the Third World ^a by the leading suppliers, 1979–88	196
Table 6.2.	The leading exporters of major weapons, 1984–88	198
Table 6.3.	The leading importers of major weapons, 1984–88	210

Appendix 6A. Aggregate tables of the value of the trade in major weapons with the Third World, 1969–88 226

Table 6A.1.	Values of imports of major weapons by the Third World: by region, 1969–88	226
Table 6A.2.	Values of exports of major weapons to regions listed in table 6A.1: by supplier, 1969–88	228

Appendix 6B. Register of the trade in major conventional weapons with industrialized and Third World countries, 1988 230
Ian Anthony, Agnès Courades Allebeck, Espen Gullikstad and Aaron Karp

Appendix 6C. Register of licensed production of major conventional weapons in industrialized and Third World countries, 1988	269
<i>Ian Anthony, Agnès Courades Allebeck, Espen Gullikstad and Aaron Karp</i>	
Appendix 6D. Sources and methods	278
I. The SIPRI sources	278
II. Selection criteria	278
III. The value of the arms trade	279
IV. Priority sources	280
Journals and periodicals—Newspapers—Annual reference publications—Other reference books	
V. Conventions	283
Abbreviations and acronyms—Region codes	
Chapter 7. Ballistic missile proliferation in the Third World	287
<i>Aaron Karp</i>	
I. Introduction	287
II. Six basic issues	288
III. Ballistic missile programmes in the Third World	290
Afghanistan—Algeria—Argentina—Brazil—Cuba—Egypt—Greece—India—Indonesia—Iran—Iraq—Israel—North Korea—South Korea—Kuwait—Libya—Pakistan—Saudi Arabia—South Africa—Syria—Taiwan—Turkey—North Yemen—South Yemen	
IV. Conclusion	308
Notes and references	310
Chapter 8. Arms trade regulations	319
<i>Agnès Courades Allebeck</i>	
I. Introduction	319
II. The United States	321
Principal legislation—The decision-making process—Legal conditions for arms transfer	
III. The Soviet Union	324
Principal legislation—The decision-making process—Conditions for arms transfer	
IV. France	325
Principal legislation—The decision-making process—Legal conditions for arms transfer	
V. The United Kingdom	326
Principal legislation—The decision-making process—Legal conditions for arms transfer	
VI. The Federal Republic of Germany	328
Principal legislation—The decision-making process—Legal conditions for arms transfer	
VII. Sweden	330
Principal legislation—The decision-making process—Legal conditions for arms transfer	

VIII. Italy	332
Principal legislation—The decision-making process—Legal conditions for arms transfer	
Notes and references	334
Chapter 9. Major armed conflicts in 1988	339
<i>Karin Lindgren, G. Kenneth Wilson and Peter Wallenstein</i>	
I. Reduced conflict activity in 1988	339
II. Counter-developments in 1988	339
III. Conflict characteristics	341
Notes and references	342
Table 9.1. Major armed conflicts in the world, 1988	342

Part III. Developments in arms control

Chapter 10. US–Soviet nuclear arms control	359
<i>Christoph Bertram</i>	
I. Introduction	359
II. The contours of the START treaty	359
III. Stumbling-block I: SDI and space-based defences	361
IV. Stumbling-block II: sea-launched cruise missiles	363
V. The Bush Administration and the future of START	365
Notes and references	367
Chapter 11. Conventional arms control in Europe	369
<i>Jane Sharp</i>	
I. Introduction	369
II. Coming to closure at the third CSCE follow-up meeting	370
Disputes over human rights issues—The relationship of the CFE talks to the CSCE	
III. Prospects for the CFE talks	373
The Gorbachev speech to the UN General Assembly—The Western response	
IV. Developing the negotiating positions	376
The intra-WTO debate—Elements of the WTO proposal—Developing the Western negotiating positions—Intra-NATO differences	
V. Reconciling the NATO and WTO positions	381
The data exchange—CFE zones of application—Can the NATO–WTO asymmetries be corrected?—Prospects for an agreement to limit aircraft—Naval forces—What kind of verification?	
VI. Prospects for the new 35-state CDE-II	393
VII. The MBFR and the CFE talks: continuity and change	395
The matter of political will: NATO—The matter of political will: WTO	
Notes and references	399
Figure 11.1. CFE reduction zones—a Soviet view	385

Figure 11.2. CFE reduction zones—Western concepts	387
---	-----

Appendix 11A. Implementation of the Stockholm Document and calendar of planned notifiable military activities in 1989 and forecast for 1990 403

Richard Fieldhouse and Axel Krohn

Table 11A.1. Calendar of planned notifiable military activities in 1989 and forecast for 1990, as required by the Stockholm Document	404
Table 11A.2. On-site inspections of military activities conducted in 1987–88, as permitted by the Stockholm Document	411

Appendix 11B. Extracts from the Concluding Document of the 1986–89 Vienna Meeting of Representatives of the Participating States of the Conference on Security and Co-operation in Europe 416

Chapter 12. Multilateral arms control efforts 427

Heinz Gärtner

I. Introduction	427
II. Chemical disarmament	427
Framework—New proposals—Remaining issues—Verification—An international verification body—Entry into force—Conclusion	
III. Nuclear test ban	436
Framework—Development of negotiations—An international verification body—Conclusion	
IV. Obstacles to and opportunities for a CW convention and a CTB	439
Notes and references	439

Part IV. Special features

Chapter 13. Conflict resolution in 1988: the role of the United Nations 445

Brian Urquhart

I. Overview of events in 1988	445
II. Improved US–Soviet relations: catalyst for change	445
III. Soviet foreign policy and the trend towards peace	446
IV. US foreign policy and the trend towards peace	446
V. The UN and the trend towards peace	447
VI. Enhanced effectiveness of the UN	448
VII. Lack of superpower co-operation and effectiveness of the UN	449
The Security Council—The Secretary-General	
VIII. The international climate and conflicts	450
Afghanistan—Iraq–Iran–Namibia–Western Sahara—Cyprus—Kampuchea	
IX. Conclusion	459
Notes and references	460

Chapter 14. The SIPRI 1988 Olof Palme Memorial Lecture—‘Arms control and arms reduction: the agenda ahead’	461
<i>Marshal Sergey F. Akhromeyev</i>	

Annexes

Annexe A. Major multilateral arms control agreements	475
<i>Ragnhild Ferm</i>	
I. Summaries of the agreements	475
II. Status of the implementation of the major multilateral arms control agreements, as of 1 January 1989	478
III. UN member states and year of membership	504
 Annexe B. Chronology	505
<i>Ragnhild Ferm</i>	
 About the contributors	521
 Abstracts	526
 Errata	530
 Index	531

Foreword

I

What sort of a year was 1988? Will it go down in history as the year that saw the tide turn, as so many observers claim? Do events in 1988 suggest that the traditional patterns of East–West relations no longer prevail, that confrontation has finally given way to co-operation, and that ideological and social differences have lost their divisive force? If such predictions prove to be true, is this because the political leadership of the Soviet Union has also come to recognize that ‘the preservation of any kind of “closed” societies is hardly possible’ and because the ‘world economy is becoming a single organism and no state, whatever its social system or economic status, can normally develop outside it’, as General Secretary Gorbachev chose to put it in his breathtaking, historic speech to the United Nations on 7 December 1988?¹

It has become obvious that the Reagan–Gorbachev consensus of opinion—that is, to free regional conflicts from the influence of East–West rivalry²—has greatly helped to reach a number of important agreements. In April 1988, agreement was reached about the withdrawal of Soviet occupation forces from Afghanistan; in August, a cease-fire between Angola and South Africa was agreed upon; and, in December, independence for Namibia was formally agreed upon, involving also a return home of the Cuban expeditionary forces; and in the eight-year war between Iraq and Iran, a cease-fire took effect in August. Finally, following the proclamation of a Palestinian state in November and the acceptance by the Palestine Liberation Organization (PLO) of UN Security Council Resolutions 242 and 338, Arafat’s statement to the UN General Assembly in Geneva in December was accepted as a sufficient renunciation of terrorism and an acceptance of Israel’s right to exist within secure borders, which the USA set as a pre-condition for opening official talks with the PLO; the talks consequently began in December.³

It is also one of the positive achievements of 1988 that the UN has again become an efficient instrument for individual countries, including the two superpowers, to turn to, to resolve conflicts ‘without losing face’.⁴ As for the broad field of arms control and arms reduction, the smooth implementation of

¹ Statement by Mikhail S. Gorbachev, President of the Presidium of the Supreme Soviet of the USSR, General Secretary of the Central Committee of the Communist Party of the Soviet Union, at the Plenary Meeting of the United Nations General Assembly, 7 December 1989. See the English version as distributed by the Soviet UN Delegation, p. 2.

² Reflected in the paragraph on ‘Regional Issues’ in the Joint Statement issued after the Moscow summit meeting, 29 May–2 June 1988.

³ For more details about regional conflicts, see this *Yearbook*, chapters 9 and 13.

⁴ See Urquhart, B., in this *Yearbook*, chapter 13.

the 1987 US–Soviet INF Treaty is an encouraging fact, with the first destruction of Soviet and US missiles occurring on 1 August and 8 September, respectively. Careful analysis of the implementation of confidence-building measures agreed upon in the Document of the Stockholm Conference on Confidence- and Security-Building Measures and Disarmament in Europe of 19 September 1986⁵ shows that the rules have been much better observed than one might have expected. This is also true for the right to request, on very short notice (within ‘36 hours after the issuance of the request’), an on-site inspection if compliance with the constraining provisions is in doubt.⁶

It surely marks a major step forward that Gorbachev, in his December UN speech, announced unilateral reductions of Soviet troops and armaments in Europe, which amount to no less than reducing almost 40 per cent of the Soviet tank divisions and 50 per cent of the Soviet tanks currently deployed in the German Democratic Republic, Czechoslovakia and Hungary.⁷ Among other considerations, this bold decision of the General Secretary, taken not quite in line with the publicly recorded advice of his principal adviser on military security and arms control, Marshal Akhromyev,⁸ demonstrated that Gorbachev continues to take long-standing security concerns of the West seriously and that he is not afraid to take unorthodox decisions, provided they serve the purpose of reducing the military burden without endangering Soviet security as well as improve the conditions for reaching a negotiated stability situation in Europe with the West.

If there was, however, a need to remind the public of the simple truth that there are always two sides to the coin, 1988 has certainly done that. After the Stockholm Conference had closed its gates in September 1986, it was not until 15 January 1989 that agreement was reached on the subjects for the next round of CSCE negotiations—among them, negotiations to deal with the reduction of troops and armaments in Europe—previously known as the Conventional Stability Talks (CST) and now called the Negotiations on Conventional Armed Forces in Europe (CFE), and a further refinement of confidence-building measures.⁹ Sixteen years after the signing of the SALT I Agreement,¹⁰ Washington and Moscow have still not managed to agree on how actually to reduce their strikingly redundant arsenals of strategic nuclear weaponry. Ronald Reagan—who had campaigned his way into the White House not least on the grounds of his extremely sharp criticism of the arms control policy of his predecessor, Jimmy Carter, in particular concerning the signed but unratified

⁵ For the full text, see SIPRI, *SIPRI Yearbook 1987: World Armaments and Disarmament* (Oxford University Press: Oxford, 1987), pp. 355–69.

⁶ For an excellent analysis, see Peters, I., ‘Die Möglichkeiten der Politik militärischer Vertrauensbildender Maßnahmen sind größer als erwartet. VSBM—Ein Lernprozeß der Sicherheitsexperten’, in *Beiträge zur Konfliktforschung*, no. 4 (1988), pp. 91–116. See also appendix 11A of this *Yearbook* on the implementation of the Stockholm Document.

⁷ See Krakau, A. and Diehl, O., ‘Gorbatschows Ankündigung einseitiger konventioneller Rüstungsreduzierungen der Sowjetunion, in *Aktuelle Analysen*, Bundesinstitut für ostwissenschaftliche und internationale Studien, no. 60 (1988); see also chapter 11 of this *Yearbook*, delivered at SIPRI on 29 Sep. 1988 in this *Yearbook*, chapter 14.

⁹ Documented in this *Yearbook*, appendix 11B.

¹⁰ Documented in SIPRI, *World Armaments and Disarmament: SIPRI Yearbook 1973* (Almqvist & Wiksell: Stockholm, 1973), pp. 20–30.

SALT II Treaty¹¹ of June 1979—left the Oval Office after two presidential terms with no new agreement on strategic nuclear weapons ready for signature. What President Reagan termed START (Strategic Arms Reduction Talks) was left by his Administration as unfinished business. And it is largely though not exclusively due to Reagan's Strategic Defense Initiative (SDI) vision, first enunciated in March 1983,¹² that the danger to the key East–West arms control treaty, the Anti-Ballistic Missile (ABM) Treaty of 1972, was not eliminated: an explicit agreement between Washington and Moscow about an identical reading of what is called the 'traditional interpretation' of the ABM Treaty is still missing. And it certainly does no credit to arms control efforts that a global ban on chemical weapons is still not within reach, despite more than eight years of intensive negotiations both within the UN framework and in bilateral US–Soviet talks, and despite the abhorrent use of these weapons in the Iraq–Iran War.

As for the many regional conflicts which have for decades been waged in the Third World, it remains to be seen whether the Iraq–Iran cease-fire can be translated into a genuine peace process; whether the US–PLO talks can be developed into real negotiations, at the end of which the key parties, Israel and the Palestinians, recognize each other's right to exist within secure borders; whether a stable national government in Afghanistan can be formed; and whether South Africa, Namibia and Angola will manage to coexist peacefully.

Last but not least, the international debt crisis must not be overlooked. Given its obvious importance for any effort to prevent war through the creation of socially just conditions, it is an alarming fact that the crisis has further deteriorated, still with no sign of readiness on the part of the creditor nations to solve the problem before the interest-service alone strangles some of the credit recipients, which it otherwise is likely to do.¹³

In sum, 1988 has seen remarkable progress towards a potentially more peaceful world; hence, compared with recent years, it has been successful. However, in view of what is required to transform this progress into lasting settlements, the best that can be said about 1988 is that hope for peaceful conflict resolution is better founded than in any other year since the end of World War II. Whether or not the opportunity will be properly used depends to no small degree on the future relationship between the two superpowers. After all, a unique opportunity presented itself at the turn of the year: with Gorbachev in the Kremlin, for the first time since the cold war broke out an incoming US President was welcomed by his opposite number in Moscow in a co-operative spirit.

As opposed to all his predecessors since the end of World War II, President George Bush is neither confronted with a war-prone crisis (as was Harry S. Truman in the Berlin Crisis of 1948–49, and John F. Kennedy in the Berlin Crisis of 1958–62 and in the Cuba Crisis of 1962), nor does he find US armed

¹¹ Documented in SIPRI, *World Armaments and Disarmament: SIPRI Yearbook 1980* (Taylor & Francis: London, 1980), pp. 209–83.

¹² See the speech by President Reagan, 23 March 1983, US Congress, Office of Technology Assessment, *Ballistic Missile Defense Technologies*, OTA-ISC-254, Washington, DC, 1985.

¹³ For more details, see chapter 5 of this *Yearbook*.

forces involved in the conduct of a war (as was the case for Dwight D. Eisenhower with the Korean War of 1950–53, and for Lyndon B. Johnson and Richard S. Nixon with the Viet Nam War until 1973), nor is President Bush exposed to both proxy conflicts and an insensitive Soviet missile policy (as was Gerald R. Ford in the Angola conflict of 1975–76 and Jimmy E. Carter and Ronald W. Reagan with the Afghanistan conflict of 1979–80, and as both Presidents experienced with the Brezhnev-Gromyko missile policy, for which the SS-20 emerged as the key symbol). Thus history presents the United States and the Soviet Union with a unique opportunity to turn trends into events—which is no small progress, given the tremendous amount of destructive potential available to mankind.

II

This *Yearbook* is presented in the four standard parts which were introduced in the *SIPRI Yearbook 1987*: I. Weapons and Technology, II. Arms Trade, Military Expenditure and Armed Conflicts, III. Developments in Arms Control, and IV. Special Features.

We are proud to have again secured the co-operation of several distinguished international researchers and experts outside the SIPRI staff: Dr Christoph Bertram, Dr Heinz Gärtner, John Pike, Sir Brian Urquhart and Professor Dr Peter Wallensteen. And we are grateful to those who cared to provide us with valuable suggestions as to how to improve the *Yearbook* work to the benefit of a globally dispersed readership.

A dedicated staff produced the *Yearbook*, under Connie Wall's experienced leadership. Special thanks are due to the editors, Billie Bielckus, Paul Claesson, Jetta Gilligan Borg and Gillian Stanbridge; and to the secretaries, Gabrielle Bartholemew, Cynthia Loo, Marianne Lyons and Ricardo Vargas-Fuentes.

Dr Walther Stütze
Director, SIPRI
15 January 1989

GLOSSARY AND CONVENTIONS

Acronyms

ABM	Anti-ballistic missile	COCOM	Co-ordinating Committee for East-West Trade Policy
ACE	Allied Command Europe (NATO)	CORRTEX	Continuous reflectometry for radius versus time experiments
ACM	Advanced cruise missile	CSBM	Confidence- and security-building measure
ADM	Atomic demolition munition	CSCE	Conference on Security and Co-operation in Europe (Helsinki, Belgrade, Madrid, Vienna)
AFAP	Artillery-fired atomic projectile	CST	Conventional Stability Talks
AFB	Air Force Base	CTB	Comprehensive test ban
ALCM	Air-launched cruise missile	CTOL	Conventional take-off and landing
ASAT	Anti-satellite	CW	Chemical warfare
ASEAN	Association of South East Asian Nations	CWC	Chemical Weapons Convention
ASLCM	Advanced sea-launched cruise missile	CWFZ	Chemical weapon-free zone
ASM	Air-to-surface missile	DEW	Directed-energy weapon
ASUW	Anti-surface warfare	EC	European Community
ASW	Anti-submarine warfare	EDI	European Defence Initiative
ATBM	Anti-tactical ballistic missile	EFA	European Fighter Aircraft
ATTU	Atlantic-to-the Urals	ELINT	Electronic intelligence
AWACS	Airborne warning and control system	ELV	Expendable launch vehicle
BMD	Ballistic missile defence	EMP	Electromagnetic pulse
BW	Biological warfare	Enmod	Environmental modification
BWC	Biological Weapons Convention	ERW	Enhanced radiation (neutron) weapon
CBM	Confidence-building measure	FBS	Forward-based system
CBW	Chemical and biological warfare	FEL	Free electron laser
CD	Conference on Disarmament (Geneva)	FOC	Full operational capability
CDE-I	Conference on Confidence- and Security-Building Measures and Disarmament in Europe (Stockholm)	FOFA	Follow-on forces attack
CDE-II	Conference on Confidence- and Security-Building Measures and Disarmament in Europe (Vienna)	FOST	Force Océanique Stratégique
CEP	Circular error probable	FOTL	Follow-on to Lance
CFE	Negotiation on Conventional Armed Forces in Europe (Vienna)	FROG	Free-rocket-over-ground
CMEA	Council for Mutual Economic Assistance	GBR	Ground-based radar
		GLCM	Ground-launched cruise missile
		HLTF	High Level Task Force
		IAEA	International Atomic Energy Agency
		ICBM	Intercontinental ballistic missile

ICJ	International Court of Justice	R&D	Research and development
INF	Intermediate-range nuclear forces	RMA	Restricted Military Area
IOC	Initial operational capability	RPV	Remotely piloted vehicle
IRBM	Intermediate-range ballistic missile	RV	Re-entry vehicle
JVE	Joint Verification Experiment	SALT	Strategic Arms Limitation Talks
KEW	Kinetic-energy weapon	SAM	Surface-to-air missile
Laser	Light amplification by simulated emission of radiation	SCC	Standing Consultative Commission
LTTB	Low-threshold test ban	SDI	Strategic Defense Initiative
MAD	Mutual assured destruction	SDIO	SDI Organization
MARV	Manoeuvrable re-entry vehicle	SICBM	Small ICBM
M(B)FR	Mutual (and Balanced) Force Reduction talks	SLBM	Submarine-launched ballistic missile
MD	Military District	SLCM	Sea-launched cruise missile
MIRACL	Mid-infrared advanced chemical laser	SLV	Space launch vehicle
MIRV	Multiple independently targetable re-entry vehicle	SSOD III	Third (UN) Special Session On Disarmament
MLRS	Multiple launcher rocket system	SRAM	Short-range attack missile
MRV	Multiple (but not independently targetable) re-entry vehicle	SRBM	Short-range ballistic missile
MTCR	Missile Technology Control Regime	SRNF	Short-range nuclear forces
MURFAAMCE	Mutual Reduction of Forces and Armaments and Associated Measures in Central Europe	SSBN	Nuclear-powered, ballistic-missile submarine
NATO	North Atlantic Treaty Organization	SSGN	Guided missile submarine, nuclear-powered
NNA	Neutral and non-aligned (states)	SSN	Nuclear-powered attack submarine
NPT	Non-Proliferation Treaty	START	Strategic Arms Reduction Talks
NST	Nuclear and Space Talks (Geneva)	SVC	Special Verification Commission
NTS	Nevada Test Site	SWS	Strategic weapon system
NWFZ	Nuclear weapon-free zone	TASM	Tactical air-to-surface missile
OAU	Organization for African Unity	TEL	Transporter-erector-launcher
OECD	Organization for Economic Co-operation and Development	TLI	Treaty-limited item
O&M	Operation and maintenance	TNF	Theatre nuclear forces
PLO	Palestine Liberation Organization	TTB(T)	Threshold Test Ban (Treaty)
PNC	Palestine National Council	UNFICYP	UN Peacekeeping Force in Cyprus
PNE(T)	Peaceful Nuclear Explosions (Treaty)	UNGOMAP	UN Good Offices Mission for Afghanistan and Pakistan
PTB(T)	Partial Test Ban (Treaty)	UNIIMOG	UN Iran-Iraq Military Observers Group
		VLTTB	Very-low-threshold test ban
		V/STOL	Vertical/short take-off and landing
		WTO	Warsaw Treaty Organization (Warsaw Pact)

Glossary

Anti-ballistic missile (ABM) system	Weapon system for intercepting and destroying ballistic missiles and their warheads in flight.
Binary chemical weapon	A shell or other device filled with two chemicals of relatively low toxicity which mix and react while the device is being delivered to the target, the reaction product being a supertoxic chemical warfare agent, such as nerve gas.
Biological weapon	Living organisms or infective material derived from them, which are intended for use in warfare to cause disease or death in man, animals or plants, and the means of their delivery.
Chemical weapon	Chemical substances—whether gaseous, liquid or solid—which might be employed as weapons in combat because of their direct toxic effects on man, animals or plants, and the means of their delivery.
Circular error probable (CEP)	A measure of missile accuracy: the radius of a circle, centred on the target, within which 50 per cent of the weapons aimed at the target are expected to fall.
Conference on Disarmament (CD)	Multilateral arms control negotiating body, based in Geneva, which is composed of 40 states, including all the nuclear weapon powers. The CD reports to the UN General Assembly.
Conference on Confidence- and Security-Building Measures and Disarmament in Europe (CDE-I)	The Stockholm Conference, held in Stockholm, Sweden, January 1984–September 1986. The Stockholm Document was signed on 19 September 1986. Part of the CSCE process.
Conference on Confidence- and Security-Building Measures and Disarmament in Europe (CDE-II)	The second stage of the Stockholm Conference, which opened in Vienna in March 1989. Part of the CSCE process.
Conference on Security and Co-operation in Europe (CSCE)	Conference of 33 European NATO, WTO and neutral and non-aligned states plus the USA and Canada, which began in 1972 and in 1975 adopted a Final Act (also called the Helsinki Declaration), containing, among others, a Document on confidence-building measures and disarmament. Follow-up meetings were held in Belgrade (1977–78), Madrid (1980–83) and Vienna (1986–89).
Conventional armed Forces in Europe (CFE)	Subject of negotiations between NATO and the Warsaw Treaty Organization (23 states) on conventional force reductions in Europe, which opened in Vienna in March 1989. Part of the CSCE process. During the third CSCE follow-up meeting in Vienna, 1986–89, where the mandate for these negotiations was discussed, the forum was usually referred to as the Conventional Stability Talks (CST).
Conventional weapon	Weapon not having mass destruction effects. <i>See also:</i> Weapon of mass destruction.
Cruise missile	Unmanned, self-propelled, guided weapon-delivery vehicle which sustains flight through aerodynamic lift, generally flying at very low altitudes to avoid radar detection, sometimes following the contours of the terrain. It can be air-, ground- or sea-launched and deliver a conventional or nuclear warhead.
First-strike capability	Theoretical capability to launch a single attack on an adversary's strategic nuclear forces that nearly eliminates the second-strike capability of the adversary.
Flexible response	The NATO doctrine for reaction to an attack with a full range of military options, including the use of nuclear weapons.
Helsinki Declaration	<i>See:</i> Conference on Security and Co-operation in Europe.

Initial operational capability (IOC)	Date by which a weapon system is first operationally deployed, ready for use in the field.
Intercontinental ballistic missile (ICBM)	Ground-launched ballistic missile with a range in excess of 5500 km.
Intermediate-range nuclear forces (INF)	Theatre nuclear forces with a range of from 1000 up to and including 5500 km. <i>See also:</i> Theatre nuclear forces.
Kiloton (kt)	Measure of the explosive yield of a nuclear weapon equivalent to 1000 tons of trinitrotoluene (TNT) high explosive. (The bomb detonated at Hiroshima in World War II had a yield of about 12–15 kilotons.)
Launcher	Equipment which launches a missile. ICBM launchers are land-based launchers which can be either fixed or mobile. SLBM launchers are missile tubes on submarines.
Launch-weight	Weight of a fully loaded ballistic missile at the time of launch.
Megaton (Mt)	Measure of the explosive yield of a nuclear weapon equivalent to one million tons of trinitrotoluene (TNT) high explosive.
Multiple independently targetable re-entry vehicle (MIRV)	Re-entry vehicle, carried by a missile, which can be directed to separate targets along separate trajectories (as distinct from MRVs).
Mutual assured destruction (MAD)	Concept of reciprocal deterrence which rests on the ability of the nuclear weapon powers to inflict intolerable damage on one another after receiving a nuclear attack. <i>See also:</i> Second-strike capability.
Mutual reduction of forces and armaments and associated measures in Central Europe (MURFAAMCE)	Subject of negotiations between NATO and the Warsaw Treaty Organization, which were held in Vienna 1973–89. Often referred to as mutual (and balanced) force reduction (M(B)FR).
Nuclear and Space Talks (NST)	Negotiations between the USA and the USSR on strategic nuclear weapons (START) and on space weapon issues, held in Geneva from March 1985. The INF negotiations of 1985–87 were also included in the NST.
Peaceful nuclear explosion (PNE)	Application of a nuclear explosion for non-military purposes such as digging canals or harbours or creating underground cavities.
Re-entry vehicle (RV)	That part of a ballistic missile which carries a nuclear warhead or penetration aids to the target and re-enters the earth's atmosphere and is destroyed in the terminal phase of the missile's trajectory.
Second-strike capability	Ability to receive a nuclear attack and launch a retaliatory blow large enough to inflict intolerable damage on the opponent. <i>See also:</i> Mutual assured destruction.
Short-range nuclear forces (SRNF)	Nuclear weapons with ranges up to 500 km; not limited by the INF Treaty. <i>See also:</i> Theatre nuclear forces.
Special Verification Commission (SVC)	US–Soviet consultative body established in accordance with the INF Treaty, to promote the objectives and implementation of the Treaty.
Standing Consultative Commission (SCC)	US–Soviet consultative body established in accordance with the SALT agreements, to promote the objectives and implementation of the agreements.
Strategic Arms Limitation Talks (SALT)	Negotiations between the Soviet Union and the United States which opened in 1969 and sought to limit the strategic nuclear forces, both offensive and defensive, of both sides. The SALT I Agreement was signed in 1972. The negotiations were terminated in 1979, when the SALT II Treaty was signed. <i>See also:</i> Strategic Arms Reduction Talks.

Strategic Arms Reduction Talks (START)	Negotiations between the Soviet Union and the United States, initiated in 1982, which seek to reduce the strategic nuclear forces of both sides. Suspended in December 1983 but resumed under the Nuclear and Space Talks that opened in Geneva in March 1985. <i>See also</i> : Nuclear and Space Talks.
Strategic nuclear weapons	ICBMs, SLBMs and bomber aircraft carrying nuclear weapons of intercontinental range (over 5500 km), which can reach the territories of the other strategic nuclear weapon powers.
Terminal guidance	Guidance provided in the final, near-target phase of the flight of a missile.
Theatre nuclear forces (TNF)	Nuclear weapons with ranges of up to and including 5500 km. In the 1987 INF Treaty, missiles are divided into intermediate-range (over 1000 km) and shorter-range (500–1000 km). Also called non-strategic nuclear forces. Nuclear weapons with ranges up to 500 km are sometimes called short-range. <i>See also</i> : Short-range nuclear forces.
Throw-weight	The sum of the weight of a ballistic missile's re-entry vehicle(s), dispensing mechanisms, penetration aids, and targeting and separation devices.
Toxins	Poisonous substances which are products of organisms but are inanimate and incapable of reproducing themselves. Some toxins may also be produced by chemical synthesis.
Warhead	That part of a weapon which contains the explosive or other material intended to inflict damage.
Weapon of mass destruction	Nuclear weapon and any other weapon which may produce comparable effects, such as chemical and biological weapons.
Yield	Released nuclear explosive energy expressed as the equivalent of the energy produced by a given number of tons of trinitrotoluene (TNT) high explosive. <i>See also</i> : Kiloton and Megaton.

Conventions

..	Data not available or not applicable
—	Nil or a negligible figure
()	Uncertain data
[]	Estimate with a high degree of uncertainty
m.	Million
b.	Billion (thousand million)
\$	US \$, unless otherwise indicated

Part I. Weapons and technology

Chapter 1. Nuclear weapons

Chapter 2. Nuclear explosions

Chapter 3. Military use of outer space

**Chapter 4. Chemical and biological warfare: developments
in 1988**

1. Nuclear weapons

Prepared by the *Nuclear Weapons Databook* staff and SIPRI*

I. Introduction

The year 1988 was the first in history in which both the United States and the Soviet Union destroyed modern nuclear weapon systems under a disarmament treaty, the Treaty on the Elimination of Intermediate-Range and Shorter-Range Missiles (the INF Treaty). In the first part of the year the Treaty was ratified by both countries and then entered into force during the Reagan-Gorbachev summit meeting on 1 June. In the remaining seven months of the year nearly 700 missiles were physically destroyed.

Although all five acknowledged nuclear weapon states (the USA, the USSR, the UK, France and China) continued to develop new weapon systems, all have been beset by technological, political and fiscal problems that may slow or alter the pace of the arms race.

Political relations among the nuclear weapon nations have markedly improved, thus lowering the incentives for military competition. Two summit meetings were held in 1988 between Presidents Reagan and Gorbachev, and both nations signed an agreement to notify each other of their strategic ballistic missile launches (see appendix 1A).¹ Gorbachev's announcement at the United Nations on 7 December that the Soviet Union would cut and restructure its military forces will have a wide-ranging impact. The USA and the USSR continue to negotiate about large reductions of their strategic nuclear forces. Conventional arms control negotiations in Europe are imminent and will include the military forces of all the nuclear states except China. However, as in past years, the momentum of nuclear weapon developments continues, seemingly oblivious to changing political realities and future opportunities.

The USA has nearly completed the first phase of its strategic modernization plan outlined in October 1981, and a second phase is about to begin. Economic constraints at the beginning of the year led the Pentagon to reduce its own budget by \$30 billion before submitting it to Congress. These pressures are likely to continue during the Bush Administration. Furthermore, portions of the US nuclear weapon production complex came to a virtual standstill in 1988 because of serious safety, health and environmental problems caused by years of mismanagement and lack of oversight. These problems have caused serious chemical and radioactive pollution and at least a temporary halt to the production of tritium.

Despite Gorbachev's many proposals and new initiatives, the Soviet Union continued to modernize its nuclear forces. However, there were signs that weapons were being produced and deployed at lower rates than previously estimated. Mobile SS-24 and SS-25 intercontinental ballistic missile (ICBM)

* Robert S. Norris, Thomas B. Cochran and Andrew S. Burrows, Natural Resources Defense Council, Inc., Washington, DC; William M. Arkin, Institute for Policy Studies, Washington, DC; and Richard W. Fieldhouse, SIPRI.

deployments were modest during the year. Long-range SS-N-21 sea-launched cruise missile (SLCM) deployments do not appear to be significant. Short-range SS-21 missile production and deployments may have halted, a possible indication of the restructuring of European-based Soviet forces announced by Gorbachev on 7 December and of the potential elimination of battlefield nuclear forces. None the less, the strategic and non-strategic bomber force continued to grow in capability, as did fighter aircraft.

The year saw Britain step back from a possible joint air-to-surface missile project with France and move closer to one with the USA. The Trident submarine and missile programme proceeded as the cost estimate dropped. France continued to articulate its independent position as it pursued a host of new missile, aircraft and submarine programmes. Budget pressures are starting to force delays in some programmes. During the year China apparently detonated a neutron bomb and successfully fired a submarine-launched ballistic missile (SLBM) from one of its newest submarines.

The tables showing the nuclear forces of all five nations as of January 1989 (tables 1.1–1.8) appear in section III of this chapter.

II. US nuclear weapon programmes

The first phase of the Reagan strategic modernization programme, spelled out in October 1981, is almost complete, and a second phase is about to begin. With the introduction of these new forces, a new Single Integrated Operational Plan (SIOP-7)—the nuclear war plan—will be implemented in 1989.²

At the end of the year, US strategic forces were comprised of 1000 ICBMs with 2450 warheads, 608 SLBMs with 5312 warheads, and 349 bombers with 5238 air-to-surface weapons. For the first time since 1981 the US strategic arsenal did not grow quantitatively. Although almost 600 new warheads were deployed, an equal number were retired.

A budget summit between the White House and Congress was held in late November 1987 resulting in an amended budget for fiscal year (FY) 1989. The year thus began with the submission of a military budget for an amount agreed to beforehand by the executive branch and the Congress, the first such co-operation under the Reagan Administration. Unlike past practice this led to an orderly disposition of the budget. Congress did not cut the overall size of the budget but did reallocate funds for certain programmes. As in past years Congress included several arms control initiatives in the FY 1989 Defense Authorization Bill, in part causing President Reagan to veto it on 3 August. This veto was a political manoeuvre to assist candidate George Bush's presidential campaign, borne out by his signing a virtually identical bill on 30 September 1988.

ICBMs

In 1988 the last of 50 MX missiles were deployed in modified Minuteman silos at F. E. Warren Air Force Base (AFB), Wyoming. By the end of the year, all the missiles were declared operational.

Development continued on the rail-garrison basing mode for the MX missile, the fourth scheme the Reagan Administration has officially endorsed. The Strategic Air Command's formal Statement of Operational Need document was validated by Air Force Headquarters in March 1988. On 10 May 1988 the Defense Acquisition Board recommended that the rail-garrison programme proceed to full-scale development. The Secretary of Defense approved both that recommendation and \$328.7 million in contracts.³

Further details about how the rail-garrison concept would work were revealed during the year in studies and government reports.⁴ The seven-car baseline train (supplemented by additional cars) would have a crew of 29, consisting of 3 civilian railway personnel, 1 train commander, a combat missile crew of 4, a maintenance team of 6, and a security team of 15. The main operating base at F. E. Warren AFB would be the primary location for the assembly, integration, major maintenance and operations support of the missile system. The garrison at each base would be a secured area of approximately 150 acres (60 hectares) enclosed by a double chain-link fence. Inside the area would be a Train Alert Shelter (TAS) for each train. Each TAS would consist of an 800 foot (240 m)-long earth-covered igloo and a 400 foot (120 m)-long attached shelter. The MX missiles would be assembled in their launch cars at F. E. Warren AFB and subsequently deployed at an operating base. The Air Force estimates that the basing programme will cost \$7.4 billion plus another \$3.2 billion for the additional missiles. Preliminary findings indicate that approximately 125 000 miles (201 125 km) of US railway track would be available for use by rail-garrison trains.

The rail-garrison testing programme would comprise a series of 10 or more canister-launched tests using a simulated missile, followed by five live Basing Verification Missile (BVM) flight-tests. The first BVM flight-test is scheduled for June 1991 and the last for May 1992. The Initial Operational Capability (IOC), for one train on alert with two missiles, plus one spare train at F. E. Warren AFB, is scheduled for December 1991. Full Operational Capability (FOC) is scheduled for late 1993. Annual operating and support costs are estimated at \$200 million, and military construction costs for the seven-year period FYs 1988-94 are estimated at \$944 million.⁵

In congressional testimony, and in a letter to Senate Armed Services Committee Chairman Sam Nunn, Secretary of Defense Frank Carlucci stated that MX missiles now housed in underground silos should be removed and deployed in the rail-garrison basing mode.⁶ This would mean 100 missiles on 50 trains, with up to six trains at F. E. Warren AFB and at as many as 10 other installations.

The high cost of acquiring and maintaining a Small ICBM (SICBM) force has been a difficult issue for the Department of Defense, the Air Force and the Congress since the inception of the programme. In the revised FY 1989 Department of Defense (DOD) budget the Secretary of Defense recommended terminating the programme, but kept \$200 million (and \$700 million from FY 1988) in the budget to continue development so as to let the next Administration decide the issue.

Throughout the year Congress, the Administration and the Pentagon

wrestled with how to proceed with both types of ICBM. In the final bill the next President was directed to submit a report to Congress by 15 February 1989, only three weeks after the presidential inauguration, on how funds for the SICBM and MX rail-garrison programmes will be obligated for the rest of FY 1989. Because of these delays, the IOC date for the SICBM has now slipped to mid-1994.⁷ A report by the House Armed Services Committee suggested that the SICBM could be used as a silo-based replacement for the Minuteman II.⁸ The Air Force is also studying a single-warhead Minuteman IV and a double-warhead Minuteman V.

Strategic submarine programmes

Nine Trident II SLBM flight-tests were conducted in 1988 by the Naval Ordnance Test Unit from Cape Canaveral, Florida.⁹ This brings the total number of flight-tests to 17. Two more land-based tests are scheduled for early 1989, to be followed by nine at-sea missile launches from the *USS Tennessee*, which will take place from March to July. The tests in January and July 1988 were failures, and although the missile in the September test was destroyed it was later revealed that this was due to a mistake by the range safety officer.

The latest cost estimate of the Trident II SLBM programme is \$34.9 billion for 843 missiles.¹⁰ The FY 1989 budget included funds to purchase 66 missiles, bringing the number bought so far to 153. The budget also included \$1.26 billion for the sixteenth Trident submarine. The submarine base at Bangor, Washington, now supports the first eight Trident submarines. Beginning with the *USS Tennessee*, which was commissioned on 17 December, Trident submarines equipped with Trident II missiles will be based at the King's Bay Naval Submarine Base, near St Mary's, Georgia. Eventually, as the first eight submarines are retrofitted with Trident II missiles, the Bangor base will be modified to support them. During the summer of 1988 the *USS Alabama* (SSBN 731) completed the 100th Trident patrol. (The first Trident patrol was completed on 10 December 1982 by the *USS Ohio* (SSBN 726).)

A little noticed aspect of changes in strategic forces during the past few years has been the removal of Poseidon ballistic missile submarines. The reasons are a combination of not enough money to overhaul them and congressional desires to remain near the SALT Treaty ceiling of 1320 MIRVed (with multiple independently targetable re-entry vehicles) missiles and heavy bombers modified to carry air-launched cruise missiles (ALCMs). Five Poseidon submarines have been deactivated or decommissioned since 1985, and two more are scheduled to be removed by September 1989.¹¹ On 1 April 1988 the *USS Andrew Jackson* (SSBN 619) began to be deactivated, and deactivation of the *USS John Adams* (SSBN 620) began on 1 October 1988. With the planned removal in September 1989 of the *USS Henry Clay* (SSBN 625) and the *USS James Monroe* (SSBN 622) more than 1100 W68 warheads will have been retired and dismantled so that their plutonium, uranium and tritium can be recycled for use in new warheads.

Strategic bomber programmes

There were several major developments in the US strategic bomber force during the year. On 1 October four non-ALCM B-52G squadrons (69 aircraft) were removed from the SIOP and assigned strictly conventional missions.¹² The special (nuclear) weapons storage areas (WSA)—at Mather AFB, California; Andersen AFB, Guam; and Loring AFB, Maine—were deactivated, and the WSA at Barksdale AFB, Louisiana, was reduced. B-52H bombers continued to be modified to carry cruise missiles and by the end of the year 72 of the 96 were completed, leaving the final 24 for 1989.

From the moment the B-1B bomber entered service it has been plagued by problems; 1988 proved to be no exception. Two B-1Bs crashed during the year, reducing the inventory to 97. The first crash occurred on 8 November near Dyess AFB in Texas, and the second on 17 November near Ellsworth AFB, South Dakota. During the year there were continuing problems with the ALQ-161A defensive avionics system as well as an overall lack of spare parts. In July and August the seriousness of these problems came to light largely through House Armed Service Committee Chairman Les Aspin, who, with the committee, have been the bomber's severest congressional critics.

After years of secrecy the B-2 stealth bomber was first seen in public during its roll-out on 22 November, revealing some basic facts about its design. Earlier, on 20 April, the Air Force had released an artist's conception of the Northrop B-2 showing a flying wing. The news release which accompanied the drawing stated that the aeroplane would fly in the autumn. In early August the Air Force announced that it is 69 feet (21 m) long, 17 feet (5.18 m) high with a wingspan of 172 feet (approximately 52.43 m). The B-2 will have a crew of two (with provisions to add a third at a later date) and be powered by General Electric F-118 engines. Several articles fleshed out other important characteristics¹³ and discussed the rationale of its mission.¹⁴ The Air Force Chief of Staff stated that the fleet of 120 operational B-2s would carry about 2000 nuclear warheads, or about 16 weapons per plane.¹⁵ It was also learned that the bomber underwent a major redesign in 1984 which caused it to fall behind schedule by eight months.¹⁶ The changes strengthened the airframe and made the flying wing more aerodynamically efficient. In 1982 an examination of potential problems added a year to the programme schedule. Various estimates were given for how much the aircraft would eventually cost. The General Accounting Office put the cost for 132 aircraft at \$68.8 billion or \$522 million each, or almost twice as much as a B-1B bomber. The Air Force estimate was approximately the same.¹⁷ The first B-2s are scheduled to be delivered to Whiteman AFB, Missouri, in mid-1991, after approximately two years of flight-testing. The first batch of 10 planes was to have been bought with funds in the FY 1990 budget although this has been reduced to five. With fewer aircraft bought in the early years and more bought in the later years the fleet of 132 would be complete by mid-1995, according to the Air Force.¹⁸

The secret Advanced Cruise Missile (ACM) AGM-129 programme continues to have problems and is at least three years behind schedule.¹⁹ House Armed Services Committee Chairman Aspin called it a 'procurement disaster',

adding that 'there have been serious problems with quality control and contractor discipline during missile assembly'.²⁰ In 1986, Congress demanded that at least six successful ACM test-flights be conducted before full-scale production could begin. As of spring 1988 only three successful test-flights had been accomplished: in June 1987, January 1988 and February 1988. The ACM was originally scheduled to be deployed sometime in FY 1988. The cost has now risen to \$5 billion for 1400 missiles, \$2 billion more than the original projection. The first base scheduled to receive the 2500-mile (4000-km) range missile is K. I. Sawyer AFB, Michigan, followed by Minot AFB, North Dakota.

Work continued on the SRAM II missile which will replace the SRAM-A on B-52 and B-1B bombers and will arm the B-2. The first test-flight is scheduled for September 1990. Initial, low-rate production would begin in March 1991, followed by full-rate production in July 1992 to meet an IOC of April 1993.²¹ Early in the year the Lawrence Livermore National Laboratory-designed W89 warhead was chosen for the missile. The missile will have a range of 250 km and be three times as accurate as the SRAM-A for 'efficient hard target kill'. The Air Force plans to purchase 1633 missiles for an estimated \$2.7 billion. The total cost of the programme including some 1200 nuclear warheads will be over \$3 billion.

Theatre nuclear forces

Implementation of the 1987 INF Treaty had an impact on theatre nuclear forces in Europe during 1988. Following hearings in the US Congress and a vote in the Senate, the instruments of ratification were exchanged at the Moscow summit meeting on 1 June 1988 and the Treaty entered into force.²² The new US On-Site Inspection Agency began work in February 1988. After the USA and the USSR held initial inspection visits, missiles began to be removed to elimination sites where they were to be destroyed. The first Pershing missiles were destroyed on 8 September at Longhorn Army Ammunition Plant in Karnack, Texas. The first ground-launched cruise missiles (GLCMs) were destroyed at Davis-Monthan AFB, Arizona, on 18 October. By the end of the year, 70 Pershing 1A missiles, 18 Pershing II missiles and 84 GLCMs had been destroyed, approximately 20 per cent of the eventual total.

In a report to Congress, Secretary of Defense Carlucci called for the modernization of certain non-strategic weapon systems,²³ many of which were already under way. The main elements are:

1. Development of a Follow-on to Lance (FOTL) surface-to-surface missile with increased range and improved accuracy. Almost \$15 million was requested in the FY 1989 budget for the FOTL although Congress cut the request to \$8 million. The estimated cost to develop and procure 1000 missiles is \$1.2 billion.²⁴ The Pentagon wants Congress to lift the restriction on using the Army Tactical Missile System (ATACMS) as the FOTL.
2. Development of a stand-off Tactical Air-to-Surface Missile (TASM). A 400-km TASM was approved for development at the 1983 NATO meeting of

ministers in Montebello, Canada. The TASM would provide US and allied aircraft the capability of attacking high-value, heavily defended targets. During 1988 the Air Force revealed that its preference for the TASM was the SRAM II (now designated SRAM-T) which could meet the IOC of 1995.²⁵ The DOD has decided not to dismantle the W85 Pershing II warheads or the W84 GLCM warheads.²⁶ With some adaptation the warheads could be used for SRAM-T and/or FOTL missiles.

3. Modernization of NATO's Artillery-Fired Atomic Projectiles (AFAP). Three types of AFAP are currently deployed with the ground forces of eight NATO countries. After many delays the replacement for the 155-mm W48 warhead is nearing production. The Lawrence Livermore National Laboratory-designed W82 warhead is scheduled to enter production in February 1990,²⁷ probably for introduction into service later that year. The Pentagon wants a congressional restriction lifted that now limits the number of new AFAPs (8-inch W79 and 155-mm W82) to 925.

4. Continuation of NATO's dual-capable aircraft and nuclear bomb modernization programme. The F-15E is a new, long-range interdiction fighter-bomber variant of the F-15 fighter, which is scheduled to enter the force in the early 1990s. The Air Force intends to purchase 392 to equip five Tactical Fighter Wings. Thirty-six were purchased in the FY 1989 budget. Throughout the 1980s new B61-3 and B61-4 bombs have been replacing older nuclear bombs in Europe and elsewhere.

On 10 November the US Air Force disclosed the existence of an operational stealth fighter aircraft, officially known as the F-117A.²⁸ A picture of the single-seat, dual-engine Lockheed-built aircraft was also released. Although nothing has been specifically stated, it is conceivable that the F-117A could have a nuclear mission. The aircraft first flew in June 1981 and has been operational since October 1983. It is assigned to the 4450th Tactical Group at Nellis AFB, Nevada, and is based at the Tonopah Test Range Airfield. Of the 59 procured, 52 have been delivered.

The Belgian Defence Ministry announced in a statement on 24 October that the nuclear warheads for its Nike Hercules missiles had been given back to the United States in the preceding few months. By the end of 1988, virtually all of the nuclear warheads associated with the obsolete Nike Hercules were withdrawn, except for a small number with West German units. It is expected that they, too, will be withdrawn in the near future.

Naval nuclear weapons

The Navy's efforts to modernize US non-strategic naval nuclear forces have not fared well. After years of congressional criticism and budget cuts the nuclear version of the Standard-2 surface-to-air missile (SM-2[N]) to replace the Terrier has been cancelled. The Navy is planning to replace the SUBROC anti-submarine rocket-propelled nuclear depth charge with the Sea Lance missile. A decision on whether to arm the Sea Lance with a nuclear warhead has been deferred until at least December 1990.

The Tomahawk sea-launched cruise missile (SLCM) programme continued at a steady rate.²⁹ Over half of the planned 3994 SLCMs have been purchased. In the period FYs 1980–89, 2021 missiles of four types were procured; 385 were the Tomahawk land-attack missile-nuclear (TLAM-N) version, 179 for surface ships and the rest for submarines. During FY 1988, 295 Tomahawk missiles were delivered to the Navy, 51 of which were the TLAM-N. Modification of naval ships to carry Tomahawks proceeds at a rate of about five surface ships and 10 submarines per year. By the end of the year there were 27 Tomahawk-capable surface ships and 37 Tomahawk-capable submarines.

The Navy is working on a classified Advanced Sea-Launched Cruise Missile (ASLCM) now in 'concept development', which incorporates stealth features.³⁰

Problems with the nuclear weapon production complex

Long-standing problems with the Department of Energy (DOE) complex that manufactures US nuclear weapons burst into public view during the year. In the aftermath of the Chernobyl accident in 1986, panels were formed in the USA to examine DOE reactors, especially those making plutonium and tritium for nuclear weapons, and the safety procedures at various US facilities.³¹ The General Accounting Office produced a score of reports that described a pattern of poor management, inadequately trained personnel, poor maintenance, deficient safety procedures and a record of mishaps. As a consequence the N Reactor at Hanford was shut down in January 1987, and the power levels were turned down at the Savannah River Plant (SRP) reactors in March 1987. On 16 February 1988 the DOE announced that it would not restart the N Reactor, saying that plutonium requirements could be met through SRP and recycling the existing stockpile. By August all three reactors at SRP were shut down. Beginning in October the *New York Times* initiated a series of major, mostly front-page, articles which examined the complex in detail.³² The impact of this was to focus a great deal of attention on two sorts of problem.

The first is the extensive radioactive and chemical pollution that has been generated by the manufacture of some 60 000 US nuclear weapons since the Manhattan Project in the 1940s. The scope of the contamination and the cost of cleaning it up are enormous. The estimates range up to \$150 billion.³³ A report, known informally as the 2010 Report, delivered to the House and Senate Armed Services Committees in January 1989 recommends that \$81 billion (in 1990 US dollars) be spent over the next 21 years to modernize the complex, and clean up some of the more contaminated sites.³⁴ Of that amount \$52 billion would go to close, relocate and refurbish the complex while \$29 billion would be for cleaning up the environment. The report proposes closing the Fernald and Rocky Flats Plants and building four reactors at the Idaho National Engineering Laboratory and one at Savannah River.

The second sort of problem stems from the incapacity of the current, potentially dangerous, complex to produce materials and components for new nuclear weapons. As Secretary of Energy Herrington stated, 'this country's ability to produce and maintain a nuclear weapons stockpile is in serious

jeopardy'.³⁵ Despite such a prognosis, the USA does not face a bout of unilateral disarmament because its tritium production has been halted. The DOE view is based on the assumption that there will be no changes in the plan to build many new nuclear weapons in the coming years, an assumption that is doubtful given the budgetary and arms control constraints that are already in effect. Through various actions and decisions, the USA could maintain its stockpile of nuclear weapons for several years without restarting tritium production at Savannah River.³⁶ This would provide enough time to reassess US tritium production needs without racing to restart dangerous reactors.

III. Soviet nuclear weapon programmes

The modernization of Soviet strategic offensive forces during 1988 was steady, with no surprises except for the slow introduction of the new solid-fuel SS-24 and SS-25 mobile ICBMs. At the end of the year Soviet strategic forces comprised 1378 ICBMs with 6860 warheads, 926 SLBMs with 3602 warheads, and 170 bombers with 1100 warheads. Although the net number of launchers remained the same during the year (owing to equal deployments and retirements), the number of warheads increased by approximately 300. According to the US DOD, the Soviet Union spends about \$20 billion annually on strategic offensive nuclear forces.³⁷

Growth in strategic nuclear forces reflects continued MIRVing of the submarine missile force as well as expansion of bomber capabilities. 'By the 1990s', according to the US DOD publication *Soviet Military Power 1988*, 'assuming the continuation of the current modernization tempo, the Soviets will be in a position to field over 15,000 warheads.'³⁸ None the less, a number of systems are nearing the end of their production runs. 'The lower level of SLBM production since the early 1980s is due primarily to the production phase-out of older missiles and to the slower production of two new missiles [SS-N-20 and SS-N-23].'³⁹ In early 1988 the US DOD also reported that series production of fourth-generation Soviet ICBMs had ended.⁴⁰

ICBMs

During 1988 the USSR deployed approximately 25 new road-mobile single-warhead SS-25s and some 15 additional 10-warhead SS-24s. The SS-25 Sickle, which joined operational Strategic Rocket Forces regiments in 1985,⁴¹ increased to about 150 launchers during the year. The rail-mobile SS-24 Mod. 1 Scalpel, which began deployment in August 1987 near Arkhangelsk in the northern Soviet Union, has been much slower to emerge, with only 20 launchers (and 200 warheads) deployed at the end of the year.⁴² According to some analysts, the missile is still in the 'shakedown phase' prior to Full Operational Capability. On 12 May an explosion in a Soviet factory in Pavlograd may have impaired the production of rocket motors for the SS-24. What may prove to be an improved SS-24 Mod. 2 is also reported to be in development.⁴³ During 1988 and in previous years, as new SS-24 and SS-25

missiles were deployed, the USSR retired SS-11, SS-17 and SS-19 ICBMs to keep within the SALT Treaty limits.

In addition to the SS-24 Mod. 2 missile, a modification of the SS-18 ICBM (SS-18 Mod. 5) with increased accuracy is reported to be under development. This new missile, labelled TT-09 during flight-testing (and once thought to be earmarked for designation as the SS-X-26), had its first successful flight-test in December 1986, after two failures.⁴⁴ Flight-testing continued during 1987-88, and 'preparations for deployment of this missile are already underway'.⁴⁵ A third new ICBM—possibly a MIRVed version of the SS-25—reported to be under development in early 1987, has not progressed.⁴⁶

Strategic submarine programmes

Five Typhoon Class and four Delta IV Class ballistic missile submarines are estimated to be operational at the end of 1988, while the fifth unit of the Delta IV Class was launched in early 1988. One or two additional Typhoons are thought to be under construction. None of the Delta IV submarines has gone on patrol, but the system is considered by the USA to be operational.⁴⁷

Table 1.1. US strategic nuclear forces, 1989

Weapon system				Warheads		
Type	No. deployed	Year deployed	Range (km)	Warhead × yield	Type	No. deployed
<i>ICBMs</i>						
Minuteman II	450	1966	11 300	1 × 1.2 Mt	W56	450
Minuteman III (Mk 12)	200	1970	13 000	3 × 170 kt	W62	600
Minuteman III (Mk 12A)	300	1979	13 000	3 × 335 kt	W78	900
MX	50	1986	11 000	10 × 300 kt	W87	500
Total	1 000					2 450
<i>SLBMs</i>						
Poseidon	224	1971	4 600	10 × 50 kt	W68	2 240
Trident I	384	1979	7 400	8 × 100 kt	W76	3 072
Total	608					5 312
<i>Bombers^a</i>						
B-1B	97	1986	9 800	} ALCM SRAM Bombs	W80-1	1 614
B-52G/H	193	1958/61	16 000		W69	1 140
FB-111A	59	1969	4 700		^b	2 484
Total	349					5 238
<i>Refuelling aircraft</i>						
KC-135	615	1957	..	..	..	..

^a Bombers are loaded in a variety of ways, depending on mission. B-1Bs and B-52s can carry a mix of 8-24 weapons, and FB-111s can carry 6 weapons, excluding ALCMs and B53 and B28 bombs.

^b Bomber weapons include six different nuclear bomb designs (B83, B61-0, -1, -7, B57, B53, B43, B28) with yields from sub-kt to 9 Mt, ALCMs with selectable yields from 5 to 150 kt, and SRAMs with a yield of 170 kt.

Sources: Cochran, T. B., Arkin, W. M. and Norris, R. S., *Nuclear Weapons Databook, Volume 1: US Forces and Capabilities*, 2nd edn (Ballinger: Cambridge, Mass., 1989); Joint Chiefs of Staff, *United States Military Posture for FY 1989*; authors' estimates.

Table 1.2. US theatre nuclear forces, 1989

Weapon system				Warheads		
Type	No. deployed	Year deployed	Range (km)	Warhead × yield	Type	No. in stockpile
Land-based systems:						
<i>Aircraft^a</i>	2 250	..	1 060–2 400	1–3 × bombs	Bombs ^a	1 800
<i>Missiles</i>						
Pershing II	111	1983	1 790	1 × 0.3–80 kt	W85	125 ^b
GLCM	250	1983	2 500	1 × 0.2–150 kt	W84	325 ^b
Pershing 1A	72	1962	740	1 × 60–400 kt	W50	100 ^c
Lance	100	1972	125	1 × 1–100 kt	W70	1 282
Nike Hercules	27	1958	160	1 × 1–20 kt	W31	75 ^c
<i>Other systems</i>						
Artillery ^d	3 850	1956	30	1 × 0.1–12 kt	^d	1 540
ADM (special)	150	1964	..	1 × 0.01–1 kt	W54	150
Naval systems:						
<i>Carrier aircraft^e</i>	1 100	..	550–1 800	1–2 × bombs	Bombs ^e	1 450
<i>Land-attack SLCMs</i>						
Tomahawk	200	1984	2 500	1 × 5–150 kt	W80-0	200
<i>ASW systems</i>						
ASROC	..	1961	1–10	1 × 5–10 kt	W44	574
SUBROC	..	1965	60	1 × 5–10 kt	W55	285
ASW aircraft ^f	710	..	1 160–3 800	1 × <20 kt	B57	897
<i>Naval SAMs</i>						
Terrier	..	1956	35	1 × 1 kt	W45	290

^a Aircraft include US Air Force F-4D/E, F-16A/B/C/D and F-111A/D/E/F. Bombs include four types (B28, B43, B57, B61) with yields from sub-kt to 1.45 Mt.

^b Warheads will likely be placed in inactive reserve in the US stockpile.

^c Missiles are deployed with non-US NATO forces. Warheads are in US custody.

^d There are two types of nuclear artillery (155-mm and 203-mm) with four different warheads: a 0.1-kt W48, 155-mm shell; a 1- to 12-kt W33, 203-mm shell; a 0.8-kt W79-1, enhanced-radiation, 203-mm shell; and a variable-yield (up to 1.1 kt) W79-0 fission warhead. The enhanced-radiation warheads will be converted to standard fission weapons.

^e Aircraft include Navy A-6E, A-7E, F/A-18A/B and Marine Corps A-4M, A-6E and AV-8B. Bombs include three types with yields from 20 kt to 1 Mt.

^f Aircraft include US Navy P-3A/B/C, S-3A/B and SH-3D/H helicopters. Some US B57 nuclear depth bombs are allocated to British Nimrod, Italian Atlantic and Netherlands P-3 aircraft.

Sources: Cochran, T. B., Arkin, W. M. and Norris, R. S., *Nuclear Weapons Databook, Volume 1: US Forces and Capabilities*, 2nd edn (Ballinger: Cambridge, Mass., 1989); Joint Chiefs of Staff, *United States Military Posture for FY 1989*; authors' estimates.

The US DOD reported that two new Soviet SLBMs were under development and predicted that they 'should be well into developmental flight testing before 1990'.⁴⁸ A modified version of the SS-N-20 missile 'may begin at-sea flight testing' in 1988, and a 'modified version of the SS-N-23 missile will probably complete testing in 1988'.⁴⁹ There has been no additional information during 1988 about a new class of ballistic missile submarine which was reported in 1987 to be under construction.⁵⁰

Table 1.3. US nuclear warheads in Europe, 1965–92

Type	May 1965	Dec. 1981	Dec. 1988	After INF (1992) ^a
<i>Artillery</i>				
8-inch	975	938	738	240
155-mm	0	732	732	750
<i>Tactical SSMs</i>				
Lance	0	692	692	692
Pershing 1A	200	293	100	0
Pershing II	0	0	90	0
Honest John	1 900	198	0	0
Sergeant	300	0	0	0
<i>Nike Hercules SAMs</i>	990	686	75	0
<i>Bombs</i>	1 240	1 729	1 400	1 400
B57 NDB	–	192	192	192
<i>ADMs</i>	340	372	0	0
<i>GLCMs</i>	0	0	256	0
Total	5 945	5 832	4 318	3 274

^a TASM/SRAM-T and FOTL are planned for deployment in the mid-1990s.

Source: Authors' estimates.

Retirement of Yankee Class submarines continues, with one submarine retired in 1987 and one retired in 1988. This brings the Yankee deployment level down to eight submarines each in the Northern and Pacific Fleets.⁵¹ The US Navy reported in March that Yankee Class submarine patrols off the US coasts had ceased in late 1987, but intermittent patrols in the central Atlantic resumed in June 1988.⁵² Although some have speculated that the shift in patrols was to compensate for SS-20 missiles eliminated by the INF Treaty, the US Navy stated in June that the patrol reduction could be attributed primarily to 'deployment patterns as units of that class, and their older missile systems, reach the end of their active operational lives'.⁵³

Strategic bomber programmes

The Soviet intercontinental bomber force continues to improve and may play a more central role in the strategic force structure. Three bomber types were in production in 1988: Bear G (a modification of older Bear B/C aircraft), Bear H and Blackjack.

Older Bear B/C bombers continue to be modified to the Bear G model to carry the dual-capable, supersonic AS-4 Kitchen air-to-surface missile (ASM) rather than the nuclear-only AS-3 Kangaroo subsonic ASM. About 45 Bear Gs were operational at the end of 1988. The Bear G bombers, curiously enough, have also been reassigned to a theatre and maritime role, rather than continuing a strategic intercontinental bomber role. The bombers are assigned to the Irkutsk Air Army, which includes 25 Bear B/Cs and about 45 Bear Gs.⁵⁴

Table 1.4. Soviet strategic nuclear forces, 1989

Weapon system					Warheads	
Type	NATO code-name	No. deployed	Year deployed	Range (km)	Warhead × yield	No. deployed
<i>ICBMs</i>						
SS-11 Mod. 2	Sego	160	1973	13 000	1 × 1.1 Mt	160
Mod. 3		210	1973	10 600	3 × 350 kt (MRV)	630 ^a
SS-13 Mod. 2	Savage	60	1973	9 400	1 × 750 kt	60
SS-17 Mod. 2	Spanker	120	1979	10 000	4 × 750 kt (MIRV)	480
SS-18 Mod. 4	Satan	308	1979	11 000	10 × 550 kt (MIRV)	3 080
SS-19 Mod. 3	Stiletto	350	1979	10 000	6 × 550 kt (MIRV)	2 100
SS-24	Scalpel	20	1987	10 000	10 × 550 kt (MIRV)	200
SS-25	Sickle	150	1985	10 500	1 × 550 kt	150
Total		1 378				6 860
<i>SLBMs</i>						
SS-N-6 Mod. 3	Serb	240	1973	3 000	2 × 1 Mt (MRV)	480 ^a
SS-N-8 Mod. 1/2	Sawfly	286	1973	7 800	1 × 1.5 Mt	286
SS-N-17	Snipe	12	1977	3 900	1 × 1 Mt	12
SS-N-18 Mod. 1/3 Mod. 2	Stingray	224	1978	6 500	7 × 500 kt	1 568
			1978	8 000	1 × 1 Mt	
SS-N-20	Sturgeon	100	1983	8 300	10 × 200 kt	1 000
SS-N-23	Skiff	64	1986	7 240	4 × 100 kt	256
Total		926				3 602
<i>Bombers</i>						
Tu-95	Bear A	15	1956	8 300	2 bombs	30
Tu-95	Bear B/C	25	1962	8 300	4 bombs or 1 AS-3	100
Tu-95	Bear G	45	1984	8 300	4 bombs and 2 AS-4	270
Tu-95	Bear H	75	1984	8 300	8 AS-15 ALCMs or bombs	600
Tu-160	Blackjack	10	1988	..	6 AS-15 ALCMs and 4 bombs	100
Total		170				1 100
<i>Refuelling aircraft</i>	..	140–170	..	..	..	..
<i>ABMs</i>						
ABM-1B	Galosh Mod.	32	1986	320	1 × unknown	32
ABM-3	Gazelle	68	1985	70	1 × low yield	68
Total		100				100

^a SS-11 and SS-N-6 MRV warheads are counted individually.

Sources: Authors' estimates derived from: Cochran, T. B., Arkin, W. M., Norris, R. S. and Sands, J. I., *Nuclear Weapons Databook, Volume IV, Soviet Nuclear Weapons* (Ballinger: Cambridge, Mass., 1989); US Department of Defense, *Soviet Military Power*, 1st, 2nd, 3rd, 4th, 5th, 6th, 7th edns; NATO, *NATO-Warsaw Pact Force Comparisons*, 1st, 2nd edns; Berman, R. P. and Baker, J. C., *Soviet Strategic Forces: Requirements and Responses* (Brookings Institution: Washington, DC, 1982); US Defense Intelligence Agency, *Unclassified Communist Naval Orders of Battle*, DDB-1200-124-85, Dec. 1985; Congressional Budget Office, *Trident II Missiles: Capability, Costs, and Alternatives*, July 1986; Collins, J. M. and Victory, B. C., *U.S./Soviet Military Balance*, Library of Congress/Congressional Research Service, Report No. 88-425-S, 15 Apr. 1988; Background briefing on DOD, *SMP 1986*, 24 Mar. 1986; SASC/SAC, *Soviet Strategic Force Developments, Senate Hearing 99-335*, June 1985; Polmar, N., *Guide to the Soviet Navy*, 4th edn (US Naval Institute: Annapolis, Md., 1986).

Table 1.5. Soviet theatre nuclear forces, 1989

Weapon system					Warheads	
Type	NATO code-name	No. deployed ^a	Year first deployed	Range ^b (km)	Warhead × yield	No. deployed ^a
Land-based systems:						
<i>Aircraft</i>						
Tu-26	Backfire A/B/C	180	1974	4 000	1-3 × bombs or ASMs	360
Tu-16	Badger A/G	250	1954	3 100	1-2 × bombs or ASMs	250
Tu-22	Blinder A/B	120	1962	6 500	1-2 × bombs or 1 ASM	120
Tactical aircraft ^c		4 050	..	700-1 300	1-2 × bombs	3 230
<i>Missiles</i>						
SS-20	Saber	405	1977	5 000	3 × 250 kt	1 215
SS-4	Sandal	65	1959	2 000	1 × 1 Mt	65
SS-12	Scaleboard	135	1969/78	900	1 × 500 kt	405
SS-1c	Scud B	620	1965	280	1 × 1-10 kt	1 370
SS-23	Spider	239	1985	500	1 × 100 kt	90
..	FROG 7	370	1965	70	1 × 1-25 kt	200
SS-21 ^d	Scarab	130	1978	120	1 × 10-100 kt	1 100
SSC-1b	Sepal	100	1962	450	1 × 50-200 kt	100
SAMs ^e	..	7 000	1954-80	40-300	1 × low kt	4 000
<i>Other systems</i>						
Artillery ^f	..	6 760	1973-80	10-30	1 × low kt	2 000
ADMs	..	?	?	?	?	?
Naval systems:						
<i>Ballistic missiles</i>						
SS-N-5	Sark	36	1963	1 400	1 × 1 Mt	36
<i>Aircraft</i>						
Tu-26	Backfire A/B/C	140	1974	4 000	1-3 × bombs or ASMs	280
Tu-16	Badger A/C/G	170	1955	3 100	1-2 × bombs or ASMs	170
Tu-22	Blinder A	30	1962	6 500	1 × bombs	30
ASW aircraft ^g	..	375	1966-82	..	1 × depth bombs	400
<i>Anti-ship cruise missiles^h</i>						
SS-N-3 b/a,c	Shaddock/Sepal	228	1960	450	1 × 350 kt	120
SS-N-7	Starbright	90	1968	65	1 × 200 kt	44
SS-N-9	Siren	208	1969	280	1 × 200 kt	78
SS-N-12	Sandbox	200	1976	550	1 × 350 kt	76
SS-N-19	Shipwreck	136	1980	550	1 × 500 kt	56
SS-N-22	Sunburn	80	1981	100	1 × 200 kt	24
<i>Land-attack cruise missiles</i>						
SS-N-21	Sampson	4	1987	3 000	1 × 200 kt	16
SS-NX-24	?	0	1989?	<3 000	1 × n.a.	0
<i>ASW missiles and torpedoes</i>						
SS-N-15	Starfish	400	1973	37	1 × 10 kt	400
SS-N-16	Stallion		1979	120	1 × 10 kt	
FRAS-1	..	25	1967	30	1 × 5 kt	25
Torpedoes ⁱ	Type 65	575	1965	16	1 × low kt	575
	ET-80		1980	>16	1 × low kt	
<i>Naval SAMs</i>						
SA-N-1	Goa	65	1961	22	1 × 10 kt	260
SA-N-3	Goblet	43	1967	37	1 × 10 kt	
SA-N-6	Grumble	33	1981	65	1 × 10 kt	

^a For missile systems, the number is for operational or deployed missiles on launchers (see the Memorandum of Understanding of the INF Treaty, in *SIPRI Yearbook 1988*, appendix 13B).

^b Range for aircraft indicates combat radius, without refuelling.

^c Nuclear-capable tactical aircraft models include MiG-21 bis Fishbed L, MiG-23 Flogger B/G, MiG-27 Flogger D/J, Su-7B Fitter A, Su-17 Fitter C/D/H, and Su-24 Fencer A/B/C/D/E.

^d Includes SS-21s in GDR and Czechoslovakian units.

^e Nuclear-capable land-based surface-to-air missiles probably include SA-1 Guild, SA-2 Guideline, SA-5 Gammon and SA-10 Grumble.

^f Nuclear-capable artillery include systems of the three calibres: 152-mm (D-20, M-1976, 2S3 and 2S5), 203-mm (M55, 2S7 and M-1980) and 240-mm (2S4 and M-240). Some older systems may also be nuclear-capable.

^g Includes 95 Be-12 Mail, 45 Il-38 May and 60 Tu-142 Bear F patrol aircraft. Land- and sea-based helicopters include 115 Ka-25 Hormone and 60 Ka-27 Helix models.

^h Based on an average of 2 nuclear-armed cruise missiles per nuclear-capable surface ship, except for 4 per Kiev and Kirov Class submarine, and 4 per nuclear-capable cruise missile submarine, except for 12 on the Oscar Class.

ⁱ The two types of torpedo are the older and newer models, respectively, with the ET-80 probably replacing the Type 65.

Sources: Cochran, T. B., Arkin, W. M., Norris, R. S. and Sands, J. I., *Nuclear Weapons Databook, Volume IV, Soviet Nuclear Weapons* (Ballinger: Cambridge, Mass., 1989); Polmar, N., *Guide to the Soviet Navy*, 4th edn (US Naval Institute: Annapolis, Md., 1986); Department of Defense, *Soviet Military Power*, 1st, 2nd, 3rd, 4th, 5th, 6th, 7th edns; NATO, *NATO-Warsaw Pact Force Comparisons*, 1st, 2nd edns; Joint Chiefs of Staff, *United States Military Posture for FY 1989*; interviews with US DOD officials, Apr. and Oct. 1986; 'More self-propelled gun designations', *Jane's Defence Weekly*, 7 June 1986, p. 1003; Handler, J. and Arkin, W. M., *Nuclear Warships and Naval Nuclear Weapons: A Complete Inventory*, Neptune Paper no. 2 (Greenpeace/Institute for Policy Studies: Washington, DC, 1988).

The new production variant of the Bear bomber, the Tu-95 Bear H, has been deployed since late 1984, and 75 were deployed at the end of 1988. The Bear H, based at Dolon in Central Asia, is air-refuellable and carries the 1600-nautical mile (3000-km) range AS-15 Kent ALCM in internal bomb-bays. Production of the Bear H will probably be phased out in 1989-90. Routine intercontinental training missions and long-range anti-shipping operations by Bear G and Bear H bombers continued in 1988.⁵⁵ A new long-range aerial refuelling tanker, the Il-76 Midas, became operational in 1987, and may be used to increase the range of strategic bomber missions.

The Blackjack A supersonic bomber was declared operational in mid-1988, after about a decade in development, and some three years behind the schedule anticipated by the USA. In an important move as part of *glasnost* and improved US-Soviet relations, Secretary of Defense Carlucci and other US officials inspected a Blackjack bomber on 2 August during their visit to Kubinka Air Base, 40 miles (64 km) west of Moscow.⁵⁶

The Blackjack seems capable of carrying up to 6 AS-15 ALCMs and 4 bombs in two internal bomb-bays, and may eventually carry the AS-X-16 short-range attack missile (SRAM) or AS-X-19 supersonic ALCMs under development. The bomber inspected by Secretary Carlucci was equipped with six ALCMs in the forward bomb-bay; the aircraft is currently believed to be equipped with a combination of six ALCMs and four bombs.⁵⁷ According to *Soviet Military Power 1988*, 'Blackjack can cruise subsonically over long ranges, perform high-altitude supersonic dash, and attack utilizing low-altitude, high subsonic

Table 1.6. British nuclear forces, 1989^a

Weapon system				Warheads		
Type	No. deployed	Year deployed	Range (km) ^b	Warhead × yield	Type	No. in stockpile
<i>Aircraft</i>						
Tornado GR-1	220 ^c	1982	1 300	1-2 × 400/200 kt bombs ^e	WE-177A/B	155-175 ^f
Buccaneer S2B	25 ^d	1962	1 700	1 × 400/200 kt bomb	WE-177A/B	
<i>SLBMs</i>						
Polaris A3-TK	64	1982 ^g	4 700	2 × 40 kt	MRV	128
<i>Carrier-based aircraft</i>						
Sea Harrier						
FRS.1 ^h	42	1980	450	1 × 10 kt bomb	WE-177C	
<i>ASW helicopters</i>						
Sea King HAS 5	56	1976	-	1 × 10 kt depth bomb	WE-177C	25 ⁱ
Lynx HAS 2/3	78	1976	-	1 × 10 kt depth bomb	WE-177C	

^a British systems certified to use US nuclear weapons include 31 Nimrod ASW aircraft based in the UK, and 20 Lance launchers (1 regiment of 12 launchers, plus spares) and 135 artillery guns in 5 regiments (120 M109 and 15 M110 howitzers) based in FR Germany.

^b Range for aircraft indicates combat radius, without refuelling.

^c Some formerly nuclear-armed Buccaneer and Jaguar aircraft, withdrawn from bases in FR Germany and replaced by Tornado GR-1, may still be assigned nuclear roles in the UK.

^d Plus 18 in reserve and 9 undergoing conversion, probably the remainder from FR Germany.

^e The US Defense Intelligence Agency (DIA) has confirmed that the RAF Tornados 'use two types of nuclear weapons, however, exact types are unknown'. The DIA further concludes that each RAF Tornado is capable of carrying two nuclear bombs, on the two outboard fuselage stations.

^f The total stockpile of WE-177 tactical nuclear gravity bombs is about 180-200, of which 155-75 are versions A and B. All three weapons use the same basic 'physics package', and the yield is varied by using different amounts of tritium.

^g The Polaris A3-TK (Chevaline) was first deployed in 1982 and has now completely replaced the original Polaris A-3 missile (which was first deployed in 1968).

^h The US DIA has concluded that the Sea Harrier is not nuclear-capable, even though every British Defence White Paper since 1981 states that it is.

ⁱ The C version of the WE-177 bomb is believed to be assigned to selected Royal Navy (RN) Sea Harrier FRS.1 aircraft and ASW helicopters. The WE-177C exists in both a free-fall and depth bomb modification, by varying the fuzing and casing options. There are an estimated 25 WE-177Cs, each with a yield of approximately 10 kt (possible variable yield).

Sources: British Ministry of Defence, *Statement on the Defence Estimates*, 1980-88 (Her Majesty's Stationery Office: London, annual); Campbell, D., 'Too few bombs to go round', *New Statesman*, 29 Nov. 1985, pp. 10-12; US Defense Intelligence Agency, *Ground Order of Battle: United Kingdom*, DDB-1100-UK-85 (secret, partially declassified), Oct. 1985; Nott, J., 'Decisions to modernise U.K.'s nuclear contribution to NATO strengthen deterrence', *NATO Review*, vol. 29, no. 2 (Apr. 1981); International Institute for Strategic Studies, *The Military Balance 1988-89* (IIS: London, 1988); US Defense Intelligence Agency, various reports released under the Freedom of Information Act; Urban, M., *The Independent*: including Urban, M., 'Outdated nuclear bomb's credibility in question', *The Independent*, 16 May 1988, p. 5; Urban, M., 'Clarification', *The Independent*, 17 May 1988; authors' estimates.

penetration maneuvers'.⁵⁸ According to one naval intelligence specialist, the bomber may also have a maritime role.⁵⁹

According to the US DOD, 'The Soviets are developing reduced-signature technologies and may be testing these technologies in aircraft and other military systems. They may soon begin limited operational deployment of some

Table 1.7. French nuclear forces, 1989

Weapon system				Warheads		
Type	No. deployed	Year deployed	Range (km) ^a	Warhead × yield	Type	No. in stockpile
<i>Aircraft</i>						
Mirage IVP/ASMP ^b	18	1986	1 500	1 × 300 kt	TN-80	20
Mirage 2000N/ASMP	15	1988	1 570	1 × 300 kt	TN-81	15
Jaguar A ^c	45	1974 ^d	750	1 × 6–8/30 kt bomb	AN-52 ^e	50
Mirage IIIE ^c	15	1972 ^d	600	1 × 6–8/30 kt bomb	AN-52 ^e	35
<i>Refuelling aircraft</i>						
C-1325F/FR	11	1965	..	..	..	..
<i>Land-based missiles</i>						
S3D ^e	18	1980	3 500	1 × 1 Mt	TN-61	18
Pluton	44	1974	120	1 × 10/25 kt	AN-51 ^f	70
<i>Submarine-based missiles</i>						
M-20	64	1977	3 000	1 × 1 Mt	TN-61	64
M-4A	16	1985	4 000–5 000	6 × 150 kt (MIRV)	TN-70 ^g	96
M-4B ^h	16	1987	6 000	6 × 150 kt (MIRV)	TN-71	96
<i>Carrier-based aircraft</i>						
Super Etendard	36	1978	650	1 × 6–8/30 kt bomb	AN-52 ^e	40

^a Range for aircraft indicates combat radius, without refuelling, and does not include the 100- to 300-km range of the ASMP air-to-surface missile (where applicable).

^b On 1 July 1988, the last Mirage IVA bomber squadron was disbanded, the EB 2/94 'Marne' at Saint-Dizier. This left just two bomber squadrons operating the Mirage IVP aircraft, the EB 1/91 at Mont de Marsan and EB 2/91 at Cazaux. These Mirage IVPs are armed with the ASMP missile and will remain in service until 1996, when they will be disbanded.

^c The Mirage IIIE and Jaguar A aircraft were first deployed in 1964 and 1973, respectively, although they did not carry nuclear weapons until 1972 and 1974, respectively.

^d S3D ('Durcie') is the designation for the hardened S3 missile. The original S3 missile was deployed in 1980.

^e Gravity bombs for these aircraft include: the AN-52 warhead (incorporating the same basic MR 50 charge as that used for the Pluton SSM), reported to have 25- and 30-kt yields by CEA and DIA, respectively; and an alternate low-yield (6–8 kt) gravity bomb.

^f Warheads for the Pluton include the AN-51 (incorporating the same basic MR 50 charge as the AN-52) with a yield of 25 kt, and a specially designed alternate warhead of 10 kt.

^g The *Inflexible* will be the only SSBN to receive the TN-70. All subsequent refits of the M-4 into Redoutable Class SSBNs will incorporate the improved TN-71 warhead. The M-4As of the *Inflexible* will eventually also be changed to hold the TN-71, dockyard space and budgets permitting.

Sources: Commissariat à l'énergie atomique (CEA), 'Informations non classifiées sur l'armement nucléaire français', 26 June 1986; CEA, 'Regard sur l'avenir du CEA', *Notes d'Information*, Jan.–Feb. 1986, p. 7; CEA, *Rapport Annuel 1987*, pp. 77–79; US Defense Intelligence Agency (DIA), *A Guide to Foreign Tactical Nuclear Weapon Systems under the Control of Ground Force Commanders*, DST-1040S-541-83, 9 Sep. 1983, with CHG 1 and 2 (secret, partially declassified), 17 Aug. 1984 and 9 Aug. 1985; 'Dissolution', *Air Actualités*, no. 407, Feb. 1988, p. 8; *Rapport fait au nom de la Commission des Finances, de l'Économie Générale et du Plan sur le projet de loi de finances pour 1988 (no. 941)* (Assemblée Nationale: Paris, 9 Nov. 1987), Report no. 960, Annex 39: Défense Title V et VI, p. 18; *Jane's Fighting Ships*, 1988–89, p. 166; authors' estimates.

"stealth" technologies. The Soviets are believed to have built several test facilities to support their research and development activities'.⁶⁰ There was also one report during 1988 that the USSR might develop a long-range supersonic

Table 1.8. Chinese nuclear forces, 1989

Weapon system			Warheads		
Type	No. deployed	Year deployed	Range (km)	Warhead × yield	No. in stockpile
<i>Aircraft^a</i>					
B-5 (Il-28 Beagle)	15-30	1974	1 850	1 × bomb ^b	15-30
B-6 (Tu-16 Badger)	100	1966	5 900	1-3 × bombs	100-130
<i>Land-based missiles</i>					
DF-2 (CSS-1)	30-50	1966	1 450	1 × 20 kt	30-50
DF-3 (CSS-2)	75-100	1970	2 600	1 × 1-3 Mt	75-100
DF-4 (CSS-3)	~10	1971	4 800-7 000	1 × 1-3 Mt	10
DF-5 (CSS-4)	~10	1979	13 000	1 × 4-5 Mt	10
<i>Submarine-based missiles^c</i>					
JL-1 (CSS-N-3)	24	1983	3 300	1 × 200 kt-1 Mt	26-38

^a All figures for these bomber aircraft refer to nuclear-capable versions only. Hundreds of these aircraft are also deployed in non-nuclear versions.

^b Yields of bombs are estimated to range from below 20 kt to 3 Mt.

^c Two missiles are presumed to be available for rapid deployment on the Golf Class submarine (SSB). Additional missiles are being built for new Xia Class submarines.

Sources: Joint Chiefs of Staff, *Military Posture (annual report) FY 1978, 1982, 1983*; Department of Defense, *Annual Report for 1982*; Defense Intelligence Agency, *Handbook on the Chinese People's Liberation Army*, DDB-2680-32-84, Nov. 1984; Defence Intelligence Agency, 'A guide to foreign tactical nuclear weapon systems under the control of ground force commanders', DST-1040S-541-83-CHG 1 (secret, partially declassified), 17 Aug. 1984; US Congress, Joint Economic Committee, *Allocation of Resources in the Soviet Union and China* (annual hearing) 1976, 1981, 1982, 1983; Anderson, J., 'China shows confidence in its missiles', *Washington Post*, 19 Dec. 1984, p. F11; Lewis, J. W. and Xue, L., *China Builds the Bomb* (Stanford University Press: Stanford, Calif., 1988); Jencks, H. W., 'PRC nuclear and space programs', in ed. R. Yang, *SCPS Yearbook on PLA Affairs, 1987* (Sun Yat-sen Center for Policy Studies: Kaohsiung, Taiwan, 1988), chapter 8; authors' estimates.

cruise missile platform derived from the Tu-144 transport that could carry either the AS-15 or the AS-X-19.⁶¹

Strategic defence developments

The anti-ballistic missile (ABM) system around Moscow has now been upgraded from 64 old, reloadable, above-ground Galosh launchers, into a two-layer system that includes 100 improved silo-based Galosh exo-atmospheric missiles and new silo-based Gazelle high-acceleration endo-atmospheric missiles, plus a modernized array of early-warning, acquisition and battle-management radars.⁶² Modernization of modified and new missiles, with hardened silos, should be completed around 1989.⁶³

New nuclear-capable surface-to-air missile (SAM) forces continued to be deployed. The SA-10 Grumble, first introduced in 1980, continued in production and was deployed both around Moscow and in the Far East,

replacing the SA-1, SA-2 and SA-3 SAMs. The SA-X-12B Giant mobile SAM continued in testing but was still not deployed. According to the US DOD, both the SA-10 and the SA-X-12B have some capability against cruise and ballistic missiles.⁶⁴

Cruise missile programmes

During 1988, there was a significant downgrading and shift in the Soviet long-range cruise missile programme.⁶⁵ First, two ground-launched missiles under development, the subsonic SSC-X-4 and the supersonic SSC-X-5, were banned by the INF Treaty, and their development was halted.⁶⁶ This will undoubtedly affect the cost of their air- and sea-launched counterparts, the AS-15 Kent and SS-N-21 Sampson, respectively, which are deployed and continued in production during 1988. Fewer than 100 SS-N-21s and 660 AS-15s are estimated to have been deployed by the end of 1988. Two additional missiles, the sea-launched SS-NX-24 and the air-launched AS-X-19, continued under development. They are the supersonic counterparts to the SSC-X-5

The SS-N-21 Sampson, with a maximum range of 1600 nautical miles (2960 km), is capable of being launched from Akula, Sierra, Victor III and converted Yankee Notch Class attack submarines, and is believed to be operational in all but the Victor III.⁶⁷ The Yankee Notch Class submarine, a conversion from a former Yankee I Class ballistic missile submarine, was deployed in 1988. The larger supersonic SS-NX-24 will be flight-tested from another converted Yankee Class submarine (designated a cruise missile submarine, SSGN, rather than an attack submarine). The missile is 'expected to be operational in the next few years'.⁶⁸ The air-launched counterpart of the SS-NX-24, the AS-X-19 ALCM, continues under development for eventual deployment on the Blackjack, and possibly the Bear H. A new short-range attack missile for attacking terminal defences, and designated AS-X-16 by the West, is also in the early stages of development.

Soviet deployment of shorter-range cruise and anti-ship missiles continued at a steady rate during 1988. New naval platforms armed with the newer 550-km range SS-N-12 Sandbox, the 550-km range SS-N-19 Shipwreck and the 100-km range SS-N-22 Sunburn SLCMs were deployed during the year. These included Kirov and Slava Class cruisers, Udaloy and Sovremennyy Class destroyers, and the Oscar I Class cruise missile submarine. There were numerous reports during the year of a new nuclear-capable short-range tactical air-to-surface missile assigned to fighter aircraft, particularly the Su-24 Fencer. Although little information is available, the weapon may be either the AS-11 Kilter anti-radiation missile or the AS-14 Kedge.⁶⁹

Non-strategic nuclear forces

During the year the Soviet Union destroyed 525 missiles of four types, approximately 28 per cent of the 1846 total planned for elimination under the INF Treaty. Specifically, these included: 102 SS-20 Sabers (of 654), 304 SS-12M

Scaleboards (of 718), 39 SS-4 Sandals (of 149) and all 80 SSC-X-4 ground-launched cruise missiles. No SS-5 or SS-23 missiles were destroyed.

The elimination of the SS-20, SS-4, SS-12, SS-23 Spider and SS-20 follow-on missiles under the INF Treaty will have a significant impact on the structure of Soviet non-strategic nuclear forces. The 23-year-old SS-1c Scud missile, currently assigned to Army formations, will take on a more important role as 'the ground force's primary nuclear fire support means'.⁷⁰ Over 600 Scud launchers are deployed.⁷¹ The Scud missile will be augmented by the newer SS-21 Scarab, which began replacing FROG missiles in Soviet divisions in 1978, but has been deployed in far fewer numbers than the 660 FROG launchers. In 1988, a total of about 140 SS-21 launchers were deployed, an increase of only 10 over the number deployed in 1987.⁷² While initially the SS-21 was being deployed in Soviet divisions in the German Democratic Republic and Czechoslovakia to replace the FROG, the latest indications are that 'division-level SS-21 battalions are being consolidated into brigades in Soviet armies in [the GDR]'.⁷³ The SS-21 will therefore probably replace the Scud in the forward area. Over the long term, however, both the FROG and the Scud will probably have to be retired, as they are reaching obsolescence and will be 25 years old in 1990.

During 1988, the US DOD reported an increased number of refire missiles deployed in Eastern Europe by Soviet ground forces for their short-range missiles not constrained by the INF Treaty.

The refires for these launchers are estimated to have been increased by between 50 and 100 percent over the past several years. Consequently, the Pact has been able to plan on using these missiles, armed with non-nuclear warheads, to strike NATO air defenses, airfields, and command-and-control nodes without sacrificing their ability to plan on using the same missiles, if needed, in theater nuclear strikes.⁷⁵

Other systems may not be ideal to compensate for reductions under the INF Treaty. Long-range sea-launched cruise missiles have not yet been deployed in large enough numbers to indicate clearly whether they will have a future theatre strike role. Although there have been shifts in Yankee Class ballistic missile submarine patrols (see above), indications are that the Yankee continues to be retired as it has reached technological obsolescence. One of 12 Golf II Class ballistic-missile submarines assigned to regional missions was retired in 1987, and indications are that the remainder will be denuclearized and retired within a few years.⁷⁵ Soviet land-based ICBMs could be called upon for theatre missions. In fact, *Soviet Military Power 1988* points out that the SS-17 and SS-19 ICBMs are 'capable of flexible targeting: they can hit Eurasian as well as transoceanic targets'.⁷⁶ This, of course, has been the case for some 10 years.

The USSR continues to build about 30 Backfire C medium-range bombers per year and assign them to the Strategic Air Armies (SAA) and Soviet Naval Aviation (SNA). Some 320 Backfires are deployed, and the aircraft continue to replace Badger bombers in the Smolensk and Irkutsk Air Armies and SNA.⁷⁷ Most if not all of the Badger bombers will probably be replaced by Backfire bombers in the 1990s.⁷⁸ The number of more capable Backfires will be lower

than for the Badger, and individual Backfire regiments will be smaller than Badger regiments.

The Su-24 Fencer, the Soviet equivalent to the US F-111 fighter-bomber, also continues in production. At the end of 1988, some 850 Fencers had been deployed, assigned to the Legnica and Vinnitsa Air Armies and the Air Forces of the Military Districts/Groups of Forces.⁷⁹ Fencer E reconnaissance fighter-bombers have also been assigned to SNA since 1985.

Besides Backfire and Fencer, the emphasis in aircraft production continues to be non-nuclear fighter interceptors, with look-down, shoot-down capability and improved avionics and armaments systems: principally the MiG-29 Fulcrum A, MiG-31 Foxhound A and Su-27 Flanker B. The number of nuclear-capable fighter-bombers increased from 2100 in 1981 to 2900 in 1988, mostly Fencers, but also including some Fitters and Floggers.⁸⁰ Production of the Flogger ended in the mid-1980s, and production of the Fitter was 'cut drastically over the past several years'.⁸¹ The single-seat, twin-engine MiG-29 Fulcrum air-superiority fighter, first deployed in 1984 and similar to the US F-16 and F/A-18, may have a nuclear capability. Regiments have been activated in the GDR and Hungary.

Continued Soviet deployment of heavy, longer-range self-propelled artillery, replacing towed artillery and mortar systems, together with conversion of artillery battalions from six to eight batteries, is beginning to receive increased attention in the West.⁸² Production of nuclear-capable self-propelled artillery, according to the DOD, is at 'an all-time high'.⁸³ Towed artillery systems have now been completely replaced with self-propelled 122-mm 2S1 and 152-mm 2S3 guns in tank and motorized rifle divisions in the Western Theatre of Military Operations (*Teatr Voennykh Deistvii*, TVD), and newer 152-mm 2S5, 203-mm 2S7 and 240-mm 2S4 self-propelled guns are replacing older towed models in Front and Army artillery divisions and 'high power' brigades.⁸⁴ Although much of this development is related to providing greater protection and mobility for artillery crews on the battlefield, the larger-calibre, longer-range guns are also believed to possess a vastly improved nuclear capability. There is no evidence, however, of any greater Soviet emphasis on nuclear fire-support. On the contrary, conventional artillery tactics and munitions are receiving increased attention.

Naval nuclear forces

Three different classes of nuclear-powered attack submarine (SSN) were in production in 1988—Akula, Sierra and Victor III—as well as Kilo Class diesel-powered submarines.⁸⁵ All of the new nuclear-powered submarines are capable of firing both nuclear anti-submarine warfare weapons and torpedoes, and the SS-N-21 SLCM. New production of submarines, however, has been offset numerically by retirement of a significant number of diesel-powered submarines during the 1980s.⁸⁶ The third Akula Class submarine was launched in 1988. However, the submarine is still not fully operational. The first Akula hull, launched in 1984, was still undergoing sea trials in early 1988.⁸⁷ The Sierra Class, a follow-on to the Victor III, is now in series production. A single

Yankee Class SSN, converted from a ballistic missile submarine in 1983, is operational; with its updated fire control and sonar systems, it can 'launch a wider variety of weapons'.⁸⁸

The fourth and last of the Kiev Class aircraft-carriers, the *Baku*, was deployed in 1988. One notable change in the configuration of the ship is the absence of the SUW-N-1 launcher for the nuclear-armed FRAS-1 anti-ship/anti-submarine ballistic rocket. The *Baku*, which spent much of its first cruise at anchor north of Tunisia in the Mediterranean Sea, has a phased-array radar and an improved command and control suite which is much improved over the other ships of the Kiev Class.⁸⁹

Preparation of the first Soviet large-deck aircraft-carrier continues. The *Tbilisi* (formerly designated *Leonid Brezhnev* and *Kremlin*) continues to be fitted out and is expected by the USA to commence sea trials in 1989. Owing to problems of integrating and perfecting the catapult and arresting-gear system for use by conventional take-off and landing (CTOL) aircraft, the carrier is now accepted in the West as being 'designed for ramp-assisted aircraft launch',⁹⁰ and will accommodate vertical/short take-off and landing (V/STOL) aircraft. The Su-27 Flanker fighter interceptor is considered the prime candidate for CTOL, while a follow-on Yak-41 V/STOL jet aircraft is currently under development.

Four nuclear-capable major surface combatant types continued in production in 1988: the Slava and Kirov Class cruisers, and the Udaloy and Sovremennyy Class destroyers. The Ka-27 Helix helicopters, also nuclear-capable, 'are rapidly replacing' the Ka-25 Hormone on board Soviet ships.⁹¹

One of two Soviet wing-in-ground-effect vehicles under development—a turbofan-powered, aircraft/hovercraft—the Utkha Class, has been mentioned as a potential coastal defence nuclear-capable platform in the future.⁹² The Utkha Class may be capable of launching the SS-N-22 SLCM.

The Soviet military and *perestroika*

On 7 December 1988, President Gorbachev told the United Nations General Assembly that Soviet armed forces would be unilaterally cut by 500 000 soldiers and 10 000 tanks by 1991. In his speech, Gorbachev announced a number of specific and general changes, including: (a) removal of six tank divisions from the GDR, Czechoslovakia and Hungary, and the removal of 50 000 men and 5000 tanks from Eastern Europe; (b) removal of assault-landing and river-crossing troops and their equipment from Eastern Europe; (c) reduction of 5000 tanks in the western Soviet Union; (d) reduction of 8500 artillery guns; (e) reduction of 800 combat aircraft; (f) 'restructuring' of the remaining forces in Eastern Europe into a defensive posture; (g) removal of 'a major portion' of forces from Mongolia; and (h) conversion of two or three defence plants from military to civilian use in 1989.

Despite immediate scepticism expressed in the media that the cut-backs would involve relocation of troops rather than demobilization and that the destruction would only be of old military equipment, Maj. Gen. Yuri V. Lebedev, Deputy Chief of the General Staff Legal Directorate, stated that the divisions will be disbanded, and the military hardware, including 'the most

up-to-date tanks', and modern equipment would be destroyed.⁹³ General Vladimir Lobov, Deputy Chief of Staff of the General Staff, further stated on 14 December that one-fifth of the personnel cuts, amounting to 100 000 men, would be of professional officers, while the remainder would be conscripts.⁹⁴

In terms of diminishing the short-warning threat to Central Europe, the withdrawal of six Category One divisions from Eastern Europe (2040 tanks), and the armoured inventory equivalent to some nine additional tank divisions (3000 tanks) is most significant. The withdrawal of virtually all of the tanks of 14 forward-based tank divisions, as well as assault bridging equipment, seems to confirm Gorbachev's stated intention to 'restructure' Soviet forces to emphasize a defensive rather than an offensive posture.

The new defence posture, and the unilateral cuts, follow the adoption of a new military doctrine by the Soviet Union. In his 27th Party Congress speech in February 1986, Gorbachev espoused a new concept of military 'reasonable sufficiency', a concept which has come to mean achieving 'parity at a lower level'.⁹⁵ The concept of reasonable sufficiency as a new military doctrine was formally unveiled at a meeting of the Warsaw Treaty Organization on 28–29 May 1987 in East Berlin.⁹⁶ The new doctrine was advanced as purely 'defensive', with forces to be maintained that are sufficient for defence to 'reliably repel' aggressors. While continuing to call for a 'counteroffensive' in the face of attack,⁹⁷ it includes a pledge not to be the first to use military force. During Marshal Akhromeyev's visit to the United States in 1988, he 'insisted that the new doctrine means the Soviet Union will initially remain on the defensive for about twenty days while trying to negotiate a peace. If that fails, Soviet forces will have to launch a "counteroffensive"'.⁹⁸ The doctrine also identified no specific enemy and introduced a major new component—'a system of basic views on the prevention of war'—an aim not mentioned in previous doctrines and considered to belong to the sphere of foreign policy.⁹⁹

The concept of a military doctrine has a strict and serious meaning in the Soviet Union,¹⁰⁰ yet the reaction of many Western Soviet observers and the US DOD has been one of great scepticism. In the DOD's *Soviet Military Power 1988*, for instance, it was stated that 'there is no reason to conclude that "reasonable sufficiency" represents a renunciation or even an alteration of the inherently offensive Soviet military strategy'.¹⁰¹ Retired US Army General William E. Odom, former Director of the National Security Agency, wrote that 'Akhromeyev's concept of a defensive phase for a few weeks followed by counteroffensive is not a change of doctrine. It is a change of war plans'.¹⁰² These views were not shared by another US analyst of the Soviet military, retired Maj. Gen. Edward B. Atkinson, the former National Intelligence Officer for general-purpose forces, who wrote:

This is no casual event . . . We in the West, having no comparable unified theory underlying our strategic decisions, tend to be a bit cavalier in dismissing such changes as just more Marxist mumbo jumbo . . . [Soviet] military doctrine is the entire body of knowledge regarding the nature of war and the requirements of a state for the preparation of its people and armed forces . . . By no means could the paper adopted by

the Warsaw Pact PCC [Political Consultative Committee] be construed as a succinct statement of the entirety of the new doctrine; instead, it was a commentary on the doctrine.¹⁰³

The newly announced troop cuts and force restructuring flow from the adoption of a new military doctrine that emphasizes defence and war prevention, but Gorbachev has taken a number of other important steps which are indicative of concrete changes in the Soviet military.¹⁰⁴ He has: (a) implemented an 18-month unilateral moratorium on nuclear weapon testing; (b) accepted the US 'zero option' INF proposal, made concessions on the exclusion of British and French nuclear forces, added Soviet shorter-range missiles to the INF Treaty, and agreed to significant asymmetrical reductions and extensive on-site inspections; (c) agreed to make deep cuts in land-based long-range strategic nuclear missiles in concert with the United States; (d) agreed to and actually withdrew Soviet forces from Afghanistan; (e) presided over the opening of the national security policy debate to civilian scholars from think-tanks and non-governmental organizations; (f) made available a front-line MiG-29 Fulcrum fighter for observation and photography in Finland and at the Farnborough Air Show in the UK in September 1988; (g) opened Soviet bases to Western observers, including ABM installations around Moscow, an SS-11 missile silo, the Semipalatinsk nuclear test site, the Shikany chemical warfare centre and the Krasnoyarsk radar installation;¹⁰⁵ (h) opened Soviet bases to Western government inspectors, including Secretary of Defense Carlucci, who visited the Soviet Union on 1–3 August;¹⁰⁶ (i) succeeded in a major shake-up of Politburo members on 30 September 1988, including the retirement of President Andrei Gromyko, and the reorganization of the Central Committee from 22 Departments to six Commissions; (j) reduced naval deployments to the Caribbean, and arms deliveries to Nicaragua and Angola; and (k) reshuffled the Soviet military high command in July 1987 following the Cessna aircraft incident in Red Square, including the retirement of Defence Minister Sokolov.

In addition, Gorbachev has retired powerful military officers with their own followings, most notably Admiral Sergey Gorshkov, Commander-in-Chief of the Navy from 1956, and Marshal Nikolai Ogarkov, the former General Staff Chief, and Western Theatre Commander-in-Chief. In addition, there have been no promotions to the rank of Marshal since Gorbachev became the Soviet leader. Following the retirement of Marshal Sergey Akhromyev as Chief of the General Staff, Gorbachev appointed a relatively junior officer, Col. Gen. Mikhail Moiseyev, to the position.¹⁰⁷ Gorbachev's greatest deed, in fact, has been reinforcing the subordination of the Soviet military to Party and civilian control, and forcing limits on defence spending and overall influence in Soviet society by the military establishment. These developments clearly show that the changes in the Soviet military are internal in nature and not designed primarily for external propaganda purposes, as some in the West have claimed.

IV. British nuclear weapon programmes

During 1988 Britain's two main nuclear weapon systems remained deployed, while plans continued for their replacements. In the mid-1990s the Polaris SLBM/Chevaline A3-TK warhead system is scheduled to be replaced by the Trident II submarine and missile system. In the late 1990s the WE-177 tactical nuclear gravity bomb is scheduled to be replaced by a nuclear air-to-surface missile. While there was much discussion during the year about co-operative defence projects with France, all of these British nuclear weapon systems are being developed with the assistance of the USA.

British-French nuclear co-operation

In an attempt to forge a more European identity in the defence and security field, Britain and France discussed a number of proposals for greater bilateral military co-operation. In 1987 and early 1988 there were discussions about a possible British-French co-operative effort to develop an air-to-surface nuclear missile, perhaps based on a future version of the existing French Air-Sol-Moyenne-Portée (ASMP) tactical ASM, called the Air-Sol-Longue-Portée (ASLP). These talks were hailed as a promising sign of a new era of defence co-operation in Western Europe.

At the Anglo-French summit meeting in London on 29 January 1988 a number of other proposals were discussed. Accords were reached permitting British troops to use French lines of transportation (ports, airports, railways and highways) during reinforcement exercises of the British Army of the Rhine,¹⁰⁸ and permitting French nuclear missile submarines to call at British ports.¹⁰⁹ However, progress was limited on two other matters to which the French attached particular importance. One concerned the co-ordination of nuclear targeting by the two nations' nuclear-powered ballistic-missile submarine (SSBN) fleets; the other, the joint development of the ASLP missile.

Since the January 1988 summit meeting, the UK has become increasingly ambivalent towards the idea of co-operating with France on the development of the ASLP missile. Although a final decision by the UK will not be made until 1989, some sources claim that the proposed joint project is all but dead.¹¹⁰ Officials in both countries have balked at the cost and complexity of modifying the ASMP to meet the British Royal Air Force (RAF) requirements of increased range (500 km) and accuracy, and stealth features.¹¹¹ However, the commander of the French Strategic Air Force, Lt Gen. Philippe Vouigny, stated on 26 January 1988 that France and Britain were looking at a modified ASMP with a range of 800–1000 km, 'without degrading its stealthiness and its terminal accuracy'.¹¹²

The seeming demise of the joint ASLP project, and the failure to co-ordinate nuclear targeting by the two navies, appear to be due to political and strategic factors rather than to technological ones. British Prime Minister Margaret Thatcher is known to be concerned that a proliferation of special arrangements outside of NATO's formal structures could end up fragmenting the Alliance

and loosening the UK's connection to the USA.¹¹³ In the past Britain has been reluctant to undertake joint nuclear weapon programmes with France, which is not part of the military structure of NATO, preferring instead bilateral co-operation with the USA.

The WE-177 tactical nuclear bomb and its replacement

It has been known for some time that Britain's stockpile of some 180–200 tactical nuclear WE-177 gravity bombs is scheduled for replacement. The WE-177, first deployed in the late 1960s, will have exceeded its service lifetime by the late 1990s. On 16 May 1988, British Defence Secretary George Younger confirmed that the WE-177s would be replaced by a 'stand-off' air-to-surface missile, in part because improved Soviet air defences challenge aircraft that must penetrate the WTO airspace to strike targets at long range.¹¹⁴

Of the approximately 180–200 WE-177 bombs originally manufactured, the majority have been allocated to the RAF strike/attack aircraft assigned tactical nuclear missions. Currently the RAF Tornado GR-1 is the primary aircraft in this category, nine squadrons of which are stationed in the FRG and Britain. A limited number of WE-177s are allocated to RAF Buccaneer S2B aircraft, two squadrons of which are in Britain. Tornado and Buccaneer aircraft can carry two versions of the WE-177 bomb, reportedly called A and B, with 400-kt and 200-kt yields, respectively.¹¹⁵

A third version of the WE-177 bomb is reportedly the C,¹¹⁶ and is a nuclear depth bomb carried by select Royal Navy carrier-based Sea Harrier FRS.1 strike aircraft and anti-submarine warfare (ASW) helicopters.¹¹⁷ There are an estimated 25 WE-177s of the C version, each with a yield of approximately 10 kt.¹¹⁸

Britain's choices are really only two: either the ASLP missile to be developed with France (discussed above), or the US-made SRAM-T. Since co-operation with France now seems unlikely, and it would be too expensive for the UK to develop a missile by itself, especially in small numbers, this would leave some form of co-operation with the USA as the only real alternative.

Trident

Prime Minister Thatcher announced in March 1988 that the first Trident will enter service in 1993–94.¹¹⁹ Two of the eventual four Trident SSBNs have been ordered thus far. The official estimate of the cost of the Trident programme, covering the period 1980–2000, is £9.043 billion (at 1987–88 prices), 17 per cent lower than the original estimate of November 1981.¹²⁰ Approximately £3.229 billion will be spent in the USA.¹²¹ Britain is currently spending at a rate of about £933 million per year. As of May 1988 £3.5 billion had been committed and £1.5 billion spent.¹²²

The most severe problem of the Trident programme concerns production facility A90, at Aldermaston, which is to be used for production of plutonium and uranium fissile material for Trident warheads. Following reported delays in the construction of the A90 production facility in January 1988,¹²³ there have

been further revelations concerning this facility. It has now been confirmed that the A90 plant will not start production of warhead components until 1992, at least two years later than planned. As a result more fissile material will have to be made in the old facilities at Aldermaston, which, as they are less efficient, will lead to delays and further increases in cost. This raises the possibility of the first two Trident submarines being put to sea with fewer than 100 warheads each.¹²⁴

Britain and arms control

Since the December 1987 US–Soviet summit meeting the British Government has made several official statements about its independent nuclear forces, indicating a reluctance to have its warheads included in the START negotiations, based upon its claim of a small British strategic arsenal.

The British position on the role of its nuclear forces in strategic arms negotiations remains that, if Soviet and US strategic arsenals were to be very substantially reduced, that is, by much more than 50 per cent, and if no significant changes occur in Soviet defensive capabilities, then ‘we would want to consider how we could best contribute to arms control in the light of the reduced threat’.¹²⁵ The British Government considers that the priority in strategic arms negotiations must thus be reductions in US and Soviet arsenals, which amount to ‘some 95% of the world-wide total’.¹²⁶

The UK stated in 1988 that it should not have its SLBM warheads included in any arms control forum because, ‘even after a 50% Soviet reduction in strategic warheads, and the introduction of Trident, the British deterrent would still represent a smaller proportion of Soviet strategic offensive warheads than did Polaris when it entered full operational service in 1970’.¹²⁷ A February 1988 statement by British Foreign Secretary Geoffrey Howe said that the British Polaris force represented about 3 per cent of the ‘Soviet deterrent capability’ in 1970.¹²⁸

V. French nuclear weapon programmes

Since the US–Soviet INF Treaty of December 1987, France has gone to great lengths to advertise the importance of its nuclear forces. According to the official publication *Revue Aérospatiale*, an indirect effect of the INF Treaty has been to ‘upgrade the French nuclear deterrent, since the American withdrawal leaves France as the only European power with a comprehensive “pre-strategic” and strategic nuclear armament’, giving France an ‘enhanced political role’.¹²⁹

As part of this self-perceived role, France has attempted to create a European identity in the defence and security field. The French Minister of Foreign Affairs, Jean-Bernard Raimond, stated that France ‘cannot . . . confine herself within her frontiers and behave like a “nuclear Albania” in Europe’.¹³⁰ France has thus renewed security agreements with the FRG and has attempted to forge a level of nuclear co-operation with the United Kingdom, including the proposed joint development of a nuclear air-to-surface missile.

France has also become more forthcoming with details of its nuclear forces. Included in this new openness have been extensive statements to the press during 1988 by the commanders of France's various nuclear commands. For example, the commander of the ballistic missile submarine force (FOST, see below) declared in September that 'the [SSBN] system works and it is in our interest to let everyone know it'.¹³¹ Similar statements were made by other nuclear commanders during 1988. Additionally, breaking with past practice, the French Government has decided henceforth to announce at the end of each year the number of nuclear tests it has conducted during the previous 12 months (see also chapter 2).¹³²

Defence budget

Even though the proposed 1989 defence budget calls for a 4.6 per cent increase in overall spending, it has also become increasingly apparent that France cannot afford the ambitious modernization plans set forth in the 1987-91 five-year budget. Instead of cancelling programmes outright, France has stretched out the expenditures over a longer period of time, which delays the introduction of a number of major nuclear weapon programmes.

Of the systems planned for the 1990s, heavy emphasis and resources are being placed on a new generation of ballistic missile submarines (Triomphant Class), considered the heart of French nuclear forces. According to Defence Minister Jean-Pierre Chevenement, the cost of the Triomphant programme will begin to have an impact upon the 1989 military budget and future ones. The new submarine will be financed to the detriment of other programmes, in particular the S4 land-based missile programme, temporarily suspended and no longer considered a 'major priority'.¹³³ Other programmes have also been delayed, including the M-5 SLBM and the *Charles de Gaulle* nuclear-powered aircraft-carrier.

Force Océanique Stratégique

It is estimated that the six French ballistic missile submarines have completed some 223 operational patrols since the first SSBN entered service in 1971.¹³⁴

During 1988, the commander of the Force Océanique Stratégique (FOST), Vice Admiral Michel Merveilleux de Vignaux, disclosed details on the availability and deployment of French submarines. Speaking during a visit to the FOST base at Ile Longue, he stated that during the month of September the SSBNs *Redoutable*, *Tonnant* and *Inflexible* were on patrol, with a fourth, *Foudroyant*, at dockside for repairs at Ile Longue, but able to join the other three SSBNs at two days' notice.¹³⁵ Vice Admiral de Vignaux further disclosed, for the first time, details of French SSBN patrol areas. In reference to the above three SSBNs, he stated that the patrol areas included the North Atlantic, the Mediterranean and the Norwegian Sea.¹³⁶

In other developments, a third SSBN, *L'Indomptable*, is expected to be refitted with the M-4 missile (replacing M-20s), and put to sea in July 1989. In 1987 the French Atomic Energy Commission (CEA) began the fabrication of

the TN-71 warheads for *L'Indomptable*.¹³⁷ This will give the French SSBN force a total of 336 warheads and an estimated total yield of 91.2 Mt.¹³⁸ An unexpected 19 per cent increase in research costs for the six Triomphant Class submarines has caused the IOC to slip from 1994 to 1996.¹³⁹

The initial missile to be carried by the first two Triomphant Class submarines is to be a modified M-4 missile.¹⁴⁰ The CEA has been researching the new TN-75 warhead for this missile for some time,¹⁴¹ and work continued through 1988.¹⁴² The 1989 budget will fund work on this modified M-4 missile, now referred to as the M-45 SLBM,¹⁴³ recently defined by Defence Ministry officials as an interim step between the M-4 and M-5 missile systems. The M-45 will incorporate the propulsion stages of the M-4 missile and new penetration aids planned for the M-5.¹⁴⁴ Owing to financial constraints, the M-5 SLBM programme is also being delayed by two to three years, according to defence officials.¹⁴⁵ Although the M-5 is not scheduled for introduction until the year 2002, it is still planned to be deployed on the third submarine of the Triomphant Class.

S4 IRBM

Development of the S4 intermediate-range ballistic missile (IRBM) continued in 1988, although its future remains uncertain. The S4 IRBM had been expected to enter service in 1996, replacing S3D missiles currently in silos in south-eastern France.

On 26 January 1988, Lt Gen. Philippe Vougny, commander of the French Strategic Air Force, gave some indication of the eventual yield of the S4 when he said that 'the estimated firepower of 18 S4s will be at least equivalent to the combined firepower of the present 18 S3Ds and 18 Mirage IVP bombers armed with ASMP missiles'.¹⁴⁶ This would mean that the yield of 18 MIRVed S4s would be at least 23 Mt.¹⁴⁷ Although the number of warheads the missile will carry is not known, the CEA did disclose its designation, the TN-35, stating that it was still being designed.¹⁴⁸

In April 1988, the French Minister of Defence awarded Aérospatiale the contract for the initial development phase of the S4, although the final decision has not been made on whether it will be mobile or placed in existing S3D silos.¹⁴⁹

In September Defence Minister Chevenement revealed that the S4 programme was temporarily suspended, owing to financial constraints on the proposed 1989 defence budget. Since then the French Defence Ministry has been considering more economical alternatives, such as an S4 multiple-warhead land-based missile derived from the M4 SLBM. In 1985 Defence Minister Charles Hernu proposed a land-based M4 instead of the mobile S4.¹⁵⁰ The fate of the S4 project will most likely be decided in the spring of 1989.

'Pre-strategic' weapons

When deployed, the Hadès short-range ballistic missile (SRBM) and ASMP missiles will provide French land and air forces with greater operational

flexibility. The Hadès and the ASMP, scheduled to replace the Pluton missile, and AN-52 and AN-22 bombs, respectively, will provide a significant increase in range and accuracy. According to French Prime Minister Jacques Chirac these new tactical weapons will 'broaden our strategy'.¹⁵¹ France considers pre-strategic forces to be used as a 'specific, efficacious and limited' nuclear warning,¹⁵² but the new weapons will 'allow for in-depth use'¹⁵³ and be able to 'penetrate the adversary's capabilities as deeply as possible'.¹⁵⁴

Development of the Hadès continued in 1988 with the first flight-test conducted on 22 November 1988.¹⁵⁵ The 500-km range Hadès will replace the 120-km Pluton and is expected to enter service in 1992. The French Army plans to purchase 180 Hadès missiles. The missile is dual-capable and could carry a 10- to 25-kt nuclear warhead, an enhanced-radiation warhead (ERW, or neutron bomb), a conventional warhead or, potentially, chemical agents.

France has been developing an ERW warhead since the early 1980s, purportedly for use on the Hadès missile. Once again in 1988, President François Mitterrand stated that France fully understands the technical secrets of the ERW, and that if he gave the order to manufacture it, 'we can do it'.¹⁵⁶ According to Mitterrand, 'there is no prohibition [concerning the ERW] . . . this weapon must join the French armoury if the threat grows more definite'.¹⁵⁷

French politicians have tried to make the ERW more palatable by referring to it as a 'limited collateral effects weapon', or 'weapons having minor side-effects'. President Mitterrand stated: 'its capacity . . . is much more akin to those artillery bombardments we experienced in the other wars than to a nuclear-type explosion'.¹⁵⁸ This, of course, is not true; even very-low-yield ERW warheads are vastly more destructive than any conventional artillery systems. Mitterrand also stated that he 'would not rule out' a review of the project if other countries began negotiating on short-range nuclear forces,¹⁵⁹ assuming he 'approve[d] of the terms on which disarmament would materialize'.¹⁶⁰

Mirage 2000N

During 1988 Mirage 2000N aircraft entered operational service with the Tactical Air Force (FATAC). The first 11 Mirage 2000N aircraft arrived at Luxeuil AB on 30 March 1988 and officially entered service with l'Armée de l'Air on 1 April 1988. The first 15 Mirage 2000N aircraft went on operational alert with the Dauphiné squadron of the 4th Fighter Wing at Luxeuil Air Base (Haute-Saône) on 1 July 1988, replacing Mirage IIIE aircraft armed with the AN-52 gravity bomb.¹⁶¹ Eventually the Mirage 2000N will replace 75 Mirage IIIE and Jaguar A aircraft in five squadrons in the tactical nuclear role.

The Mirage 2000N nuclear attack aircraft is a two-seat derivative of the basic Mirage 2000 fighter and incorporates a terrain-following electronics package for all-weather, low-altitude, high-speed penetration. The aircraft is also 'hardened' against nuclear effects. The primary armament of the Mirage 2000N is the ASMP supersonic medium-range air-to-surface nuclear missile. The CEA began manufacturing the TN-81 warheads for these ASMP missiles in 1987.¹⁶²

The remaining four squadrons will be converted to Mirage 2000Ns, at the rate of one a year. The next one will be converted during 1989: the Luxeuil-based La Fayette squadron now flying the Mirage IIIE.¹⁶³ The most recent plan appears to be that only 45 Mirage 2000Ns will be armed with ASMPs.¹⁶⁴ The remaining Mirage 2000Ns could carry nuclear gravity bombs or even 'smart' conventional munitions.¹⁶⁵

Naval aviation

Eventually 24 Super Etendard carrier-based aircraft will be equipped with the ASMP missile. The aircraft-carrier *Foch* (which went to sea on 1 June 1988 following a 16-month overhaul) was converted to 'handle and store' the ASMP for its Super Etendard aircraft.¹⁶⁶ The ageing aircraft-carrier *Clemenceau* will not be converted to carry the ASMP missile,¹⁶⁷ although it is still equipped to handle the AN-52 bomb. The new nuclear-powered carrier *Charles de Gaulle*, being built at Brest, will be able to 'handle and store' the ASMP for carriage by Super Etendard aircraft beginning in 1997.¹⁶⁸

France and arms control

France continues to refuse to participate in any nuclear arms control negotiations. In March 1988 French Minister of Defence André Giraud made it clear that in any possible arms control agreements, 'nuclear weapons should be the last to go, and it is from Europe that they should go last'.¹⁶⁹

With reference to the possibility of the inclusion of any French weapons in an INF-type arms reduction agreement, French Prime Minister Jacques Chirac has stated that 'there is obviously no question of [France's] prestrategic weapons being brought up in any discussion whatsoever'.¹⁷⁰

France also refuses to participate in the START negotiations. According to Giraud, the USSR and the USA together account for 98 per cent of the world strategic nuclear stockpile, so that even a 50 per cent cut in the superpowers' strategic armaments levels would leave them with about 96 per cent of the total stockpile.¹⁷¹ Thus, according to President Mitterrand, 'even a 50% reduction in strategic arms . . . would not be enough' to convince France to put its weapons on the negotiating table.¹⁷²

VI. Chinese nuclear weapon programmes

The most significant nuclear weapon-related development of 1988 in China was the prospect of improved relations with the USSR. Chinese relations with the USSR took a notable turn for the better in early December when Chinese Foreign Minister Qian Qichen went to Moscow to meet with Foreign Minister Eduard Shevardnadze. Both sides discussed, *inter alia*, a number of security and arms control topics and agreed to have another meeting in early 1989 in preparation for the first Sino-Soviet summit meeting in some 30 years.¹⁷³ President Gorbachev is scheduled to travel to Beijing in May 1989 to meet with Deng Xiaoping, Chairman of the Central Military Commission and China's

paramount leader. This improvement in Sino-Soviet relations—which have at times been bitterly strained during the past two decades—could help to relax regional military tensions and competition and thus to obviate incentives for China to proceed with some nuclear weapon programmes. The USSR has been China's major military adversary since the late-1960s, and it is believed that most, if not all, Chinese nuclear weapons are targeted on the Soviet Union.¹⁷⁴

Nevertheless, China proceeded with a number of nuclear weapon-related developments in 1988 that suggest no lack of interest in continuing to modernize its nuclear forces. Most prominent among these developments were a nuclear weapon test believed to be its first of a neutron bomb and a test of a submarine-launched ballistic missile. The most significant events of 1988 are described below.

Nuclear test

On 29 September 1988, China conducted a nuclear explosion at its Lop Nur test site in Xinjiang Province. It was estimated by foreign seismic experts to be a very-low-yield explosion, perhaps below 1 kt and well below 5 kt. This test was similar in size to the Chinese test of 19 December 1984, but unlike previous nuclear weapon tests this explosion was reported in the Western press to be of an enhanced-radiation or so-called neutron bomb design.¹⁷⁵ If this is true it would confirm the existence of a Chinese effort to develop distinctly tactical nuclear weapons that could be used, for example, against adversary armour and troop formations. This would mark a considerable departure from the visible thrust of Chinese nuclear weapon programmes that have previously concentrated on relatively long-range weapon delivery systems (above 1000 km) that would be targeted on foreign territory, most likely against cities. It would also tend to belie Chinese assertions that China wants to have only a minimal nuclear force.¹⁷⁶ Tactical nuclear weapons could be delivered by existing aircraft or missile systems, or possibly by future systems under development in China.

SLBM test

On 27 September 1988, China launched a ballistic missile on a test-flight from a nuclear-powered Xia Class ballistic-missile submarine to a target area in the East China Sea.¹⁷⁷ The missile flew about 1400 km to the SLBM impact area 400 km south-east of Shanghai and 400 km north-west of Taiwan. This is the second known submarine launching of an SLBM since 1982, when a CSS-N-3 missile was first launched from a submerged Golf Class training submarine. (An SLBM test launch on 15 October 1985, probably a CSS-N-3 launched by a Xia Class SSBN, was barely reported by official Chinese sources, although the test personnel were reportedly commended by Deng Xiaoping for increasing the missile's range and 'multiple targeting ability'.¹⁷⁸ Given the notably small publicity it received, the 1985 test may have been considered a failure.¹⁷⁹) The SLBM launched in 1988, which Chinese officials heralded as a great success, is presumed to be a CSS-N-3—the missile designed for the Xia Class submarine

and China's only known SLBM. In 1988 several official Chinese sources reported that China is working on a new SLBM, variously saying that the Navy is 'developing new submarine-carried strategic missiles' and 'developing a new type of submarine-launched strategic missile'.¹⁸⁰

Although China has claimed for some years that its SSBN force was operational,¹⁸¹ the fact that a Xia Class submarine had not been credited with a single SLBM launch may have led to doubts that China's strategic submarines *were* in fact operationally deployed. For example, in his testimony to the US Congress in March 1988, Admiral William Studeman, Director of Naval Intelligence, stated that the USSR would perceive a threat from 'Chinese SSBNs *when* they become operational'.¹⁸² Since an operational test launch of an SLBM can be considered the major and final milestone in developing a working missile submarine fleet, the successful test launch in September should demonstrate that China's SSBNs are capable of operation. According to a Chinese radio broadcast, a senior officer of the Second Artillery Corps, China's nuclear weapon command, told reporters in January 1988 that 'many successful firing practices were proof that China's strategic missile corps already had a fair-sized nuclear retaliatory capacity'.¹⁸³ And the *People's Daily* reported in August that 'the Chinese Navy is now armed with both tactical guided missiles and strategic nuclear missiles'.¹⁸⁴

China announced on 7 September 1988 that it would conduct carrier rocket tests during the period 14 September–3 October, and urged governments to keep their ships and aircraft out of the usual target area for SLBM test launches—an area centring on 123.53° N and 28.13° E with a 35 nautical-mile (65 km) radius—from 10:00 until 17:00 every day.¹⁸⁵ The test launch was well publicized, as reporters from the official Chinese news agency Xinhua and radio services were apparently permitted to observe and report on the launch from an observation ship and from the submarine itself.¹⁸⁶ These reports devoted considerable detail to the description of the launch procedure and missile performance. The commander-in-chief of the test launch was quoted as saying, 'Compared with the 1982 submarine launch of a carrier rocket, this successful underwater launch of the carrier rocket by a nuclear submarine has made a great technological breakthrough, marking a new leap in modernization of China's national defense'.¹⁸⁷

Nuclear exercises

Although the Government of China has lately de-emphasized the risk of nuclear war, the Chinese military (the People's Liberation Army, or PLA) seems determined to keep practising for nuclear combat. A considerable number of exercises have recently been described as being conducted 'under nuclear conditions'. These exercises usually include at least one simulated nuclear explosion and have taken place over land and, more recently, at sea—mostly in short-range tactical combat situations.

In 1988 several such nuclear exercises were reported by official Chinese sources. In late June, a navy exercise at an unnamed navy base in the East China Sea began with a 'huge simulated mushroom cloud' followed by mock

nuclear and chemical bombing attacks by 'enemy' air forces on the base.¹⁸⁸ This exercise was specifically intended to 'study and discuss the characteristics and rules of defensive war under nuclear conditions'. A report from aboard a frigate, probably during the same exercise, described the nuclear decontamination procedure used after a simulated nuclear attack.¹⁸⁹ The vessel is reportedly designed to withstand nuclear fall-out and chemical agents. Given that the Chinese political and Communist Party authorities have officially declared their belief that nuclear war seems very unlikely for the remainder of the century,¹⁹⁰ it is interesting to note the military emphasis on training for nuclear war.

Missile and rocket developments

China achieved considerable notoriety in 1988 for its sale of ballistic missiles to Saudi Arabia and for reports that it offered a shorter-range missile to other nations (see also chapter 7). It was revealed in March that China had previously concluded an agreement to transfer dozens of DF-3A ballistic missiles to Saudi Arabia. These missiles, known in the West as the CSS-2, were originally developed for and deployed with nuclear warheads by China, so there was considerable international concern about the nuclear proliferation (and other) dangers of such a deal.¹⁹¹ China reportedly told the USA that the missiles had been modified to carry conventional warheads, thus reducing their range, and that China does not transfer nuclear weapon technology to other nations.¹⁹² Saudi Arabia felt compelled to disavow any interest in nuclear weapon capabilities and announced that it would sign the Non-Proliferation Treaty (NPT), which it did on 3 October (see also annexe A). The missile agreement came as a surprise to many nations because Saudi Arabia did not even have diplomatic relations with China prior to the deal.

The sale of the DF-3A missiles demonstrates that these missiles were considered expendable to China, because they had either been removed from operational service or taken from undeployed stockpiles. The DF-3 has been the backbone of China's nuclear missile force since the mid-1970s and still forms the bulk of its nuclear weapon capacity. China is apparently moving towards replacing some of its ballistic missiles. One Chinese source stated in July that 'China will develop a new generation of strategic and tactical missiles'.¹⁹³

Another case involving the potential transfer of Chinese ballistic missiles concerned reports that China was planning to sell to Syria—and possibly to other Middle Eastern nations—short-range missiles known in the West as the M-9.¹⁹⁴ The M-9 has been under development for several years, and it is believed to be intended both for the Chinese military and for export.¹⁹⁵ The domestic version is considered in the West to be a nuclear missile. Selling the missile overseas would help offset the cost of developing and deploying a Chinese version. It was reported that the missile was still under development and had not been sold to any nation. A number of senior US officials discussed the issue of ballistic missile proliferation with Chinese leaders in Beijing during the summer and autumn of 1988.¹⁹⁶ The result of these meetings seemed to

satisfy the USA that China understood US concerns and would not act in a manner that destabilized the region.

Aerospace developments

During 1988, China achieved a number of important results in aerospace endeavours that are linked to its military and nuclear weapon programmes. In recent years China has devoted increasing resources to economic modernization, and space industry is one of its leading technology sectors. While most of the space-related programmes are outwardly commercial, many are directly applied to military research, development and operations that are central to the nuclear weapon programme.

On 7 September, China launched a new rocket—the Changzheng 4, or CZ-4—that delivered China's first weather satellite into orbit (see also chapter 3).¹⁹⁷ Although this rocket is being marketed for commercial purposes—launching foreign satellites—the technology it uses is the same as for intercontinental ballistic missiles. In fact, the rocket's predecessor was developed from a Chinese ballistic missile, as are all Chinese rockets, thus demonstrating an interesting 'spin-off' cycle from the military to civilian fields and now possibly back to the military. The CZ-4 is said to be suitable for multiple satellite launches, a capability which would permit some research into multiple re-entry vehicles (MRVs) or even multiple independently targetable re-entry vehicles for Chinese ballistic missiles without an overt MIRV programme. The high reliability of China's space launch vehicles suggests that its ballistic missiles must also be considered quite reliable.

The 'experimental meteorological satellite' Fengyun 1 (FY-1) launched by the CZ-4 will provide China with its first indigenous satellite weather monitoring and forecasting capability.¹⁹⁸ The improved weather information will be valuable to China's nuclear forces since it is crucial for nuclear operations to have the most accurate weather data possible. The State Council and the Central Military Commission sent congratulations to the civilian and military specialists who developed, tested and launched the satellite.

As part of its increased space launch and missile test activities, China completed the modernization of its two astronautic survey ships in 1988. These two Yuanwang Class ships were built to monitor and track ballistic missile flights, track satellites in orbit and monitor satellite launches such as the FY-1 launch. They have formed the core of China's first ocean-going fleet, since they must sail several thousand kilometres to observe ICBM test-flight re-entry. The first ship-borne satellite communication terminals were installed on the ships, thus permitting direct communication between the ship and command centres on the mainland.¹⁹⁹ One Chinese expert called the ships 'combat worthy'.²⁰⁰

While none of these programmes has the outward appearance of any relationship to China's nuclear weapon programme, each will be an important component of any future modernization of China's nuclear forces.

Notes and references

¹ Further indications of improved relations were a variety of meetings between high military officials. These have included: (a) a Dec. 1987 visit by Marshal Sergey Akhromeyev to the Pentagon hosted by Chairman of the Joint Chiefs of Staff Admiral Crowe; (b) on 16–17 Mar. 1988 Secretary of Defense Carlucci and Soviet Defense Minister Dmitri T. Yazov met for 10 hours in Bern, Switzerland; (c) Secretary Carlucci and Minister Yazov met again during the Moscow summit meeting in May; (d) Marshal Akhromeyev made a six-day visit on 6–11 July to military facilities in the USA, culminating in an announcement that steps would be taken to avoid unintended military confrontations. In addition a two-year programme of US–Soviet military exchanges were worked out; and (e) Secretary Carlucci visited military facilities in the Soviet Union on 1–4 Aug.

² Adams, P., 'Planners draft new nuclear war tactics', *Defense News*, 20 June 1988, p. 1; Halloran, R., 'U.S. revises its war plan for new age', *New York Times*, 2 Nov. 1988, p. A7.

³ Wilson, G. C., 'Rail-mobile MX is pressed by Carlucci', *Washington Post*, 19 May 1988, p. A1. A contract of \$167 million was awarded to Westinghouse Electric Marine Division of Sunnyvale, California, to develop the launch car by mid-1992, and a contract of \$161.7 million went to Rockwell International Autonetics Electronics Systems of Anaheim, California, for a launch control system.

⁴ US Congress, House Armed Services Committee (HASC), *MX Rail Garrison and Small ICBM: A Program Review*, Committee Print No. 10, 21 Mar. 1988 (US Government Printing Office: Washington, DC, 1988); Department of the Air Force, *Draft Environmental Impact Statement: Peacekeeper Rail Garrison Program*, June 1988; Fridling, B. E. and Harvey, J. R., 'On the wrong track? An assessment of MX rail garrison basing', *International Security*, winter 1988/89, pp. 113–41.

⁵ US Congress, House Appropriations Committee (HAC), *Military Construction Appropriations for FY 1988*, Hearings before a Subcommittee of the Committee on Appropriations, House of Representatives, 100th Congress, 1st session (US Government Printing Office: Washington, DC, 1987), Part 4, p. 339.

⁶ US Congress, Senate Foreign Relations Committee (SFRC), *The INF Treaty*, Hearings, 100th Congress, 2nd session, Senate Hearing 100–522 (US Government Printing Office: Washington, DC, 1988), Part 2, p. 66; Letter, Frank Carlucci to Sam Nunn, 3 Mar. 1988.

⁷ US Congress, House Appropriations Committee (HAC), *Hearings on Department of Defense Appropriations for FY 1989* (hereafter cited as HAC, FY 1989 DOD), Part 1, p. 63.

⁸ HASC (note 4), p. 2.

⁹ The tests were held on 21 Jan., 7 Apr., 28 Apr., 25 May, 7 July, 27 Aug., 19 Sep., 7 Nov. and 16 Dec. See General Accounting Office (GAO), *Navy Strategic Forces; Trident II Proceeding toward Deployment*, GAO/NSIAD–89–40, Nov. 1988.

¹⁰ The GAO estimated that the total life-cycle cost for the acquisition, operation and support of a 19-submarine programme (including the refitting of the Trident I submarines to Trident II), through their retirement in the year 2032 is about \$155 billion; GAO (note 9), p. 29.

¹¹ On 16 Sep. 1985 the *USS Sam Rayburn* (SSBN 635) was taken out of service. It has been converted to a dockside training submarine for nuclear propulsion plant operators. On 3 Nov. 1986 the *USS Nathan Hale* (SSBN 623) was decommissioned, and on 16 Dec. 1986 the *USS Nathanael Greene* (SSBN 636) was decommissioned.

¹² US Congress, Senate Appropriations Committee (SAC), *Hearings on Department of Defense Appropriations for FY 1989* (hereafter cited as SAC, FY 1989 DOD), Part 2, p. 221.

¹³ Adam, J. A., 'How to design an "invisible" aircraft', *IEEE Spectrum*, Apr. 1988, pp. 26–31; Halloran, R., 'Stealth bomber takes shape: a flying wing and crew of 2', *New York Times*, 16 May 1988, p. A1; Browne, M. W., 'Will the stealth bomber work', *New York Times Magazine*, 17 July 1988, pp. 24–31.

¹⁴ Brower, M., 'Why the B-2 will bomb: the problems stealth can't hide', *Arms Control Today*, Sep. 1988, pp. 17–22; Pike, J. and Bourns, D., 'The case against the stealth bomber' (Federation of American Scientists), 16 Nov. 1988.

¹⁵ Wilson, G. C., 'Stealth called nuclear deterrent', *Washington Post*, 17 May 1988, p. A10.

¹⁶ Dornheim, M. A., 'Air force cites 1984 B-2 redesign as major reason for schedule lag', *Aviation Week & Space Technology*, 7 Nov. 1988, p. 20.

¹⁷ Cushman, J. H., 'U.S. confirms 16% rise in cost for secret bomber', *New York Times*, 16 Sep. 1988, p. A23; Halloran, R., 'Air force raises cost estimate of stealth bombers to \$68.1', *New York Times*, 17 Dec. 1988, p. 12.

¹⁸ Morrocco, J. D., 'Budget constraints force one-year delay in peak production of B-2', *Aviation Week & Space Technology*, 19 Dec. 1988, pp. 24–25.

¹⁹ Smith, R. J., 'Cruise missile reported late, over budget', *Washington Post*, 21 Apr. 1988, p. A37.

²⁰ *Congressional Record*, 21 Apr. 1988, p. E1161.

²¹ HAC, FY 1989 DOD, Part 7, p. 285.

²² The Senate Foreign Relations Committee held 20 days of hearings between 25 Jan. and 22 Mar.; SFRC (note 6), Parts 1-5; Senate Foreign Relations Committee Report, *The INF Treaty*, Senate Executive Report 100-15, 14 Apr. 1988 (US Government Printing Office: Washington, DC, 1988). The Senate Armed Services Committee held 13 days of hearings between 25 Jan. and 23 Feb.; US Congress, Senate Armed Services Committee (SASC), *NATO Defense and the INF Treaty*, Hearings, 100th Cong., 2nd sess., Senate Hearing 100-493, Parts 1-4 (US Government Printing Office: Washington, DC, 1988); Senate Armed Services Committee Report, *NATO Defense and the INF Treaty*, Senate Report 100-312, 1 Apr. 1988 (US Government Printing Office: Washington, DC, 1988). On 15 May the INF Treaty was brought to the floor of the Senate. After floor debate the Senate voted 93 to 5 on 27 May to approve the INF Treaty.

²³ Department of Defense (DOD), *Support of NATO Strategy in the 1990's*, 25 Jan. 1988.

²⁴ HAC, FY 1989 DOD, Part 1, p. 673.

²⁵ HAC, FY 1989 DOD, Part 7, pp. 312, 334.

²⁶ HAC, *Energy and Water Development Appropriations for 1989*, Hearings, Part 6, pp. 769, 776-77.

²⁷ Lawrence Livermore National Laboratory, *Energy and Technology Review*, July-Aug. 1988, p. 4.

²⁸ Office of the Assistant Secretary of Defense for Public Affairs (OASD/PA), News Release no. 553-88, 10 Nov. 1988.

²⁹ HAC, FY 1989 DOD, Part 6, pp. 148-64.

³⁰ US Cruise Missiles Project, US DOD, 'Tomahawk Cruise Missile Facts', Washington, DC, undated mimeograph, p. 5.

³¹ Six nuclear materials are used in the production of nuclear weapons: uranium-235, plutonium-239, tritium, deuterium, lithium-6 and uranium-238. In recent years the USA has produced only plutonium and tritium for weapons, having ample stocks of the other materials on hand. More recently, the DOE has indicated that there is sufficient plutonium in the US stockpile to obviate any need to continue producing it; therefore, only tritium is considered to be in short supply.

³² Lanouette, W., 'The half-life of the tritium story', *Deadline*, Jan./Feb. 1989, p. 1; Randolph, E., 'New York Times crusade focuses attention on weapons plants', *Washington Post*, 9 Jan. 1989, p. A3.

³³ US Department of Energy (DOE), *Environment, Safety and Health Report for the Department of Energy Defense Complex*, July 1988; GAO, *Dealing with Problems in the Nuclear Defense Complex Expected to Cost Over \$100 Billion*, GAO/RCED-88-197BR, July 1988; DOE, *Environmental Survey: Preliminary Summary Report of the Defense Production Facilities*, Sep. 1988.

³⁴ Schneider, K., 'U.S. pessimistic on reactors' role in atomic arsenal', *New York Times*, 27 Dec. 1988, p. A1; Smith, R. J., '\$50 billion sought for weapons plants', *Washington Post*, 11 Dec. 1988, p. A1; DOE, *Nuclear Weapons Complex Modernization Report*, Dec. 1988.

³⁵ Peterson, C., 'Energy Secretary warns of new arms-plant cuts', *Washington Post*, 18 Dec. 1988, p. A1.

³⁶ See Cochran, T. B., Norris, R. S. and Arkin, W. M., 'The Department of Energy's Savannah River Plant reactors and US requirements for tritium and plutonium for nuclear weapons', Background Paper (Natural Resources Defense Council: Washington, DC, 19 Oct. 1988).

³⁷ US Department of Defense (DOD), *Soviet Military Power 1988* (hereafter cited as DOD, SMP 1988), p. 44. It should be noted that this, as most sources of information about Soviet nuclear weapon programmes, is an official US source. Despite *glasnost*, very little information from the Soviet Union about its nuclear weapons has been made publicly available, except for the data exchanged in compliance with arms control agreements, as in the SALT II Treaty and the INF Treaty.

³⁸ DOD, SMP 1988, p. 47.

³⁹ DOD, SMP 1988, p. 40.

⁴⁰ DOD, SMP 1988, p. 39.

⁴¹ DOD, SMP 1988, p. 47.

⁴² DOD, SMP 1988, p. 15, for instance, reports about 10 SS-24 Mod. 1 missiles operational as of Mar. 1988. See also Zaloga, S. J., 'Land-based logic drives Soviet mobile ICBM effort', *Armed Forces Journal International*, Nov. 1988, pp. 27-28.

⁴³ DOD, SMP 1988, p. 101.

⁴⁴ Gertz, B., 'Soviets successfully test missile that will be largest in arsenal', *Washington Times*, 7 Jan. 1987; 'Failure of Soviet missile report by U.S. experts', *Baltimore Sun*, 18 Sep. 1986; Cannon, L., 'Missile test by Soviets goes astray', *Washington Post*, 16 Sep. 1986.

⁴⁵ DOD, SMP 1988, pp. 4, 47.

⁴⁶ US Department of Defense (DOD), *Report of the Secretary of Defense Frank Carlucci to the Congress for FY 1988* (annual report), (hereafter cited as DOD FY 1988), p. 25; US Air Force, *Report of the Secretary of the Air Force to Congress for FY 1988*, p. 15.

⁴⁷ Rear Admiral Studeman, W. O., US Navy, Director of Naval Intelligence, Statement before the HASC, 1 Mar. 1988, p. 33.

⁴⁸ DOD, SMP 1988, p. 40.

⁴⁹ DOD, SMP 1988, p. 48; DOD, SMP 1987, p. 35.

⁵⁰ DOD, SMP 1987, pp. 27, 34.

⁵¹ DOD, SMP 1988, p. 48. This includes one Yankee II submarine in the Northern Fleet.

⁵² 'Soviet "Yankees" resume US patrol', *Jane's Defence Weekly*, 30 July 1988, p. 154; Black, N., 'Soviet nuclear subs resume patrol off U.S. east coast', *Washington Post*, 8 Aug. 1988, p. 13.

⁵³ US Department of Defense (DOD), response to a *New York Times* inquiry of June 1988, undated memorandum.

⁵⁴ DOD, SMP 1988, pp. 51, 79.

⁵⁵ 'Bear-H mission details reported', *Jane's Defence Weekly*, 16 Apr. 1988, p. 756.

⁵⁶ Morrocco, J. D., 'Soviet Union unveils Blackjack bomber', *Aviation Week & Space Technology*, 8 Aug. 1988, pp. 14-15; North, D. M. and Morrocco, J. D., 'Blackjack shares aspects of U.S. B-1B and XB-70', *Aviation Week & Space Technology*, 15 Aug. 1988, pp. 16-18.

⁵⁷ North and Morrocco (note 56).

⁵⁸ DOD, SMP 1988, p. 50.

⁵⁹ Rear Admiral Sheafer, E. D., Jr., 'An intelligence overview: the threat expands, expands', *Wings of Gold*, summer 1988, p. 18.

⁶⁰ DOD, SMP 1988, p. 149.

⁶¹ *Aviation Week & Space Technology*, 28 Mar. 1988, p. 15.

⁶² DOD, SMP 1988, p. 15.

⁶³ DOD, SMP 1988, Preface, pp. 44, 55-56.

⁶⁴ The SA-12A Gladiator variant, intended for deployment in non-strategic forces, is already being fielded.

⁶⁵ DOD, SMP 1988 did not even mention cruise missiles until p. 40 of the report.

⁶⁶ It is interesting to note that, since the USSR did not include any SSC-X-5 missiles or support equipment in the INF Treaty data exchange for verification, it is unlikely that prototypes of the missile had been produced as of Nov. 1987.

⁶⁷ Sheafer (note 59); DOD, SMP 1988, p. 53.

⁶⁸ DOD, SMP 1988, p. 53.

⁶⁹ DOD, SMP 1988, p. 79.

⁷⁰ DOD, SMP 1988, p. 55.

⁷¹ DOD, SMP 1988, p. 55.

⁷² DOD, SMP 1987, p. 55; DOD, SMP 1987, p. 66.

⁷³ DOD, SMP 1988, p. 55.

⁷⁴ DOD, SMP 1988, p. 109.

⁷⁵ DOD, SMP 1988, pp. 15, 33.

⁷⁶ DOD, SMP 1988, p. 46.

⁷⁷ DOD, SMP 1988, pp. 15, 79.

⁷⁸ DOD, SMP 1988, p. 79.

⁷⁹ DOD, SMP 1988, p. 79.

⁸⁰ DOD, SMP 1988, p. 80.

⁸¹ DOD, SMP 1988, p. 39.

⁸² Crutchley, M. J. and Milam, J. H., 'Warsaw pact artillery modernization—a quantitative advantage', *Military Technology*, no. 11 (1987), pp. 49-63; DOD, SMP 1988, pp. 55, 68; Adams, P., 'Defense board probing Soviet artillery gains', *Navy Times*, 2 May 1988; 'Key role of self-propelled guns', *Jane's Defence Weekly*, 3 Dec. 1988, pp. 1418-21.

⁸³ DOD, SMP 1988, p. 38.

⁸⁴ DOD, SMP 1988, p. 75; 'Soviet revive heavy artillery formations', *Jane's Defence Weekly*, 16 Mar. 1988, pp. 534-35.

⁸⁵ Sheafer (note 59); DOD, SMP 1988, p. 38. Eleven of the 20 Kilo Class submarines built through mid-1988 were in the Soviet fleet; the remainder had been exported to India, Poland, Romania and Algeria. The Mike Class SSN, launched in 1983, is a test-bed submarine, and only 1 prototype was built.

- ⁸⁶ DOD, SMP 1988, p. 129.
- ⁸⁷ DOD, SMP 1988, Preface, p. 85.
- ⁸⁸ DOD, SMP 1988, p. 85.
- ⁸⁹ 'Analysis of changes to the Baku', *Jane's Defence Weekly*, 6 Aug. 1988, p. 225.
- ⁹⁰ DOD, SMP 1988, Preface.
- ⁹¹ Sheafer (note 59).
- ⁹² Sheafer (note 59) DOD, SMP 1988, p. 134.
- ⁹³ Keller, B., 'Soviet military wary of arms cuts', *New York Times*, 23 Dec. 1988, p. 3; see also 'Soviet to recycle tank engines', *Washington Times*, 23 Dec. 1988, p. 3; 'This is not just a matter of tactics', *Newsweek*, 19 Dec. 1988, pp. 31-32.
- ⁹⁴ Dobbs, M., 'Soviet officers vent unease at cutbacks', *Washington Post*, 16 Dec. 1988, p. A37.
- ⁹⁵ DOD, SMP 1988, pp. 9, 12.
- ⁹⁶ Meeting of the Political Consultative Committee of the Warsaw Treaty Organization, 'On the military doctrine of the Warsaw Treaty member states', *Pravda*, 30 May 1987.
- ⁹⁷ Defense Minister Yazov explained that 'sufficiency in that sphere presupposes a quantity and quality of armed forces and armaments capable of reliably ensuring the collective defense of the socialist community . . . The armed forces of the allied countries are maintained in a state of combat readiness sufficient not to be taken unawares. In case of an attack against them, they will deal the aggressor a crushing rebuff'; *Pravda*, 27 July 1987; quoted in Institute of World Economy and International Relations (IMEMO), *Disarmament and Security: Yearbook 1987* (Novosti: Moscow, 1988), pp. 219-20.
- ⁹⁸ Odom, W. E., 'Soviet military doctrine', *Foreign Affairs*, winter 1988/89, p. 130.
- ⁹⁹ IMEMO (note 97), p. 215; see also Goure, L., 'The Soviet strategic view', *Strategic Review*, fall 1988, p. 83.
- ¹⁰⁰ IMEMO (note 97), p. 201. According to Alexei Arbatov, 'A military doctrine has two mutually related aspects: socio-political and military-technical. The first one reflects the relatively constant social system and political objectives of a state, as well as its geographical (geostrategic) situation and its probable adversaries. The second one directly relates to the military programs, technical equipment of the forces and their training, and the determination of the forms and methods to be used in the course of operations and the war as a whole. This aspect is very dynamic in the conditions of an intensive period of military and technological race; shifts in absolute and relative combat potentials of the armed forces of states as a result of the modernization of their weapons and combat equipment; qualitative changes and changes in composition and deployment of forces; and innovations in exercises and manoeuvres and systems of mobilized deployment'.
- ¹⁰¹ DOD, SMP 1988, p. 12.
- ¹⁰² Odom (note 98). See also Goure, L., 'A "new" Soviet military doctrine: reality or mirage?', *Strategic Review*, summer 1988, p. 26.
- ¹⁰³ Atkinson, E. B., Maj. Gen., 'The new Pact doctrine: implications for NATO', *Army*, Nov. 1988, p. 11.
- ¹⁰⁴ Taubman, P., 'Is the Soviet military on the Gorbachev diet?', *New York Times*, 7 Aug. 1988, p. E7; Atkinson (note 103), pp. 11-13.
- ¹⁰⁵ 'West benefiting from military openness', *Jane's Defence Weekly*, 5 Nov. 1988, p. 1157.
- ¹⁰⁶ Defense Secretary Carlucci inspected the exterior and interior of the newest Soviet strategic bomber—the Blackjack—at Kubinka Air Base, near Moscow, during this visit.
- ¹⁰⁷ Smith, R. J., 'Young, obscure officer is named leader of Soviet Armed Forces', *Washington Post*, 14 Dec. 1988, p. A37.
- ¹⁰⁸ A previous agreement provided for transit only in time of war; 'France permits BAOR exercise movements', *Jane's Defence Weekly*, 13 Feb. 1988, p. 254. British troops have not been allowed to exercise in France since France withdrew from NATO's integrated military structure in 1966.
- ¹⁰⁹ de Briganti, G., 'France, Britain agree to closer military links', *Defense News*, 8 Feb. 1988, p. 15; Markham, J. S., 'Meager arms progress by Britain and France', *New York Times*, 4 Feb. 1988, p. A7.
- ¹¹⁰ Connell, J., 'Britain backs out of French missile deal', *Sunday Times*, 7 Aug. 1988, p. 1.
- ¹¹¹ Connell (note 110); Dickson, D., 'Anglo-French nuclear missile under study', *Science*, 12 Feb. 1988, pp. 720-21. The maximum range of the ASMP is 300 km.
- ¹¹² de Briganti, G., 'France, Britain mull joint development of longer range stand-off nuclear missile', *Defense News*, 1 Feb. 1988, p. 8.
- ¹¹³ Markham, J. S., 'Meager arms progress by Britain and France', *New York Times*, 4 Feb. 1988, p. A7; Dickson, D., 'Anglo-French nuclear missile under study', *Science*, 12 Feb. 1988, pp. 720-21.

¹¹⁴ Morrison, J., 'Britain plans to upgrade nuclear arsenal', *Washington Times*, 17 May 1988, p. 9.

¹¹⁵ Urban, M., 'Clarification', *The Independent*, 17 May 1988.

¹¹⁶ All three types use the same basic 'physics package'. The yield is varied by the amount of tritium introduced; Urban (note 115).

¹¹⁷ The WE-177C can be used as a free-fall bomb or as a depth bomb by varying the fuzing and the casing.

¹¹⁸ Author's interview with Mark Urban of *The Independent*, on 13 Oct. 1988.

¹¹⁹ Prime Minister Thatcher, 'The NATO summit: the British view', press conference in Brussels, 3 Mar. 1988, reprinted by the British Information Services, New York, Policy Statement 12/88, 4 Mar. 1988, p. 4.

¹²⁰ British House of Commons, Defence Committee, *The Progress of the Trident Programme*, session 1987-88, 11 May 1988, pp. vi-ix.

¹²¹ Most of this money is spent through the US Navy's Strategic Systems Program Office (SSPO). Since the inception of the Polaris Sales Agreement in 1963 through FY 1988, the UK has spent £2.37 billion through the SSPO on the Polaris, Chevaline and Trident weapon systems. The authors estimate that, as of Dec. 1988, roughly 80 per cent of this amount has been spent on Polaris and Chevaline, and 20 per cent on Trident.

¹²² British Information Services, 'British defence policy', Policy Background Paper 7/88, 17 May 1988, p. 7.

¹²³ SIPRI, *SIPRI Yearbook 1988: World Armaments and Disarmament* (Oxford University Press: Oxford, 1988), p. 47.

¹²⁴ Urban, M., 'Aldermaston delays confirmed', *The Independent*, 31 Mar. 1988, p. 1; Urban, M., 'MPs hit at Trident "inaccuracies"', *The Independent*, 27 May 1988, p. 1.

¹²⁵ British Ministry of Defence, *Statement on the Defence Estimates 1988* (Her Majesty's Stationery Office: London, 1988), para. 222.

¹²⁶ Note 125, para. 223.

¹²⁷ Note 125.

¹²⁸ British Foreign Secretary Geoffrey Howe, 'The British foreign secretary's visit to the Soviet Union', interview on Soviet television 16 Feb. 1988, reprinted by the British Information Services, New York, Policy Background 1/88, 19 Feb. 1988, p. 3.

¹²⁹ 'Touring the Inflexible', *Revue Aérospatiale*, no. 44 (Nov. 1987), pp. 26-28.

¹³⁰ French Minister of Foreign Affairs Jean-Bernard Raimond, 'Prospects for East-West relations and disarmament negotiations', speech given at the Institute of Higher National Defence Studies (IHEDN), translated by the Service de Presse et d'Information of the French Embassy, London, 8 Mar. 1988, p. 1.

¹³¹ Isnard, J., 'France claims SSBN advantage', *Jane's Defence Weekly*, 1 Oct. 1988, p. 746.

¹³² French Foreign Minister Roland Dumas, statement before the UN Third Special Session on Disarmament, cited in French Embassy Press and Information Service, *News from France* (Washington, DC), 14 June 1988, p. 2.

¹³³ Lenorovitz, J. M., 'French boost 1989 defense budget for conventional, nuclear upgrades', *Aviation Week & Space Technology*, 26 Sep. 1988, p. 31.

¹³⁴ Authors' estimate to the end of 1988, based on: the 172nd patrol of the FOST began at the end of February 1986; SIPRI, *SIPRI Yearbook 1987: World Armaments and Disarmament* (Oxford University Press: Oxford, 1987), p. 32. 200 patrols had been conducted by Oct. 1987; Cornec, J.-P., 'Médecin à bord de SNLE: Un soutien indispensable', *Armées d'aujourd'hui*, no. 125 (Nov. 1987), p. 53.

¹³⁵ Isnard, J., 'France claims SSBN advantage', *Jane's Defence Weekly*, 1 Oct. 1988, p. 746.

¹³⁶ Note 135.

¹³⁷ Commissariat à l'énergie atomique, *Rapport Annuel 1987* (CEA: Paris, 1988), p. 18. The two SSBNs already armed with the M4 are the *Inflexible* (TN-70 warheads) and the *Tonnant* (TN-71 warheads).

¹³⁸ Authors' estimates.

¹³⁹ Schwartzbrod, A., 'French '89 defense budget gives priority to R&D and nuclear forces', *Armed Forces Journal International*, Nov. 1988, p. 32; 'Triumphant to cost 19 per cent more', *Jane's Defence Weekly*, 17 Dec. 1988, p. 1535.

¹⁴⁰ Both boats will be converted to carry the M5 SLBM early in the next century.

¹⁴¹ See *SIPRI Yearbook 1988* (note 123), p. 51.

¹⁴² Commissariat à l'énergie atomique, *Rapport Annuel 1987* (CEA: Paris, 1988), p. 18.

¹⁴³ In 1988, the French Defence Ministry provided a name for this new M4 variant—the M45. However, contrary to popular belief, the M45 was not a new missile; it had been in the planning stage for many years but did not have a name.

¹⁴⁴ Lenorovitz, J. M., 'French boost 1989 defense budget for conventional, nuclear upgrades', *Aviation Week & Space Technology*, 26 Sep. 1988, p. 31.

¹⁴⁵ Note 144.

¹⁴⁶ de Briganti, G., 'France, Britain mull joint development of longer range stand-off nuclear missile', *Defense News*, 1 Feb. 1988, p. 8.

¹⁴⁷ This figure is based on the following calculation: $(18 \times 1 \text{ Mt}) + (18 \times 300 \text{ kt}) = 18 \text{ Mt} + 5.4 \text{ Mt} = 23.4 \text{ Mt}$.

¹⁴⁸ Commissariat à l'énergie atomique, *Rapport Annuel 1987* (CEA: Paris, 1988), p. 18. It was previously thought that the S4 would use the TN 75 warhead, the warhead planned for the M45 SLBM.

¹⁴⁹ 'Début de développement du missile stratégique S4', *Air et Cosmos*, no. 1191 (21 May 1988), p. 42.

¹⁵⁰ Isnard, J., 'French looking at land-based M-4', *Jane's Defence Weekly*, 29 Oct. 1988, p. 1050.

¹⁵¹ French Prime Minister Jacques Chirac, statements before a Diplomatic Press Association Luncheon, translated by the Service de Presse et d'Information of the French Embassy, London, 14 Dec. 1987, p. 5.

¹⁵² French Prime Minister Jacques Chirac, speech given at the Institute of Higher National Defence Studies (IHEDN), translated by the Service de Presse et d'Information of the French Embassy, London, 12 Dec. 1987, pp. 5-6.

¹⁵³ French Minister of Defence André Giraud, 'France's Defense and European Security', speech given at Chatham House, London, translated by the Service de Presse et d'Information of the French Embassy, London, 22 Mar. 1988, p. 6.

¹⁵⁴ Note 152.

¹⁵⁵ 'Hades test flight success', *Jane's Defence Weekly*, 10 Dec. 1988, p. 1447.

¹⁵⁶ French President François Mitterrand, interview published in *Die Welt*, translated by the Service de Presse et d'Information of the French Embassy, London, 18 Jan. 1988, p. 6. Mitterrand said that he would give the order to manufacture the ERW if, 'instead of disarmament, there were to be a return to the hard line of the past four decades'; President Mitterrand, press conference in Hanover, translated by the Service de Presse et d'Information of the French Embassy, London, 22 Oct. 1987, p. 8.

¹⁵⁷ French President François Mitterrand, press conference in Hanover, translated by the Service de Presse et d'Information of the French Embassy, London, 22 Oct. 1987, p. 8.

¹⁵⁸ Note 157.

¹⁵⁹ 'France will keep up in arms race', *Jane's Defence Weekly*, 22 Oct. 1988, p. 1003.

¹⁶⁰ French President François Mitterrand, press conference in Hannover, translated by the Service de Presse et d'Information of the French Embassy, London, 22 Oct. 1987, p. 8. Another report stated that France was considering the postponement or even cancellation of Hadès as a good will gesture in disarmament negotiations; Isnard, J., 'French budget: 7550 jobs go, weapons go-ahead', *Jane's Defence Weekly*, 8 Oct. 1988, p. 845.

¹⁶¹ 'Mirage 2000N', *Air Actualités*, no. 412 (July/Aug. 1988), p. 22. The 4th Fighter Wing was also the first FATAAC wing to receive tactical nuclear weapons (AN-52) in 1972; 'A la 4e escadre de chasse, 150,000 heures de vol sur Mirage IIIE', *Air et Cosmos*, no. 1112 (11 Oct. 1986), p. 29.

¹⁶² Commissariat à l'énergie atomique, *Rapport Annuel 1987* (CEA: Paris, 1988), p. 18.

¹⁶³ Guyot, H., 'La 4e escadre de chasse: un nouveau départ', *Air Actualités*, no. 412, July/Aug. 1988, p. 7.

¹⁶⁴ Isnard, J., 'France to update nuclear arsenal with ASMP', *Jane's Defence Weekly*, 30 July 1988, pp. 152-53.

¹⁶⁵ Note 164, p. 153.

¹⁶⁶ Prézélin, B., 'Les porte-avions', *Cols Bleus*, no. 1991 (4 June 1988), p. 7.

¹⁶⁷ Note 164, p. 153.

¹⁶⁸ Owing to financial constraints in the defence budget, the *Charles de Gaulle* will be delayed, with the sea trials to begin in 1996 (rather than 1995) and to become operational in 1997; Lenorovitz, J. M., 'French boost 1989 defense budget for conventional, nuclear upgrades', *Aviation Week & Space Technology*, 26 Sep. 1988, p. 31; Schwartzbrod, A., 'French '89 defense budget gives priority to R&D and nuclear forces', *Armed Forces Journal International*, Nov. 1988, p. 32.

¹⁶⁹ French Minister of Defence André Giraud, 'France's Defence and European Security', speech given at Chatham House, London, translated by the Service de Presse et d'Information of the French Embassy, London, 22 Mar. 1988, p. 5.

¹⁷⁰ French Prime Minister Jacques Chirac, interview published in *Le Point*, translated by the Service de Presse et d'Information of the French Embassy, London, 5 Oct. 1987, p. 2. In Mar. 1988 Giraud compared the process of reduction of nuclear weapons to that of a house of cards that has to

be dismantled without having it collapse. 'In our house of cards the topmost cards are those of conventional and chemical weaponry, followed by those of strategic nuclear weapons. The bottom-most cards, that is the cards that keep the whole edifice together, are those corresponding to pre-strategic nuclear weapons'; Minister of Defence Giraud, 'France's Defense and European Security', speech given at Chatham House, London, translated by the Service de Presse et d'Information of the French Embassy, London, 22 Mar. 1988, p. 5.

¹⁷¹ Note 169, p. 1.

¹⁷² French President François Mitterrand, 'Franco-British Summit', joint press conference with Prime Minister Thatcher in London, translated by the Service de Presse et d'Information of the French Embassy, London, 29 Jan. 1988, p. 1.

¹⁷³ 'A TASS interview with Eduard Shevardnadze', *Pravda*, 4 Dec. 1988, official English translation from *Daily Review* of Novosti Press Agency (APN), 5 Dec. 1988.

¹⁷⁴ See Fieldhouse, R., 'Chinese nuclear forces: an overview', SIPRI, *World Armaments and Disarmament: SIPRI Yearbook 1986* (Oxford University Press: Oxford, 1986), pp. 97-113.

¹⁷⁵ 'China detonates neutron bomb', *Washington Post*, 8 Nov. 1988, p. A23.

¹⁷⁶ See Jencks, H. W., 'PRC nuclear and space programs', in ed. R. H. Yang, *SCPS Yearbook on PLA Affairs 1987* (Sun Yat-sen Center for Policy Studies: Kaohsiung, Taiwan, 1988), chapter 9, p. 109.

¹⁷⁷ See Chinese reports translated in *Foreign Broadcast Information Service Daily Report—China* (hereafter cited as *FBIS-CHI-88*) (National Technical Information Service (NTIS) of the US Department of Commerce: Washington, DC, daily) *FBIS-CHI-88-188*, 28 Sep. 1988, pp. 26-29.

¹⁷⁸ See *SIPRI Yearbook 1987* (note 134), p. 36.

¹⁷⁹ There is some confusion concerning the 1985 SLBM test launch. See Jencks (note 175), p. 111.

¹⁸⁰ Xinhua press release quoting the 6 Aug. overseas edition of *People's Daily*, translated as 'Navy armed with strategic nuclear missiles', in *FBIS-CHI-88-152*, 8 Aug. 1988, p. 32; and Shen, S., 'The Chinese navy forms a guided missile based attack force', translated in *BBC Summary of World Broadcasts*, Part 3, 10 Aug. 1988, reprinted in Institute for Defense and Strategic Analysis (IDSA), *News Review on East Asia*, Sep. 1988, p. 732.

¹⁸¹ See *SIPRI Yearbook 1987* (note 133), p. 36.

¹⁸² Note 47, p. 10. Emphasis added.

¹⁸³ 'Missile units have retaliatory capacity', translated and printed in British Broadcasting Corporation (BBC), *Summary of World Broadcasts* Part 3, 11 Jan. 1988, reprinted in Institute for Defense and Strategic Analysis (IDSA), *News Review on East Asia*, Feb. 1988, p. 112.

¹⁸⁴ 'Navy armed with strategic nuclear missiles', *FBIS-CHI-88-152*, 8 Aug. 1988, p. 32.

¹⁸⁵ The announcement appeared in a release from Xinhua, and appears in translation as: 'Announcement on experimental rocket launching', *FBIS-CHI-88-173*, 7 Sep. 1988, p. 22. See also *Beijing Review*, 25 Oct. 1982, p. 5.

¹⁸⁶ See Chinese reports translated in *FBIS-CHI-88-188*, 28 Sep. 1988, pp. 26-29.

¹⁸⁷ 'Xinhua "feature" on test', *FBIS-CHI-88-188*, 28 Sep. 1988, pp. 28-29.

¹⁸⁸ Wu, X. and Cao, G., 'Naval base conducts defensive exercise under the conditions of nuclear war', *Renmin Ribao*, 2 July 1988, p. 4, translated and reprinted in 'Navy exercise under nuclear war conditions', *FBIS-CHI-88-128*, 5 July 1988, p. 47; and 'Nuclear Notebook', *Bulletin of the Atomic Scientists*, Nov. 1988, p. 47. See also 'Sea fleet completes long-range exercises', *FBIS-CHI-88-006*, 11 Jan. 1988, pp. 37-38; and 'Navy exercise simulates nuclear war', *FBIS-CHI-87-235*, 8 Dec. 1987, p. 21.

¹⁸⁹ Wu, X. and Cao, G., 'Watching exercises aboard missile frigate no. 536', translated by BBC *Summary of World Broadcasts*, Part 3, 9 Aug. 1988, reprinted in IDSA *News Review on East Asia*, Sep. 1988, pp. 737-38. See also 'Chinese Navy shows its defects', *Jane's Defence Weekly*, 20 Aug. 1988, p. 295.

¹⁹⁰ See *SIPRI Yearbook 1988* (note 123), p. 52.

¹⁹¹ See Cheung, T. M., 'China's bargain sale: bangs for a buck', *Far Eastern Economic Review*, 2 June 1988, pp. 22-23; 'Missile sales a test of US-Chinese relationship', United States Information Agency Wireless File, background article on briefing for Shultz's trip to China, 14 July 1988, USIA, Stockholm, Sweden.

¹⁹² Chanda, N., 'The Third World race for ballistic missiles', *Far Eastern Economic Review*, 2 June 1988, pp. 22-24.

¹⁹³ Comments of Lin Zongtang, chief of the new Ministry of Aeronautics and Astronautics Industry, reported in *China Daily*, 6 July 1988, translated in IDSA, *News Review on East Asia*, Aug. 1988, p. 660.

¹⁹⁴ Sciolino, E., 'US fears Chinese may sell new missile', *International Herald Tribune*, 14 July 1988, p. 1.

¹⁹⁵ See *SIPRI Yearbook 1988* (note 123), p. 53.

¹⁹⁶ These included Secretary of State George Shultz in July, General William Burns, Director of the US Arms Control and Disarmament Agency (ACDA) in Aug., and Defense Secretary Carlucci in Sep. See Tyson, J. L., 'US tries again to staunch China arms flow', *Christian Science Monitor*, 4 Aug. 1988, p. 9.

¹⁹⁷ For descriptions of the satellite and CZ-4 launcher see *FBIS-CHI-88-173*, 7 Sep. 1988, pp. 22–24; and *FBIS-CHI-88-176*, 12 Sep. 1988, pp. 24–25.

¹⁹⁸ Note 197.

¹⁹⁹ Xu, Z., 'China's oceangoing astronautic survey fleet has reached an advanced level', *Liaowang overseas edn*, 12 Sep. 1988, pp. 14–15, translated in 'Liaowang praises astronautic sea fleet', *FBIS-CHI-88-181*, 19 Sep. 1988, pp. 30–31.

²⁰⁰ Note 199, p. 31.

Appendix 1A. Agreement between the United States of America and the Union of Soviet Socialist Republics on Notifications of Launches of Intercontinental Ballistic Missiles and Submarine-Launched Ballistic Missiles

The United States of America and the Union of Soviet Socialist Republics, hereinafter referred to as the Parties,

Affirming their desire to reduce and ultimately eliminate the outbreak of nuclear war, in particular, as a result of misinterpretation, miscalculation, or accident,

Believing that a nuclear war cannot be won and must never be fought,

Believing that agreement on measures for reducing the risk of outbreak of nuclear war serves the interests of strengthening international peace and security,

Reaffirming their obligations under the Agreement on Measures to Reduce the Risk of Outbreak of Nuclear War between the United States of America and the Union of Soviet Socialist Republics of September 30, 1971, the Agreement between the Government of the United States of America and the Government of the Union of Soviet Socialist Republics on the Prevention of Incidents on and over the High Seas of May 25, 1972, and the Agreement between the United States of America and the Union of Soviet Socialist Republics on the Establishment of Nuclear Risk Reduction Centers of September 15, 1987,

Have agreed as follows:

Article I

Each Party shall provide the other Party notification, through the Nuclear Risk Reduction Centers of the United States of America and the Union of Soviet Socialist Republics, no less than twenty-four hours in advance, of the planned date, launch area, and area of impact for any launch of a strategic ballistic missile; an intercontinental ballistic missile (hereinafter 'ICBM') or a submarine-launched ballistic missile (hereinafter 'SLBM').

Article II

A notification of a planned launch of an ICBM or an SLBM shall be valid for four days counting from the launch date indicated in such a notification. In case of postponement of the launch date within the indicated four days, or cancellation of the launch, no notification thereof shall be required.

Article III

1. For launches of ICBMs or SLBMs from land, the notification shall indicate the area from which the launch is planned to take place.

2. For launches of SLBMs from submarines, the notification shall indicate the general area from which the missile will be launched. Such notification shall indicate either the

quadrant within the ocean (that is, the ninety-degree sector encompassing approximately one-fourth of the area of the ocean) or the body of water (for example, sea or bay) from which the launch is planned to take place.

3. For all launches of ICBMs or SLBMs, the notification shall indicate the geographic coordinates of the planned impact area or areas of the reentry vehicles. Such an area shall be specified either by indicating the geographic coordinates of the boundary points of the area, or by indicating the geographic coordinates of the center of a circle with a radius specified in kilometers or nautical miles. The size of the impact area shall be determined by the notifying Party at its discretion.

Article IV

The Parties undertake to hold consultations, as mutually agreed, to consider questions relating to implementation of the provisions of this Agreement, as well as to discuss possible amendments thereto aimed at furthering the implementation of the objectives of this Agreement. Amendments shall enter into force in accordance with procedures to be agreed upon.

Article V

This Agreement shall not affect the obligations of either Party under other agreements.

Article VI

This agreement shall enter into force on the date of its signature.

The duration of this Agreement shall not be limited.

This Agreement may be terminated by either Party upon 12 months written notice to the other Party.

DONE at Moscow on May 31, 1988, in two copies, each in the English and Russian languages, both texts being equally authentic.

For the United States of America: George P. Shultz.

For the Union of Soviet Socialist Republics: Eduard A. Shevardnadze.

Source: Arms Control Today, July/Aug. 1988.

2. Nuclear explosions

RAGNHILD FERM

I. Introduction

In 1988, for the first time ever, the United States and the Soviet Union co-operated in conducting nuclear tests. As a direct outcome of the Joint Verification Experiment (JVE) Agreement, signed on 31 May 1988 (see appendix 2B), two explosions were conducted in order to test and assess verification methods acceptable to both parties that might enable ratification of the 1974 Threshold Test Ban Treaty (TTBT) and the 1976 Peaceful Nuclear Explosions Treaty (PNET), which limit the yield of underground nuclear explosions to 150 kt. The two treaties are not yet in force because the USA has not ratified them (and, therefore, neither has the USSR), but both states have agreed to observe the basic restrictions.

According to available information a world total of 1790 nuclear explosions had been conducted by 1 January 1989, 1244 of them after the signing of the 1963 Partial Test Ban Treaty (PTBT) prohibiting nuclear testing in the atmosphere, in outer space and under water. The United States and the Soviet Union are together responsible for 86 per cent of all explosions conducted since 1945; France ranks third in terms of the number of tests. The great majority of all nuclear weapon tests are carried out to improve the efficiency of nuclear weapons; only a few tests are conducted to check the reliability of weapon stockpiles.

II. Nuclear explosions in 1988

Forty nuclear explosions were conducted in 1988, 7 fewer than in 1987 and fewer than the yearly average for the past 20 years (excluding 1985 and 1986, when the Soviet testing moratorium was in effect). During the year the United States carried out 14 nuclear explosions (at the Nevada Test Site) and the Soviet Union 17 (13 at the test site in the Semipalatinsk area, 2 at the test site on the island of Novaya Zemlya in the Arctic Ocean, 1 in north-eastern Siberia and 1 in the European USSR). The United Kingdom did not carry out any tests at all in 1988; for the past 10 years it has conducted at least one test per year. (Since 1962 British tests have been conducted at the Nevada Test Site, in co-operation with the USA.) France conducted 8 tests (at its Pacific test centre in French Polynesia) and China 1 (at the Lop Nur test site in north-western China).

All explosions were carried out underground—no atmospheric test has been conducted since 1980. Although not parties to the PTBT, France¹ and China² announced in 1974 and 1986 respectively that they would conduct their future tests underground. The yields of the explosions in 1988 were reported to be below 150 kt, the limit established in the US-Soviet TTBT and PNET.

US explosions

In January 1988 US scientists revealed that more than 70 of the US nuclear tests conducted between 1963 and 1986 had never been announced. These explosions were all small, generally with a yield of less than 1 kt.³ Even though it was known that US policy had been to announce all but the smallest nuclear tests, it was a surprise to many that such a large number of tests had been concealed, and it became clear that the US test programme was much more extensive than had been assumed during these years. These new findings emerged from analyses and re-examination of seismic data on earth tremors that had been available for years. Of the 14 US tests in 1988, two were not announced and one was the JVE explosion on 17 August.

Soviet explosions

When its nearly 19-month moratorium on nuclear explosions ended in February 1987, the Soviet Union immediately resumed roughly the same rate of weapon testing as before the moratorium. The programme of so-called peaceful nuclear explosions (PNEs) was also resumed. These explosions are conducted outside the weapon test sites and are therefore presumed to be for civil purposes, such as the creation of underground storage areas. They are announced by the Soviet authorities as being 'in the interest of the national economy'; about 32 per cent of Soviet nuclear explosions over the past 10 years have been PNEs. The overall figure for Soviet explosions in 1988 is lower than in previous years, since only two PNEs were conducted during the year, but the number of weapon tests is almost the same as in previous years. Of the 17 tests conducted in 1988, one was the JVE explosion on 14 September.

French explosions

Since 1966 French nuclear tests have been conducted in the Tuamotu archipelago of French Polynesia, most of them at the Mururoa atoll. Since 1975 all tests have been carried out underground. During the past five years France has tested eight nuclear devices each year, and according to the Commander-in-Chief of the French Navy for the Pacific Ocean there are no plans to change this rate of testing.

For many years it has been claimed that the geological condition of the Mururoa atoll is very poor as a result of the underground test explosions carried out there. The atoll consists of limestone and dolomite, capped by coral, which extends to a depth of some 300–400 metres where a transition to volcanic layers occurs (the deepest being dense basalt). Most of the surface area of the rim of the Mururoa atoll has already been destroyed by the blasts and the tests may have contributed to underwater landslides of sections of coral limestone on the flanks of Mururoa.⁴

The environmental effects of French testing and the conditions of Mururoa were examined by expert teams in 1982⁵ and 1983.⁶ In 1987 the Costeau Foundation investigated the atoll and its surroundings before and after a

nuclear explosion. According to their report the short-term risks of the testing are negligible and do not pose an immediate danger to the population.⁷ However, the mission was not allowed access to those areas thought to be most contaminated and the basalt base of the atoll was only investigated to a depth of 50 metres. The fact that the health of the population in the area has never been checked was raised in the European Parliament. A report of the European Parliament Committee on the Environment, Public Health and Consumer Protection concludes that the effects of nuclear testing in French Polynesia are a matter for very real concern and should be properly investigated by an international team of experts, including medical specialists.⁸ A resolution calling for such an investigation was narrowly rejected in the European Parliament, but the European Commission has indicated that the question will be raised again.

In March 1988 the French Commander-in-Chief stated that, in order to prevent serious fractures in the rock of Mururoa, the most powerful blasts would in the future be conducted at Fangataufa, an atoll some 40 km south-east of Mururoa.⁹ Fangataufa is about half the size of Mururoa, roughly 5 by 8 km, and was the site of the first two French underground nuclear tests in the Pacific in 1975. It had previously been used for atmospheric testing: the first French hydrogen bomb was tested above Fangataufa in June 1968. It has been reported that because the surface of Fangataufa is still badly contaminated future tests will be carried out beneath the lagoon.¹⁰ The French Commander-in-Chief has stated that using Fangataufa will enable France to maintain its nuclear test programme for the next 50 years 'in complete safety'.¹¹ Data indicate that the explosion conducted on 30 November 1988 was carried out at Fangataufa, and the New Zealand observatory in the Cook Islands estimates its yield at about 100 kt—the largest test conducted at the French Pacific test centre for nine years.

France has not systematically announced its nuclear tests, nor has it confirmed the tests registered, for instance, by the New Zealand observatory. At the Third UN Special Session on Disarmament, in June 1988, France announced that it had decided to make a yearly statement of the number of tests performed in the preceding 12 months. This would allow people 'to assess more accurately what is actually going on than would be possible from the information that certain third States have felt authorized to circulate'.¹²

The Chinese explosion

Chinese nuclear tests are still very infrequent. According to seismic recordings the test on 29 September 1988 was of low yield, and some newspapers reported that the explosion was carried out to test a neutron device.¹³ This has not been confirmed by the Chinese authorities (see also chapter 1).

III. The Joint Verification Experiment and other bilateral initiatives

The Joint Verification Experiment

On 17 August 1988 a US nuclear explosion with a yield of about 150 kt was conducted at the Nevada Test Site in the presence of a team of Soviet scientists. A month later, on 14 September, a similar Soviet explosion at the Semipalatinsk test site was monitored by US scientists. These events took place in accordance with the US-Soviet JVE Agreement, which seeks to find mutually agreeable technology that would enable both nations accurately to monitor compliance with the TTBT and the PNET. The Agreement was signed by the US Secretary of State and the Soviet Foreign Minister at the summit meeting in Moscow (29 May–2 June 1988). Under the Agreement each side was to be given the opportunity to monitor and measure the size of a nuclear explosion at the other's test site, using its own methods.

The two main techniques for verifying the size of nuclear explosions are the seismological and the hydrodynamic methods. To date, verification of nuclear testing limits has been based primarily on remote monitoring, using world-wide networks of seismic stations that register seismic events such as nuclear explosions and earthquakes. The seismometers measure ground motions caused by the waves that propagate on the surface and through the earth after an underground explosion or an earthquake. Seismic events can be recorded several thousands of kilometres away, but to estimate accurately the size of an explosion or an earthquake assumptions must be made about the modes by which signals travel to the recording station.

The US national system for the verification of underground nuclear explosions includes numerous seismic stations situated in the USA and in many other countries. Some of the stations are located along the borders of the Soviet Union. The Soviet network of seismic stations is situated entirely on Soviet territory, which limits its ability to detect and locate explosions conducted outside the USSR.¹⁴

Over the years the US Administration has argued that yield measurements by seismological instruments are inadequate and that it can agree to ratify the TTBT, the PNET or any future agreement limiting nuclear tests only if new verification methods are negotiated. It has proposed that the CORRTEX (Continuous Reflectometry for Radius versus Time Experiments) hydrodynamic method be used. Although the Soviet Union has used direct hydrodynamic yield measurements for a number of its own tests,¹⁵ it sees remote monitoring by seismological means as the best verification method and regards imposing obligatory hydrodynamic measurement of tests as unnecessary.

The CORRTEX system is a technique for measuring the velocity of an explosion's shock-wave, which depends on the yield of the explosion. The equipment consists of a suitcase-sized electronic unit, coaxial cables and a microcomputer to interpret the data. A CORRTEX cable can be put either in the emplacement shaft (where the nuclear device is installed) and/or in separate satellite holes 2–25 metres away. When the nuclear device explodes,

its shock-wave travels outwards, crushes and melts the surrounding rock, and progressively destroys the cable. The rate of expansion can be calculated by measuring electronically how fast the cable is shortened as the explosion destroys it; the larger the explosion, the faster the shock-wave travels. Because the supersonic shock-wave causes the surrounding rock to behave like a fluid, the phenomenon is referred to as the *hydrodynamic* phase of an underground explosion.¹⁶

Hydrodynamic methods can accurately measure only explosions larger than about 50–75 kt, however. Small explosions produce too small a crush zone for accurate measurement. Another problem is that the CORRTEx method is intrusive in that it requires access by the monitoring state to the test site of the testing country before as well as during each test. In addition, the examination which has to take place could reveal sensitive information about the design of the device unless special procedures are followed.

The purpose of the JVE was to focus on the ability to detect whether a given nuclear explosion exceeds the 150-kt limit. The CORRTEx method was used for each test by the United States in order to demonstrate to the Soviet Union this method of yield estimation. Both sides had agreed that the planned yield of the explosion at each test site would not be less than 100 kt and would approach 150 kt, and that each state could choose its own means of yield verification. The tests were carried out in geologically different areas.

The two JVE tests were assessed as being of great value for the work on additional verification procedures for the TTBT and the PNET. The US device was exploded some 700 metres below the surface; the Soviet explosion took place at a depth of 642 metres. On each occasion the yield was measured by the counterpart by seismic as well as hydrodynamic means. Seismic measurement was carried out at five recording stations. To obtain hydrodynamic measurements, each side put cables in a satellite hole as well as in the emplacement shaft.

According to newspaper reports the CORRTEx equipment used at the US test site produced data that indicated that the blast exceeded the 150-kt limit, although the device was expected to yield roughly 145 kt. The cable in the emplacement hole indicated 163 kt and the equipment in the satellite hole 155 kt, but an official US spokesman argued that the yield was clearly below the threshold.¹⁷ The data from the Soviet experiment suggest that US seismic measurements taken far from the test site were about as accurate in measuring the size of the blast as was the on-site CORRTEx verification method.¹⁸ The results of the JVE were not published by the end of 1988, but from these first reports the conclusion may be drawn that the seismic approach performed as well as, if not better than, the CORRTEx system.¹⁹

The US–Soviet nuclear testing negotiations

The declared purpose of the ongoing Geneva negotiations between the USA and the USSR on nuclear testing is to work out verification measures for the TTBT and the PNET so that they can be ratified, and later to negotiate further

limitations on nuclear testing and, eventually, a complete cessation of nuclear tests as part of an effective disarmament process. This mandate was a concession by the Soviet Union, which had for many years maintained that a comprehensive test ban (CTB) was a very urgent disarmament measure and had demonstrated its seriousness by observing a unilateral moratorium on nuclear explosions from August 1985 to February 1987 and by declaring that it would observe a permanent moratorium if the United States also agreed to do so.²⁰ The US Administration has repeatedly argued that a CTB is not of immediate interest to the USA so long as the country and its allies continue to rely on nuclear weapons for their security. According to this view US testing must ensure that the nuclear arsenals are effective, reliable and safe, but the USA is prepared to ratify the TTBT and the PNET if verification methods are improved.

The draft JVE Agreement and draft verification protocols for the TTBT and the PNET were worked out during two rounds of these US–Soviet negotiations in Geneva (15 February–28 June and 29 August–15 December 1988). The two sides had agreed to make no changes to the treaties themselves. It was decided that the JVE tests should be finalized and analysed before any decision be taken on joint final texts for the protocols. The US draft protocol to the TTBT calls for the right to on-site inspection of all tests over 50 kt or, if no tests are conducted above that level, of the two largest tests made each year. A team of 30 inspectors is to be stationed at the other party's nuclear test site to verify that the explosive force of underground blasts does not exceed the treaty limit. The team should be permitted to observe the lengthy preparations for any blast expected to exceed 50 kt.²¹ The Soviet TTBT draft protocol includes updated arrangements to verify compliance with the treaty, reflecting the Soviet preference for seismic verification methods, but takes into account the US proposal for on-site hydrodynamic measurements.

For the PNET the USA proposes a completely new protocol and calls for routine use of on-site CORRTEx measurement. The USSR suggests only some new provisions to the existing Protocol—which already provides for on-site direct hydrodynamic yield measurement for certain explosions.

In June 1988 the USA and the USSR exchanged information about the size of some of their past nuclear tests in the range of 100–150 kt. This was the first time the Soviet Union had disclosed the yield of its nuclear explosions. The provision of seismic data on these blasts by both sides²² was of importance in the calculation of the size of the JVE explosions. The original Protocols to the TTBT and the PNET actually provide for exchange of calibration data, but since the treaties have not been ratified this has never taken place.

On several occasions the USA has argued that Soviet explosions have exceeded 150 kt. All these accusations have been rejected by the Soviet Union. In March and in December 1988 the USA reaffirmed previous assertions that a number of Soviet tests had probably exceeded the 150-kt limit.²³ However, the US congressional Office of Technology Assessment (OTA) has published a report stating that all of the estimates of Soviet and US tests were within the 90 per cent confidence level that one would expect if the yields were 150 kt or less. Extensive statistical studies had examined the distribution of estimated yields of explosions at Soviet test sites and concluded that the Soviet Union was

observing a yield limit 'consistent with compliance with the 150 kt limit of the Threshold Test Ban Treaty'.²⁴

Other initiatives

Since 1986 the Soviet Academy of Sciences and the Natural Resources Defense Council (NRDC), a private US environmental protection organization, have been conducting a joint seismic project with the aim of demonstrating that verification is not an obstacle to a nuclear test ban or moratorium. US scientists have been allowed to operate seismic monitoring stations in the vicinity of the Semipalatinsk test site and Soviet scientists were permitted to place seismic recording equipment around the US Nevada Test Site. When the project started the Soviet moratorium was still in effect and no nuclear explosions were conducted in the USSR. The US stations in the Semipalatinsk area registered many non-nuclear industrial explosions conducted in mines at distances of 50–100 km although their yield was only dozens of tons. The processing of data from such chemical explosions as well as from earthquakes proved the supposition that the bedrock near the Soviet test site is harder than that at the Nevada Test Site, which means that explosions at Semipalatinsk register stronger shock-waves than similar explosions at Nevada. This is important to have in mind when judging US accusations that Soviet tests have on several occasions exceeded the 150-kt yield limit. (In addition to this project a joint team of scientists from the NRDC and the Soviet Academy of Sciences also participated in the JVE test in Nevada, taking seismic measurements at three distant sites.)

In April 1988 three chemical explosions with yields of 10–15 tons were conducted in the Nevada desert by Soviet and US scientists. The explosions were designed to simulate sub-kiloton nuclear blasts to test the discrimination capability of seismic stations and to make it possible to compare the propagation of seismic signals in the Nevada Test Site region with similar data collected in the Soviet Union. The experiment allowed the scientists to confirm that the bedrock in Nevada absorbs shock-waves to a greater extent than that in the Semipalatinsk area, and that it is quite possible to verify a very-low-yield nuclear test ban.

The joint project also showed that even if efforts are made to conceal explosions by conducting them in, for example, caves ('decoupling'), it is still possible to detect them with high-frequency registering equipment and even with existing equipment if it is located near the test site.²⁵ The most important result of this private US–Soviet seismic experiment, however, is that it has proved the feasibility of verifying that nuclear tests are *not* conducted, which means that compliance with the terms of a moratorium, a permanent cessation of nuclear tests or a limitation on the number of tests can be verified.

A similar project, the British Seismic Verification Research Project (BSVRP) in which British seismic stations were set up in the Soviet Union to monitor Soviet tests, is being carried out by British experts and the Soviet Academy of Sciences.

IV. Conclusions

After the conclusion of the two JVE tests, the US chief delegate to the nuclear testing negotiations in Geneva told journalists that because of the good results of the experiment the treaties concerned could be sent to the US Congress for ratification in January 1989.²⁶ However, by the end of the year no agreement had been reached on joint verification protocols to the treaties.²⁷

Even when the TTBT and the PNET have entered into force, the situation will not have changed significantly from the arms control point of view. The 1988 JVE exercise has certainly increased confidence between the two sides but, in fact, comprehensive verification methods had been thoroughly worked out by the two parties before the signing of the two treaties. The 150-kt yield limit is of even less interest and importance now than it was when the treaties were signed, since most testing today is conducted at lower levels and because monitoring and verification capabilities have improved greatly since 1976. In addition there could be a risk that the USA now regards efforts to limit testing to be completed for the foreseeable future, or may argue for a trial implementation period for the TTBT and the PNET before other steps towards limiting testing can be taken.

There is now a broad consensus among scientists that a low-threshold test ban prohibiting tests above 1–10 kt could probably be adequately verified.²⁸ The Soviet Union earlier agreed that it would be prepared to reach an interim agreement with the USA limiting the yield of the explosions to 1 kt (and the number of tests to two or three per year).²⁹ However, the Reagan Administration was opposed to such a low threshold. In a report to the Congress, released in September 1988, President Reagan said that progress on nuclear weapon reductions has no direct linkage to restrictions on nuclear testing and that should a US–Soviet agreement on a reduction on strategic weapons be reached it will be even more important that the remaining weapons are tested. The report also argues that a ban on tests above either 1-kt or 10-kt yield would pose serious risks.³⁰

It should be noted that Article I.2 of the TTBT states: 'Each Party shall limit the number of its underground nuclear weapon tests to a minimum'. Various proposals to limit the annual number as well as the yield of tests have been presented at the Geneva Conference on Disarmament and in the US Congress. In a White House statement issued at the end of the second round of the US–Soviet nuclear testing negotiations in 1988, it was proposed that future negotiations include a step-by-step programme of limiting and ultimately ending nuclear testing.³¹

Furthermore, in the latest annual US defence budget, signed into law by President Reagan in October 1988, the Department of Energy, which is responsible for the nuclear weapon programme, is directed to pursue a series of activities under the Nuclear Test Ban Readiness Program to prepare for the possibility that a future US–Soviet agreement on nuclear testing would limit further explosive testing. The Department of Energy is required to find ways to ensure the reliability of the weapons without explosive testing and to pursue a 'vigorous program of stockpile inspection and non-explosive testing'.³²

Notes and references

- ¹ Communiqué issued by the Office of the French President, 8 June 1974; see SIPRI, *World Armaments and Disarmament: SIPRI Yearbook 1975* (Taylor & Francis: London, 1975), p. 487.
- ² Speech by the Chinese Premier, cited in 'Zhao offers arms cuts proposal in peace year speech', *China Daily*, 22 Mar. 1986.
- ³ Norris, R. S., Cochran, T. B. and Arkin, W. M., 'Known US nuclear tests July 1945 to 31 December 1987', *Nuclear Weapons Databook*, Working Paper no. 86-2 (Rev. 2A) (Natural Resources Defense Council: Washington, DC, Jan. 1988).
- ⁴ 'Mururoa "in danger of breaking up"', *The Australian*, 30 Mar. 1988.
- ⁵ Ferm, R., 'Nuclear explosions', SIPRI, *World Armaments and Disarmament: SIPRI Yearbook 1984* (Taylor & Francis: London, 1984), chapter 2.
- ⁶ Ferm, R., 'Nuclear explosions', SIPRI, *World Armaments and Disarmament: SIPRI Yearbook 1985* (Taylor & Francis: London, 1985), chapter 2.
- ⁷ Fondation Costeau, *Mission Scientifique de la Calypso: Sur le Site d'Experimentations Nucleaires de Mururoa*, Paris, Nov. 1988.
- ⁸ European Parliament, Committee on the Environment, Public Health and Consumer Protection, *Second Report on the Sending of an Independent, International Commission of Experts, Including Relevant Medical Specialists, to French Polynesia* (Doc. B2-327/87), Luxembourg, 1988.
- ⁹ 'France to shift some nuclear tests to 2d site', *International Herald Tribune*, 28 Mar. 1988.
- ¹⁰ Oral communication by Bengt Danielsson, Papeete.
- ¹¹ *Pacific Defence Reporter* (note 5).
- ¹² UN document A/S-15/PV.4, 3 June 1988.
- ¹³ 'China detonates neutron bomb', *Washington Post*, 8 Nov. 1988.
- ¹⁴ Berger, J., Gohberg, M., Cochran, T. and Nersesov, I., 'Seismic verification and the question of a nuclear test ban', *Scientific World*, vol. 32, no. 2 (1988).
- ¹⁵ US Information Service, EUR-406 (US Embassy, Stockholm), 11 Aug. 1988.
- ¹⁶ US Department of Energy, Nevada Operations Office, *CORRTEX* (Los Alamos National Laboratory: Los Alamos, N. Mex., Apr. 1986).
- ¹⁷ 'Data from atom blast adds to treaty verification questions', *Washington Post*, 8 Sep. 1988.
- ¹⁸ 'On-site test data animate US debate', *International Herald Tribune*, 31 Oct. 1988.
- ¹⁹ 'Atomic test data weaken US view', *New York Times*, 11 Sep. 1988.
- ²⁰ *Izvestia*, 5 Aug. 1988.
- ²¹ 'US seeks "intrusive" atom-test inspections', *Washington Post*, 10 Mar. 1988.
- ²² 'US and Soviets give A-test data', *New York Times*, 29 June 1988.
- ²³ The President's unclassified *Report on Soviet Noncompliance with Arms Control Agreements*, US Arms Control and Disarmament Agency (ACDA): Washington, DC, 2 Dec. 1988.
- ²⁴ US Congress, Office of Technology Assessment, *Seismic Verification of Nuclear Testing Treaties* (OTA-ISC-361) (US Government Printing Office: Washington, DC, May 1988), p. 19.
- ²⁵ See Berger *et al.* (note 17).
- ²⁶ *Atlantic News*, no. 2052 (30 Sep. 1988).
- ²⁷ 'US-Soviet talks fail to clear way for unratified nuclear-test', *International Herald Tribune*, 17-18 Dec. 1988.
- ²⁸ The issue of verifying low-level testing is covered extensively in Goldblat, J. and Cox, D. (eds), SIPRI, *Nuclear Weapon Tests: Prohibition or Limitation* (Oxford University Press: Oxford, 1988).
- ²⁹ UN document A/42/509, 25 Aug. 1987.
- ³⁰ 'Reagan tells Congress new nuclear testing limits are unlikely', *Arms Control Today*, Nov. 1988.
- ³¹ US Information Service, EUR-403 (US Embassy, Stockholm), 15 Dec. 1988.
- ³² 'Under little-noticed new provision, US must find options to atom tests', *New York Times*, 10 Oct. 1988.

Appendix 2A. Nuclear explosions, 1945–88

Table 2A.1 Registered nuclear explosions in 1988

Date	Origin time (GMT)	Latitude (deg)	Longitude (deg)	Region	Body wave magnitude ^a
USA					
15 Feb.	181000.0	37.314 N	116.471 W	Nevada	5.4
7 Apr.	171500.0	37.013 N	116.044 W	Nevada	
13 May	153500.1	37.124 N	116.072 W	Nevada	4.9
21 May	223000.0	37. N	116. W	Nevada	
2 June	130000.0	37.260 N	116.441 W	Nevada	5.5
22 June	140000.0	37.166 N	116.072 W	Nevada	
22 June	140000.0	37.166 N	116.072 W	Nevada	
7 July	150530.0	37.252 N	116.377 W	Nevada	5.9
17 Aug. ^b	170000.0	37.297 N	116.307 W	Nevada	5.6
23 Aug.	183000.0	..	..	Nevada	
30 Aug.	180000.0	37.086 N	116.069 W	Nevada	5.3
13 Oct.	140000.0	37.089 N	116.049 W	Nevada	6.1
9 Nov.	200015.0	..	..	Nevada	
10 Dec.	203001.0	37.3 N	116.5 W	Nevada	5.1
USSR					
6 Feb.	041903.0	49.1 N	78.2 E	Semipalatinsk	4.8
13 Feb.	030505.9	49.922 N	78.904 E	Semipalatinsk	7.1
3 Apr.	013305.7	49.885 N	78.955 E	Semipalatinsk	7.1
22 Apr.	093006.7	49.793 N	78.114 E	Semipalatinsk	5.0
4 May	005706.8	49.916 N	78.725 E	Semipalatinsk	7.2
7 May	224950.0	73.353 N	54.467 E	Novaya Zemlya	6.4
14 June	022706.4	50.022 N	78.986 E	Semipalatinsk	5.7
22 Aug.	161958.1	66.287 N	78.556 E	N.W. Siberia ^c	5.4
6 Sep.	162005.2	61.613 N	46.999 E	European USSR ^c	5.0
14 Sep. ^b	035957.4	49.821 N	78.796 E	Semipalatinsk	7.1
26 Sep.	074502.0	50.1 N	78.5 E	Semipalatinsk	5.0
18 Oct.	034006.4	49.865 N	78.192 E	Semipalatinsk	5.2
12 Nov.	033003.8	50.086 N	78.963 E	Semipalatinsk	6.3
23 Nov.	035707.6	49.959 N	78.086 E	Semipalatinsk	5.6
4 Dec.	051952.8	73.406 N	54.903 E	Novaya Zemlya	6.7
17 Dec.	041804.0	49.6 N	79.6 E	Semipalatinsk	4.4
28 Dec.	052809.0	50.0 N	79.0 E	Semipalatinsk	3.9
France					
11 May	165958.1	21.927 S	139.107 W	Mururoa	
25 May	170058.4	21.899 S	139.027 W	Mururoa	
16 June	171457.0	21. S	139. W	Mururoa	
23 June	173058.5	21.928 S	139.042 W	Mururoa	
25 Oct.	170000.0	21. S	139. W	Mururoa	
5 Nov.	162957.6	22.052 S	138.877 W	Mururoa	
23 Nov.	170058.5	22.908 S	139.029 W	Mururoa	
30 Nov.	175454.3	22.90 S	138.91 W	Fangataufa	
China					
29 Sep.	065957.0	41.2 N	89.1 E	Lop Nur	4.9

^a Body wave magnitude (m_b) indicates the size of the event. m_b data for the US, Soviet and Chinese explosions were provided by the Hagfors Observatory of the Swedish National Defence Research Institute (FOA).

^b JVE explosion.

^c Announced as having been carried out 'in the interest of the national economy', which may be taken to mean that it is conducted for non-military purposes.

Table 2A.2. Estimated number of nuclear explosions 16 July 1945–5 August 1963 (the signing of the Partial Test Ban Treaty)

a = atmospheric
u = underground

Year	USA		USSR		UK		France		Total
	a	u	a	u	a	u	a	u	
1945	3	0							3
1946	2 ^a	0							2
1947	0	0							0
1948	3	0							3
1949	0	0	1	0					1
1950	0	0	0	0					0
1951	15	1	2	0					18
1952	10	0	0	0	1	0			11
1953	11	0	4	0	2	0			17
1954	6	0	7	0	0	0			13
1955	17 ^a	1	5 ^a	0	0	0			23
1956	18	0	9	0	6	0			33
1957	27	5	15 ^a	0	7	0			54
1958	62 ^b	15	29	0	5	0			111
1949–58, exact years unknown									
			18						18
1959	0	0	0	0	0	0			0
1960	0	0	0	0	0	0	3	0	3
1961	0	10	50 ^a	1	0	0	1	1	63
1962	39 ^a	57	43	1	0	2	0	1	143
1 Jan.–									
5 Aug. 1963	4	25	0	0	0	0	0	2	31
Total	217	114	183^c	2	21	2	4	4	547

^a One of these tests was carried out under water.

^b Two of these tests were carried out under water.

^c The total figure for Soviet atmospheric tests includes the 18 additional tests conducted in the period 1949–58, for which exact years are not available.

Table 2A.3. Estimated number of nuclear explosions 6 August 1963–31 December 1988

a = atmospheric
u = underground

Year	USA ^a		USSR		UK ^a		France		China		India		Total
	a	u	a	u	a	u	a	u	a	u	a	u	
6 Aug.– 31 Dec.													
1963	0	15	0	0	0	0	0	1					16
1964	0	38	0	6	0	1	0	3	1	0			49
1965	0	36	0	9	0	1	0	4	1	0			51
1966	0	42	0	15	0	0	6	1	3	0			67
1967	0	34	0	17	0	0	3	0	2	0			56
1968	0	45 ^b	0	13	0	0	5	0	1	0			64
1969	0	38	0	16	0	0	0	0	1	1			56
1970	0	35	0	17	0	0	8	0	1	0			61
1971	0	17	0	19	0	0	6	0	1	0			43
1972	0	19	0	22	0	0	3	0	2	0			46
1973	0	16 ^c	0	14	0	0	5	0	1	0			36

Table 2A.3. *cont.*

Year	USA ^a		USSR		UK ^a		France		China		India		Total
	a	u	a	u	a	u	a	u	a	u	a	u	
6 Aug.– 31 Dec.													
1974	0	14	0	18	0	1	8	0	1	0	0	1	43
1975	0	20	0	15	0	0	0	2	0	1	0	0	38
1976	0	18	0	17	0	1	0	4	3	1	0	0	44
1977	0	19	0	18	0	0	0	8 ^d	1	0	0	0	46
1978	0	17	0	27	0	2	0	8	2	1	0	0	57
1979	0	15	0	29	0	1	0	9	0	0	0	0	54
1980	0	14	0	21	0	3	0	13	1	0	0	0	52
1981	0	16	0	22	0	1	0	12	0	0	0	0	51
1982	0	18	0	31	0	1	0	6	0	0	0	0	56
1983	0	17	0	27	0	1	0	9	0	1	0	0	55
1984	0	17	0	29	0	2	0	8	0	2	0	0	58
1985	0	17	0	9	0	1	0	8	0	0	0	0	35
1986	0	14	0	0	0	1	0	8	0	0			23
1987	0	14	0	23	0	1	0	8	0	1	0	0	47
1988	0	14	0	17	0	0	0	8	0	1	0	0	40
Total	0	579	0	451	0	18	44	120	22	9	0	1	1244

^a See note *a* below.^b Five devices used simultaneously in the same test are counted here as one explosion.^c Three devices used simultaneously in the same test are counted here as one explosion.^d Two of these tests may have been conducted in 1975 or 1976.

Table 2A.4. Estimated number of nuclear explosions 16 July 1945–31 December 1988

USA ^a	USSR	UK ^a	France	China	India	Total
910	636	41	172	31	1	1790

^a All British tests from 1962 have been conducted jointly with the United States at the Nevada Test Site. Therefore, the number of US tests is actually higher than indicated here.

Sources for tables 2A.1–2A.4

Swedish National Defence Research Institute (FOA), various estimates; Norris, R. S., Cochran, T. B. and Arkin, W. M., 'Known US nuclear tests July 1945 to 31 December 1987', *Nuclear Weapons Databook*, Working Paper no. 86–2 (Rev. 2A) (Natural Resources Defense Council: Washington, DC, Jan. 1988); Department of Scientific and Industrial Research (DSIR), Geophysics Division, New Zealand; Cochran, T. B., Arkin, W. M., Norris, R. S. and Sands, J. I., *Soviet Nuclear Weapons* (Ballinger: Cambridge, Mass., 1989), chapter 10; Burrows, A. S., Norris, R. S., Arkin, W. M. and Cochran, T. B., 'French nuclear testing, 1960–88', *Nuclear Weapons Databook*, Working Paper no. 89–1 (Natural Resources Defense Council: Washington, DC, Feb. 1989); and various estimates.

Appendix 2B. Agreement between the United States of America and the Union of Soviet Socialist Republics on the Conduct of a Joint Verification Experiment

The United States of America and the Union of Soviet Socialist Republics, hereinafter referred to as the Parties,

Reaffirming the statement of the Secretary of State of the United States and the Foreign Minister of the Union of Soviet Socialist Republics of December 9, 1987,

Proceeding from the agreement to conduct a Joint Verification Experiment, hereinafter referred to as JVE, for the purpose of the elaboration of effective verification measures for the Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Underground Nuclear Weapon Tests, hereinafter referred to as the 1974 Treaty on the Limitation of Underground Nuclear Weapon Tests,

Taking into account the agreements reached by the US and Soviet delegations at the negotiations in Geneva on specific JVE technical procedures and organization plans in full conformity with the December 9, 1987, ministerial statement,

Have agreed as follows:

1. For purposes of the JVE, there shall be two nuclear explosions, one at the US Nevada Test Site and one at the USSR Semipalatinsk Test Site, each hereinafter being referred to as a JVE explosion.

2. The planned yield of the JVE explosion at each test site shall be not less than 100 kilotons and shall approach 150 kilotons.

3. Each Party shall have the opportunity to measure, on the basis of reciprocity, the yield of the JVE explosion conducted at the other Party's test site using teleseismic methods and, at the other's test site, using hydrodynamic yield measurement methods.

4. Each Party shall also perform teleseismic measurements with its national seismic station network for both JVE explosions. To assist in teleseismic measurement, the Parties shall exchange data on five nuclear explosions conducted after January 1, 1978 but before January 1, 1988 to include yield, date and time, geographic coordinates, depth of burial, and associated geological and geophysical data. For each of these historical explosions, the Parties shall exchange teleseismic recordings taken at five designated stations on each side including station corrections and the best network seismic magnitude.

5. Each Party shall perform hydrodynamic yield measurements within the satellite hole provided for that purpose of the JVE explosions at both Parties' test sites using the methods it has identified in this Agreement.

6. As a yield standard, the experiment will include yield measurements within the emplacement hole of the JVE explosions at both Parties' test sites using the hydrodynamic methods each Party has identified in this Agreement. Each Party shall report to the other Party the yield values of each of the JVE explosions that are derived by each Party on the basis of hydrodynamic yield measurements undertaken within the satellite hole and within the emplacement hole. Each Party shall undertake for the purpose of the JVE to ensure at its test site a test configuration that will allow each Party to obtain an accurate yield standard of the JVE explosion. The use of hydrodynamic

yield measurement methods within the emplacement hole by the visiting Party is being undertaken only in the JVE, and such measurement methods within the emplacement hole shall not be proposed by either party for verification of the 1974 Treaty on the Limitation of Underground Nuclear Weapon Tests.

7. In the course of the JVE, each Party shall carry out teleseismic measurements of both JVE explosions at its five seismic stations for which historical data were exchanged. The Parties shall exchange the seismic data obtained in the JVE in corresponding detail to that exchanged for the historical explosions.

8. The JVE will provide information on the basis of which each Party can demonstrate the effectiveness of its hydrodynamic yield measurement methods at the test site of the other Party. Because the JVE is not designed to produce statistically significant results, it cannot by itself establish statistical proof of the accuracy of any particular yield measurement method.

9. The JVE conducted at both test sites will provide sufficient information to resolve all concerns, except those of a statistical nature, that have been identified by either Party regarding methods proposed by the other Party for verification of the 1974 Treaty on the Limitation of Underground Nuclear Weapon Tests by providing an example of the effectiveness of the verification methods used in the JVE and by demonstrating their practicability and non-intrusiveness.

10. Specific design procedures of the JVE configuration within the emplacement hole that may have been necessary to accommodate technical objectives of the JVE shall not provide a basis for objections by either Party regarding the use of hydrodynamic yield measurements within the satellite hole for future nuclear tests. Such design procedures of the JVE configuration shall not establish a precedent for requiring similar design procedures in the two Parties' future tests as a condition for agreement on measures permitting effective verification of the 1974 Treaty on the Limitation of Underground Nuclear Weapon Tests.

11. The JVE will assist the Parties in: finalizing operational procedures for the conduct of hydrodynamic yield measurements within the satellite hole and teleseismic yield measurements for verification of future nuclear tests; establishing procedures for gathering the geological and geophysical data that is to be exchanged in accordance with any future yield measurement method proposed by either Party; determining procedures for exchange of data by the Parties on shock-wave properties of rock; comparing procedures to be used by the Parties for analyzing results of either hydrodynamic or teleseismic yield measurement methods proposed by either Party; and considering improved measures for reducing any intrusiveness associated with the verification methods proposed by each Party.

12. The Parties will use their best efforts to conduct the JVE explosions in accordance with the schedule specified in the Annex.

13. The exchange of the data obtained in the preparation for and conduct of the JVE and of the results of the analysis by each Party will be done in accordance with the schedule specified in the Annex with a view toward agreement on measures providing for effective verification of the 1974 Treaty on the Limitation of Underground Nuclear Weapon Tests.

14. Upon request by either Party, the Parties shall meet promptly to discuss any question or concern that may arise concerning the provisions of this Agreement.

15. Each Party shall treat with due respect the personnel of the other Party in its territory in connection with the preparatory work for, and execution of, the JVE and shall take all appropriate steps to prevent any attack on the person, freedom and dignity of such personnel.

16. To ensure the effective implementation of the foregoing provisions, the Parties

have reached the agreements set forth in the Annex, which form an integral part of this Agreement.

This Agreement, including the Annex hereto, shall enter into force upon signature.

DONE at Moscow on May 31, 1988, in two copies, each in the English and Russian languages, both texts being equally authentic.

FOR THE UNITED STATES OF
AMERICA
George Shultz

FOR THE UNION OF SOVIET
SOCIALIST REPUBLICS
Eduard Shevardnadze

Source: US Department of State, Washington, DC, 9 Dec. 1987 (mimeographed).

Note by the Department of State: 'The annex to the agreement (more than 180 pages) is not included in this copy.'

3. Military use of outer space

JOHN PIKE

I. Introduction¹

To the extent that the military use of outer space has been a political issue in recent years, the debate has largely been focused on the ends and means of the US Strategic Defense Initiative (SDI). 1988 has been no exception in this regard. In a less public sphere, however, this year has witnessed a number of important developments, both on a policy level and in terms of technological advances, indicating that a shift in priorities is taking place. While both the USA and the USSR continue to spend money on ballistic missile defence, with uncertain implications not only for the Anti-Ballistic Missile (ABM) Treaty but perhaps more crucially for the talks on strategic arms reductions now on the agenda, there seems to be a growing consensus on the part of both countries that the most cost-effective use of outer space still lies in the application of satellite—and anti-satellite (ASAT)—technology. New impetus to ASAT programmes is seen as a balance to the expansion of military satellite capabilities of the other side. Changes in SDI planning are discussed in section II. Section III describes the current status of ASAT development.

Reflecting this trend is a major expansion in the number and capabilities of operational military satellites heralded by the successful launch in 1988 of new US and Soviet military satellites in several categories, above all the launch of the first US Lacrosse imaging-radar satellite. This expansion also involves an increased integration of various space-based systems with land, sea and air forces, enhancing their operational capabilities in many ways. The US and Soviet satellite programmes are presented in section IV.

The recommencement of the US space shuttle programme and the successful launch of the first Soviet shuttle are small but important steps in this direction as well. These developments are discussed in section V.

Section VI concludes the chapter with a brief description of the military satellite programmes of China, France and the United Kingdom.

II. Strategic defence systems

Soviet ballistic missile defence

Although public attention has largely been focused on developments in the US Strategic Defense Initiative, the Soviet Union continued work on its own anti-missile systems. Since the early 1980s the USSR has gradually upgraded the elements of the anti-missile system around Moscow that is permitted under the ABM Treaty.² Mechanically steered radars are being replaced by much more capable phased-array radars. Two types of interceptor missile will be used, taking advantage of atmospheric bulk filtering to discriminate decoys

from actual warheads. The interceptors will be deployed in underground silos to reduce their vulnerability to direct attack.

The SH-11 long-range exo-atmospheric interceptor missile (somewhat smaller than the massive Galosh missile) is probably a three-stage solid-fuel rocket with a range of 300–400 kilometres and a multi-megaton warhead. The SH-08 short-range endo-atmospheric interceptor is probably a two-stage solid-fuel rocket with a range of about 100 kilometres and a low-yield nuclear warhead. It is similar in design and mission to the US Sprint missile, although its maximum acceleration is reportedly significantly lower.

The Pill Box phased-array battle-management radar, which will replace Try Add radars at Moscow ABM sites, is similar in function to the US Missile Site Radar of the Sentinel and Safeguard systems. This radar, located in the Moscow suburb of Pushkino, provides 360 degree coverage, and will supplement the coverage provided by the older Dog House and Cat House radars.³

The Pechora-type bi-static phased-array early-warning radar will supplement the older Hen House radars. Deployment began in the late 1970s at nine sites: Sary-Shagan, Pechora, Lyaki, Mishelevka, Olenegorsk, Krasnoyarsk (Abalakova), Skrudna, Barnovichi and Mukachevo.⁴ Construction of two additional radars, at Sevastopol in the Crimea and in eastern Siberia, was reported in 1988, bringing the total number of these radars to 11.⁵ The absence of additional details concerning Soviet developments in 1988 is more a reflection of the general lack of information, than a lack of activity on the part of the USSR.

The US Strategic Defense Initiative

When President Reagan announced the Strategic Defense Initiative in 1983 it was assumed that at some point in the early 1990s a single grand decision would be made in which the United States would commit itself to deploying large-scale strategic defences, which would imply scrapping or drastically amending the ABM Treaty. This is the type of 'early deployment' decision that former Secretary of Defense Caspar Weinberger advocated with such singular lack of success.⁶

It is becoming increasingly apparent that the US political decision-making process is extremely adverse to making such very large, very momentous decisions. At the same time, the transition to the Bush Administration leaves SDI in something of a political limbo, deprived of Ronald Reagan's unquestioning support, but still popular with the right wing of the Republican Party and a considerable segment of the US public. None of the political candidates in the 1988 election found SDI to be a potent political symbol; and George Bush entered office having made ambiguous statements on the issue.

Defense Science Board recommendations

In this context, one of the most significant developments of 1988 was the report of the Everett Panel of the Defense Science Board,⁷ which had been charged by

the Defense Acquisition Board in 1987 with reviewing the status and prospects of the SDI programme.⁸ The Defense Science Board released its report in the spring of 1988, and the report quickly gained considerable political currency.

The Everett Report marks a fundamental departure in the game plan for how the Administration should go about making the decision, or in this case the decisions, for deploying an SDI system. The strategy outlined by the Everett Panel was to break the decision up into a series of smaller ones, each of which would not be unpalatable in and of itself. The Panel concluded that, although the final goal of the process would be a decision to deploy a full-out phase one⁹ SDI system, in the meantime there were a series of smaller decisions that might profitably be made, in particular with regard to the application of various SDI technologies to ASAT missions, as discussed in the following section.

One of the Panel's recommendations was deployment of the Booster Surveillance and Tracking System (BSTS, one of the sensor elements of the phase one system) to provide improved early warning of missile attack and enhanced intelligence collection and verification capabilities. The fiscal year 1990 budget request includes funding for this purpose.

Deployment of the Exoatmospheric Reentry-vehicle Interception System (ERIS) for the ASAT mission was another recommendation, as well as deployment of small numbers of several of these systems as part of what Senator Sam Nunn has suggested might be an Accidental Launch Protection System (ALPS).

Defense Acquisition Board revisions

Another major development of 1988 was the Defense Acquisition Board's revision of the plan for SDI deployment.¹⁰ These changes were driven by a requirement to reduce the cost of the system to a level that would not be obviously implausible.

Although Congress has previously greatly reduced the funding requests of the SDI Organization (SDIO), these reductions have had little impact on the course of the programme. When the SDI programme was initially defined in 1983 by a panel headed by Dr James Fletcher, two alternative budgets were prepared. A lavish 'technology-limited' budget included funding of every technology of conceivable relevance to ballistic missile defence (BMD). A more modest 'fiscally-limited' budget plan included only those technologies that were regarded as having real technical promise.

Each year since, the SDIO has submitted a 'technology-limited' budget request, and Congress has granted funding at the level of the 'fiscally-limited' budget originally envisioned by the Fletcher Panel. Although these budget cuts have led to reduced support for marginal technologies such as railguns, support for the core technologies for phase one system deployment has been largely unaffected.

As outlined in the Defense Acquisition Board's 1988 revision plan, however, these systems are also being earmarked for reductions. The previously planned capability of the BSTS and the Space Surveillance and Tracking System (SSTS) satellites is being reduced. Greater reliance is going to be placed on the

Ground-based Surveillance and Tracking System (GSTS) and a railway-deployed Ground-Based Radar (GBR) system.

Major reductions in the planned number of Space-Based Interceptors (SBI) have also been made. The original plan called for approximately 3000 interceptors to be carried on approximately 300 satellites. The current plan calls for about 1000 interceptors to be deployed on approximately 160 satellites. On the other hand, the number of ERIS interceptors has been significantly increased above the number that was originally planned in 1987.

The result of all these changes is that the SDIO currently estimates that deployment of this initial phase of the strategic defence system, rather than requiring \$120 billion or \$150 billion, could be accomplished for slightly less than \$70 billion.

These changes have also been accompanied by a stretching out of the schedule for the programme as a whole. Under current plans a final go-ahead for deployment of the system would not be given until 1994, and the system itself would probably not achieve an initial operational capability until around 1998. Full operational capability could not be achieved until early in the 21st century.

Technological developments

As in previous years, visible technical progress of the SDI programme has been sparse. The Delta-181 test of early 1988 did collect important data on the plumes of rocket boosters and post-boost vehicles, warheads and decoys, and the test also demonstrated anti-missile capabilities and hardware. But the lessons learned from this data-collection flight have yet to be incorporated into prototype hardware.

Looking beyond the phase one programmes, however, several other systems have reached an advanced state of development in 1988. The High-altitude Endoatmospheric Defense Interceptor (HEDI) would be used to intercept Soviet warheads shortly after they begin to re-enter the atmosphere.¹¹ The Airborne Optical Adjunct (AOA) is an infra-red sensor system carried on a Boeing 767 aircraft that would track warheads in the mid-course and terminal phases of flight. Both of these systems will begin field testing in 1989.

Lasers continue to be the principal long-term focus of the SDI programme. The Army Ground-Based Free Electron Laser (GB-FEL) effort is intended to demonstrate a megawatt-class laser by 1994, with scaling to higher power levels a few years thereafter. In the meantime, the GB-FEL programme is being adapted to fit an ASAT role.¹² There is also renewed interest in the space-based chemical laser. The Zenith Star space test is intended to demonstrate, prior to a decision to deploy the initial phase of SDI, the availability of a direct-energy weapon that can cope with faster-flying Soviet missiles. Ground testing of the elements of the chemical laser will be completed by 1989, and the space-based Zenith Star test of this system could be conducted by 1994.¹³

The slow rate of technical progress has not prevented the increasing integration of strategic defences into US strategic thinking and planning. The integration of offensive and defensive forces was enunciated in the January 1988 Defense Guidance prepared by Defense Secretary Frank Carlucci, which

included as one of the missions of US strategic forces the ability to 'limit damage—by active and passive measures—to the United States and its Allies'.¹⁴

SDI and the ABM Treaty

It is apparent that the debate over the broad reinterpretation of the ABM Treaty as it applies to SDI has been successfully concluded. Congress has made it very clear that it regards the reinterpretation of the ABM Treaty as being without historical or legal merit. It will not approve funds for SDI tests that are rationalized as being consistent only with a broad interpretation of the Treaty.

This also applies to the full deployment of Senator Nunn's proposed Accidental Launch Protection System outlined in the Everett Panel Report. During the course of 1988 it became clear that any anti-missile system that could provide defence against unauthorized launches would far exceed the present ABM Treaty limit of 100 interceptors deployed at a single site. Studies by Lockheed and McDonnell Douglas have concluded that as many as 1000 interceptors deployed at half a dozen sites would be required to protect the United States. An equally effective Soviet system would probably be several times this size, given disparities in geography and technology.

However, Congress has made it equally clear that as long as the Administration is prepared to claim that a test under the SDI programme is consistent with the traditional interpretation of the ABM Treaty, it is unlikely to interfere in that testing process. The three scheduled tests that pose the greatest immediate challenge to the traditional interpretation of the ABM Treaty are those of the Airborne Optical Adjunct sensor system (in 1989), the Zenith Star space-based chemical laser test (in 1993 or 1994), and the Booster Surveillance and Tracking System test (in 1995).

III. Anti-satellite weapon systems

Although eclipsed in recent years by the controversy over the Strategic Defense Initiative, interest in anti-satellite weapons is clearly on the increase. The future of the tacit moratorium on the testing of certain types of these weapons that existed in 1984–88 is now in doubt. While the US F-15 air-launched miniature vehicle ASAT programme has been terminated, the Soviet co-orbital ASAT remains operational, and there are plans for the United States to begin work on a more advanced system.

One of the sources of growing interest in ASATs is the fact that military spacecraft are becoming increasingly attractive targets. A growing number of satellites are intended to support wartime as well as peace-time operations, and new generations of intelligence satellites are emerging with the primary mission of locating terrestrial targets in wartime. While the Soviet Radar Ocean Reconnaissance Satellites (RORSAT) have long provided a rationale for US ASAT development, the introduction of the US Lacrosse and KH-12 targeting satellites must be creating similar incentives on the Soviet side.

The temptation to develop ASAT systems is also increased by growing

technological opportunities. The US SDI programme has reinforced the long-standing relationship between anti-satellite and anti-missile technology by providing a variety of new weapons that may find early application in the ASAT role, and similar trends are undoubtedly at play in the Soviet Union.

Soviet anti-satellite developments

Although there were no overt manifestations of the Soviet ASAT programme in 1988, there is little doubt that the co-orbital system at the Baikonur Cosmodrome is still operational. While there has not been a test of this system since 1983, the SL-11 booster it uses is becoming a work-horse of the Soviet space effort, and the USSR probably retains some confidence in the system, despite its manifestly limited capabilities.

It is precisely because of these limited capabilities, however, that a resumption of Soviet ASAT testing, should it occur, is likely to be in the form of a more advanced system, which might be similar in concept to one of the various systems currently under consideration in the United States. Given the frequent Soviet discussion of potential countermeasures to the SDI programme, it would not be surprising if such testing were characterized as being the development of a counter to SDI.

US anti-satellite developments

For years the centre-piece of domestic and international political controversy, the air-launched miniature vehicle ASAT weapon was scrapped with surprisingly little public notice in the opening days of 1988. The Air Force concluded that congressional opposition to testing the F-15-carried weapon was insurmountable and that there was little reason to continue the expensive, and marginally effective, programme.

The decision to proceed with the evaluation of more advanced ASAT systems based on technologies originally developed for BMD missions was made by President Reagan on 6 February 1987.¹⁵ A review committee chaired by Frank Kendall, Assistant Deputy Director for Research and Engineering for Defensive Systems,¹⁶ concluded that a decision on the most promising directed-energy weapon approach could not be made until 1991, and suggested that the Army's ERIS and GB-FEL systems were the most promising from a technological point of view. These conclusions were disputed by the Air Force and Navy.¹⁷

Unable to resolve the inter-service rivalry, by early 1989 the Defense Acquisition Board was reportedly leaning towards establishing a joint service programme office for the new ASAT systems, deferring for the time being the decision of which service should take the lead.¹⁸

MIRACL

The 2-megawatt Mid-Infrared Advanced Chemical Laser (MIRACL) at the White Sands Missile Range in New Mexico is the most powerful military laser in the United States. Initially developed by the Navy, for the past few years it

has been used in the SDI programme for testing the lethality of laser weapons. The SDIO has no interest in developing this system for actual deployment, however, and decided in early 1988 to terminate further funding for the programme.¹⁹

Energetic lobbying by the New Mexico congressional delegation and advocates of directed-energy weapons led Defense Secretary Carlucci to direct in late 1988 that \$24 million be earmarked in the 1989 budget for continued operation and further upgrading of the MIRACL.²⁰ This is to include improvements in the ability of the laser's Sky Lite beam-director mirror system to follow rapidly moving low-altitude satellites.²¹ Tests may be conducted in 1989 on inactive US satellites and space debris.²²

Army GB-FEL

Although the MIRACL laser may be used for near-term ASAT testing, the leading candidate in the long run for this mission is the Army's multi-megawatt GB-FEL, currently under construction under the SDI programme at the White Sands Missile Range. This laser, scheduled for completion in 1994, will be equipped with a sophisticated atmospheric compensation system that would enable it to destroy satellites at altitudes of thousands of kilometres, and potentially to damage spacecraft at higher altitudes.

Army ERIS

In the near term the potential candidate for performing the ASAT mission is the ERIS interceptor. Army Strategic Defense Command commander Lt Gen. Robert Hammond asserts that ERIS is 'very well designed to handle the ASAT role'.²³ ERIS programme manager James Katechis has noted that the only modification required to adapt ERIS for the ASAT mission would be changes in computer software, which would be 'quite easy'. Compared with the task of intercepting ballistic missile warheads, 'it's generally easier to kill satellites. They're bigger and their orbits are more predictable since you have more time to track them—days instead of minutes'.²⁴

The pre-prototype ERIS system that will be tested beginning in 1990 will use the upper two stages of a Minuteman booster, and a kill vehicle weighing about 120 kg. It is estimated that even this rudimentary configuration could intercept satellites in orbits at altitudes of over 5000 km. The much lighter operational kill vehicle, weighing less than 60 kg, if mated to a booster consisting of all three stages of a Minuteman III intercontinental ballistic missile (ICBM), could be capable of attacking satellites at altitudes in excess of 40 000 km, including those in geosynchronous orbit, such as communications and early-warning satellites. With an improved third stage, these satellites could be destroyed in little more than two hours after the launch of the interceptor.²⁵

Navy options

Navy Space Command commander Rear Admiral David Frost has called for the development of a Navy ASAT capability, noting that 'there are some very attractive reasons why taking an anti-satellite system to sea is a good idea, since a lot of the Soviet reconnaissance systems are devoted against navy ships'.²⁶

Thus the Navy is studying options for an ASAT system, probably based on ERIS, that could be fired from vertical launch systems currently installed on surface ships and submarines, as well as from the missile tubes of ballistic-missile submarines.²⁷

The Navy also claims unique advantages to sea-based systems. All Soviet satellites are vulnerable to attack about 45 minutes after launch, as they pass over their apsidal point, which is approximately 1200 km west of the antipode of their launch site. The apsidal points for Baikonur and Plesetsk are both in the South Pacific. Navy ships armed with ASATs deployed in this area could effectively deny the USSR access to space.²⁸

Air Force options

The Air Force has proposed mounting the kinetic-kill vehicle under development as part of the SDI programme's Space-Based Interceptor effort on an ERIS booster to perform the ASAT mission.²⁹ In addition, the Air Force has continued work on the ground-based Excimer laser programme for ASAT applications, sharing half of the cost of the programme with the SDIO in the wake of a diminished interest in this laser for strategic defence applications.³⁰ However, considerable development work remains on the Excimer laser, as well as on the Chemical Oxygen-Iodine Laser (COIL) that is also under development for ASAT applications.

Anti-satellite arms control

Over the past few years the ASAT situation has been fairly stable. The Soviet Union initiated a moratorium on the testing of anti-satellite weapons that the US Congress reciprocated.

In 1988 Congress failed to re-extend the ASAT testing moratorium. This has not caused as much concern as it might had the Air Force not cancelled the F-15 ASAT programme. Efforts to achieve an eventual ASAT test ban nevertheless continue.

The prospects for a continuation of the informal bargaining mode of arms control that has succeeded in the realm of ASATs over the last several years are not bright. Congressional support for the moratorium on the testing of the F-15 system was conditional on the fact that the moratorium did not limit SDI testing. Most of the new ASAT systems are part of the SDI programme, and will be tested in a mode that is generally regarded as being consistent with the ABM Treaty.

IV. Soviet and US military satellite developments

The United States is on the verge of a major expansion in the number and capability of military satellites. The September 1988 shuttle launch of the first Lacrosse imaging-radar intelligence satellite was the beginning of an unprecedented increase in the scope of US low-altitude intelligence systems. Over the next several years, the Navstar navigation satellite system will be brought up to full strength, and a fleet of new Milstar satellites will enter service.³¹ In all,

the number of operational US military satellites will grow from about 60 in 1984, to over 90 by 1994.

This expansion is a product of the continuing integration of military space assets with terrestrial military planning, as well as of space systems with each other. Virtually every major combat unit in the US military—ships, aircraft and ground units—will be equipped with Navstar navigation receivers. Reception of imagery from intelligence satellites, once tightly restricted to a few intelligence agencies, will soon extend to US tactical command centres around the globe.

Although future Soviet plans naturally are difficult to predict, past developments indicate that the next several years will likewise witness continued expansion and improvement in Soviet military space capabilities, as well as a parallel increased integration of these space systems with terrestrial forces and with each other.

With the long operational lifetimes of Western satellites, and the growing lifetimes of Soviet spacecraft, a listing of only the year's launches provides a misleading picture of total space capabilities. Thus in addition to the listing of the military satellite launches in 1988 (appendix 3A), this chapter also includes a list of currently active military satellites and spacecraft (appendix 3B). Preparation of such a list is fraught with methodological and conceptual difficulties, apart from the problem of data collection. Spacecraft, like General MacArthur's old soldiers, never die, but just fade away. The table of active satellites include those satellites and spacecraft that are obviously currently operational, those that are the primary members of constellations, 'warm' and 'hot' spares, as well as other spacecraft that are currently returning data on a regular basis.

Soviet photographic reconnaissance satellites

1988 was a busy year for the Cosmic Intelligence Directorate of GRU, the Soviet military intelligence administration. However, the high level of activity was marred by significant spacecraft malfunctions and problems.

The USSR launched a total of 32 photoreconnaissance satellites in 1988, up from the 25 launched in 1987 and exceeding the 31 launched in 1986.

These aggregate figures disguise the remarkable number of Soviet high-resolution third-generation satellites launched in 1988. A total of 14 of these close-look film-return satellites were lofted in 1988, compared with six in each of the previous two years. Since the early 1980s the annual launch rate of this system has progressively declined from a high of 18 launched in 1978, but the recent spate of launches suggests that this system has gained a new lease on life. Cosmos 1984 was the only Soviet third-generation satellite remaining in orbit at the end of 1988.

The continued importance of the high-resolution imagery provided by these third-generation satellites is indicated by the use of Cosmos 1923 to observe US military manoeuvres in Honduras in early March.³² The operational flexibility of these spacecraft was demonstrated in the coverage of the annual NATO naval exercise 'Team Spirit' in early September. Cosmos 1967 returned to earth

with film of this exercise after only 9 days in orbit, in contrast to the normal 14-day flights of this class of satellites.³³

Only four medium-resolution third-generation satellites were launched in 1988, continuing the downward trend in the utilization of this system. One of these, Cosmos 1973, remained in orbit for a total of 18 days, in contrast to the 13- to 14-day missions that are typical for the third-generation systems. Six third-generation satellites were launched in 1988 for military mapping and civilian land remote sensing.

Eight of the more advanced fourth-generation satellites, which typically remain in orbit for about eight weeks, were launched in 1988, in contrast to the nine that were launched in 1986 and in 1987. Serious problems emerged with the first fourth-generation satellite of 1988, Cosmos 1916, which was intentionally destroyed by on-board explosives over the Soviet Union on 27 February, when it failed to respond to ground commands to re-enter.³⁴ Cosmos 1942 covered the Iran/Iraq front from mid-May to early July, and Cosmos 1935 provided coverage of Afghanistan in late March, returning to earth prematurely after only 15 days in orbit.³⁵ By the end of the year, the sole remaining fourth-generation photoreconnaissance satellite in orbit was Cosmos 1986, launched on 29 December.

Cosmos 1965, the first identified fourth-generation satellite dedicated to military mapping and remote sensing, remained in orbit for 30 days prior to returning to earth.

In contrast to the third- and fourth-generation systems, which use film returned to earth in re-entry capsules, the Soviet fifth-generation reconnaissance satellite uses electronic transmission to return images in near real time. Eight of these satellites have been orbited since the first was launched in 1982, with an operational life expectancy of about 240 days. By September 1987, this new system seemed to be moving towards operational status, as Cosmos 1810 was replaced by Cosmos 1881.

The upsurge in third-generation flight activity may in part be accounted for by the dismal showing of the fifth-generation systems in 1988. By May 1988, Cosmos 1881 was no longer functional, and Cosmos 1936, launched on 30 March, returned to earth on 18 May after only 49 days in orbit. The absence of subsequent launches suggests that the USSR has concluded that major engineering problems remain to be solved.

US imaging intelligence satellites

The most significant development of 1988 on the US side was the first launch of the new Lacrosse imaging-radar satellite, which occurred on 2 December.³⁶ This launch marks both the beginning of a major rise in the number of US low-altitude intelligence satellites,³⁷ as well as a significant extension of the role of these satellites.

Over the past decade photographic intelligence satellite operations have assumed a fairly standard pattern. Two KH-11s, each with an operational life of about three years, would be in orbit at all times. As an old satellite exhausted its manoeuvring fuel, it would be commanded to re-enter the atmosphere, and a

new satellite would be launched a week or two later. A KH-9 would be launched in late spring each year and operate until around the end of the year; and a KH-8 would be launched in early spring and operate for a few months.³⁸ This familiar pattern of operations is now drawing to a close.

The United States continued operation of a pair of KH-11 photographic intelligence satellites throughout 1988. The sixth KH-11, launched in December 1984, remained in service at the end of 1988, surpassing by almost a year the previously demonstrated service life for this class of satellites. Given this longevity, it must be assumed that this spacecraft has been assigned secondary responsibilities since the launch in October 1987 of the seventh KH-11, which can be expected to remain operational at least through the end of 1990.

New technology has made it possible to combine the high resolution of film with real-time electronic transmission in a single satellite, the KH-12. However, the KH-12 suffers the shortcoming common to all photographic intelligence satellites, the inability to see through clouds. With much of the Soviet Union and other areas of interest frequently covered with clouds, this poses a problem for intelligence collection.

Using synthetic aperture radar (SAR) techniques, the Lacrosse imaging-radar system can potentially provide images with a resolution that approaches that of photographic reconnaissance satellites. The distinguishing features of the Lacrosse satellite include a very large radar antenna and solar panels to provide electrical power for the radar transmitter. Reportedly, the solar arrays have a wing-span of almost 50 metres,³⁹ which suggests that the power available to the radar could be in the range of 10–20 kilowatts. This could in principle give the satellite better than 1-metre resolution. While far short of the approximately 10-centimetre resolution achievable with the KH-12, it would certainly be adequate for identification and tracking of major military units such as tanks or missile transporter vehicles. Plans for the KH-12 and Lacrosse systems involve a constellation of four satellites of each type orbiting simultaneously and operating continuously, providing much more comprehensive coverage than afforded by previous systems.

In the wake of the 1986 Challenger accident, the military decided to reduce the dependence of the Lacrosse and the KH-12 on the shuttle. The KH-12 has been shifted to the Titan-4 booster, as have all but the first two Lacrosse satellites. Following the first Lacrosse launch on 2 December 1988, a second Lacrosse will apparently be launched on the shuttle using the Columbia orbiter in mid-1989. Two KH-12s will be launched on Titan-4s from the Eastern Test Range in 1989. Although the 57° inclination orbits of these four satellites will preclude coverage of the northernmost reaches of the Soviet Union, these orbits provide enhanced coverage of the European theatre, as well as Soviet ICBM deployment areas along the Trans-Siberian railway.

Beginning in 1990, additional pairs of KH-12 and Lacrosse satellites will be launched on Titan-4s from Vandenberg Air Force Base in California into the polar orbits traditionally used by US reconnaissance satellites. These will supplement the coverage of the lower-inclination satellites, as well as provide coverage of northern regions such as the Kola peninsula and the polar ice pack.

The national intelligence community is a principal user of the KH-12 and the Lacrosse. These systems will support the full range of imagery collection activities, including treaty verification and strategic and economic intelligence assessment.

The KH-12 and the Lacrosse are also the centre-piece of a new effort aimed at providing satellite imagery to tactical users. The Tactical Exploitation of National Capabilities (TENCAP) is designed to 'facilitate tactical use of national intelligence systems within an operational framework',⁴⁰ providing satellite imagery to battlefield commanders and weapon systems. TENCAP's primary application is the AirLand Battle strategy in Europe. The new spacecraft will 'be especially useful in monitoring the movement of Warsaw Pact armour'.⁴¹ TENCAP will be a principal source of information for locating targets in the German Democratic Republic, Poland and the western Soviet Union beyond the range of aerial sensors, which are limited by Warsaw Treaty Organization (WTO) air defences.⁴²

The KH-12 and Lacrosse are also the key to targeting mobile ICBMs. The satellites' manoeuvrability permits their orbits to be echeloned to concentrate their coverage on areas of specific interest. Manoeuvrability also enhances their survivability, a critical factor in the effectiveness of the B-2 bomber, which as the future primary weapon platform for attacking Soviet mobile ICBMs must rely on off-board target data acquired from the KH-12. Increasing Soviet reliance on night movement and concealment of Soviet ICBMs only enhances the value of the KH-12 and Lacrosse sensor systems.

Soviet electronic intelligence satellites

A major component of the Soviet electronic intelligence (ELINT) capability is a constellation of six low-altitude satellites. These constitute the third generation of Soviet ELINT satellites. In 1988 four launches were conducted to maintain the normal complement of this constellation.

The availability of the new SL-16 medium-class booster has occasioned the introduction of a new, fourth generation of ELINT satellites, which with a weight of some 12 000 kilograms are three times as massive as the third-generation spacecraft. Cosmos 1943 and Cosmos 1980 were the seventh and eighth launches of this series, but no clear-cut pattern has emerged to suggest the eventual size of the constellation.

Deployment of a fifth generation of Soviet ELINT satellites also appears to have begun, with the launch of Cosmos 1961, which took up station at 14°W, the location in geostationary orbit previously occupied by Cosmos 1738. This new fifth-generation ELINT system would for the first time give the USSR the type of continuous, wide-area coverage that the United States has maintained since the early 1970s with systems such as Rhyolite, Chalet and Magnum. By contrast, the low orbits of the previous generations of ELINT satellites provided only intermittent target localization capabilities, which could be evaded by the simple expedient of turning off radio and radar transmitters for the few minutes that the satellite was in sight.

US electronic intelligence satellites

US electronic intelligence activities in 1988 were marred by the apparent failure of an upper stage carrying a Chalet satellite. The Chalet series is also known as Vortex. The initial phases of the 2 September launch on a Titan-34D booster proceeded smoothly, but subsequently there was a malfunction of the Transtage upper stage, stranding the Chalet in a highly elliptical transfer orbit.⁴³ This orbit would make it very difficult to utilize the Chalet, which could re-enter the atmosphere as early as 1989.

It is difficult to assess the impact of this failure on the US ELINT programme, given the profound uncertainty concerning the precise configuration of the operational ELINT constellation. The nominal ELINT constellation consists of four satellites, and the only satellite that has not surpassed its design life is the first Magnum, an enlarged version of the Chalet, launched on the shuttle in 1985. Two other Chalets, launched in 1979 and 1981, probably remain in service, although they have long surpassed their five-year design life. It is possible, however, that there are as many as four Chalets currently operational, including the spacecraft launched in 1975 that is sometimes referred to as the Argus. In addition, many if not all six of the earlier and less sophisticated Rhyolite satellites may remain in service, or be available for service if needed.

Whatever problems this has created, however, will be remedied in 1989 with the planned launch of the final Chalet on a Titan-34D in the early part of the year and the launch of the second Magnum on the shuttle later in the year.

In addition to these geostationary ELINT satellites, two Jumpseat ELINT satellites, launched in 1985 and 1987, remained in service throughout 1988. These satellites, in highly elliptical Molniya-type orbits, provide specialized coverage of the far northern regions of the Soviet Union.⁴⁴

Soviet ocean surveillance satellites

The Soviet Union operates two classes of satellite for locating and identifying Western naval units. The Electronic Ocean Reconnaissance Satellites (EOR-SATS) pick up radio and radar transmissions. The nuclear-powered Radar Ocean Reconnaissance Satellites (RORSATS) use a radar with a power of several kilowatts to detect surface ships.

1988 was an unremarkable year for the EORSAT system, with two launches in May and November maintaining the nominal constellation of a pair of operational satellites.

For the RORSAT programme, however, 1988 was yet another hectic year, with a third satellite malfunctioning in orbit. Cosmos 1900, launched on 12 December 1987, had established a record operational life for satellites of this class of 122 days when it apparently malfunctioned on 12 April 1988.⁴⁵ This failure, coupled with the predicted re-entry of the spacecraft in early October 1988, raised concerns that a repetition of the Cosmos 954 and Cosmos 1402 incidents was in store.⁴⁶ However, the Soviet Government maintained that Cosmos 1900 incorporated improved safety features, based on prior experi-

ence, and that there was little danger of radioactive contamination.⁴⁷ Fortunately, these systems functioned properly, and on 1 October, shortly before re-entry, the reactor core was propelled to a higher orbit, with a lifetime of several hundred years.⁴⁸

The single RORSAT launched in 1988, Cosmos 1932, functioned normally for two months before its reactor was boosted into a higher orbit in mid-May.⁴⁹ The two higher-altitude RORSATs launched in 1987, Cosmos 1818 and Cosmos 1867, continued in operation in 1988. While the standard RORSAT orbit is within the range of the US F-15-launched ASAT, these higher-altitude satellites orbit above the maximum ceiling of the US ASAT.

US ocean surveillance satellites

The US counterpart to the Soviet EORSAT is the White Cloud Naval Ocean Surveillance System (NOSS). Each White Cloud launch places into low-polar orbit a cluster of one primary satellite trailed by three smaller subsatellites at distances of several hundred kilometres. This widely dispersed array of satellites enables the system to determine the location of radio and radar transmissions using triangulation; and the identity of naval units can be deduced by analysis of the operating frequencies and transmission patterns of the emitters.⁵⁰

Although there does not appear to be a definitely fixed constellation size for White Cloud, at the beginning of 1988 the constellation apparently consisted of four clusters of primary and secondary satellites, launched on Atlas boosters in 1983, 1984, 1986 and 1987. On 9 September 1988, the first launch of a reconditioned Titan-2 booster placed the ninth White Cloud cluster into orbit.

Soviet military communications satellites

The Soviet military communications network utilizes satellites in three different orbital regimes: low-altitude orbit; elliptical semisynchronous Molniya orbit; and geostationary orbit.

Three classes of satellite operate in low-altitude orbits. The first generation spacecraft are launched eight at a time on the SL-8 booster into random locations in a single orbital plane. This results in a nominal constellation of 24 of these small satellites, although the actual number operational at any one time is probably lower than this. Some of the satellites of two octuplets of these satellites, launched in November 1986 and June 1987, were operational at the outset of 1988, and they were supplemented by the launch of an additional octuplet in mid-March.

The second generation of low-altitude communications satellites are much heavier than the first, and are launched singly by the SL-8 booster. The nominal constellation consists of three satellites, each in a unique orbital plane separated by 120°. Two of the satellites were launched in 1988 to maintain this pattern. In addition, several older satellites of this network continued in operable condition in 1988.

A third generation of communications satellites first appeared in 1985. These

satellites, launched in groups of six on a single SL-14 booster, are apparently intended eventually to replace the much smaller first-generation system with a network of two dozen satellites in four planes, although this replacement process is as yet incomplete. There was a single launch under this programme in January 1988, apparently replacing the satellites launched in March 1987, maintaining a total of 12 satellites operating in two planes.

The Molniya 1 system is apparently primarily used by the Soviet military. The newer Molniya 3 system seems to accommodate both military and civilian users. The extensive development of the Molniya 3 in recent years suggested that the Molniya 1 constellation would soon be phased out, but three launches during 1988 indicate that the reports of its demise are premature, and the full complement of eight satellites remained operational at the end of the year.

A fourth generation of Soviet military communications satellites operates in geostationary orbit, possibly providing data relay support to the fifth-generation photographic reconnaissance satellites. Although there were no launches of these satellites in 1988, Cosmos 1888 and Cosmos 1894, both launched in 1987, appear to constitute the active members of this constellation in 1988.

US military communications satellites

In contrast to the brisk pace of Soviet communications satellite launches, there were only two such US flights in 1988. However, a number of US military communications systems continued in service.

The Defense Satellite Communications System (DSCS) is used by all four military services as well as by a variety of governmental agencies. Five or six satellites of the DSCS II series remain in service since being launched in the late 1970s. In addition, three of the more capable and survivable DSCS III spacecraft, launched in the early 1980s, are also operational.

A launch on a Titan-34D booster of the fourth DSCS III and the last DSCS II is planned for early 1989. Beginning in 1991, DSCS III satellites will be launched singly on upgraded Atlas II boosters procured in 1988 under the Medium Launch Vehicle II (MLV-II) programme, with 10 launches planned through 1997.⁵¹

The Navy makes extensive use of communications satellites, relying on three related systems. The first three Fleet Satellite Communications (FLTSATCOM) satellites, launched in 1978, 1979 and 1980, are also on back-up status, with FLTSATCOM 4 and FLTSATCOM 6, launched in 1980 and 1986 respectively, fully operational. FLTSATCOM 5 was lost in a 26 February 1987 launch vehicle accident, and FLTSATCOM 7 (the last of the series) will be launched in late 1989.

The Navy's other major system is the Leased Satellite (LEASAT) system, which consists of three Syncom IV spacecraft leased from Hughes, which is also the manufacturer. The final launch of the LEASAT programme is planned for 1989 on the space shuttle.

The Navy embarked on a major new communications satellite effort in 1988, known as the Ultra-high frequency Follow-On (UFO) Program.⁵² Hughes was

selected to build 10 of these satellites, based on its commercial HS-601 spacecraft, with launches on Titan-3, Atlas II and the space shuttle to begin in 1992, replacing FLTSATCOM and LEASAT satellites as needed.

The Satellite Data System (SDS) is another, frequently overlooked, military communications network. Unlike the systems discussed above, which all operate in the geostationary arc, the two SDS satellites are in highly elliptical semi-synchronous Molniya-type orbits, optimized for coverage of the northern polar region. The SDS satellites are host to Air Force Satellite Communications (AFSATCOM) strategic communications transponders. Their primary mission is to relay in real-time imagery data from KH-11 photographic intelligence satellites, while they are over the Soviet Union, to processing stations in the United States. At the outset of 1988, SDS F-5 and F-5A, launched in 1983 and 1984 respectively, were in service. The older of these satellites was replaced in 1988 by SDS F-6, which was launched on 6 November. The strategic communications and intelligence data-relay functions of the SDS satellites will be taken over by the Milstar satellite system when it becomes operational in the early 1990s.

Soviet early-warning satellites

The Soviet ballistic missile early-warning satellite network consists of a constellation of nine satellites in Molniya-type orbits. Although Soviet efforts in the past to maintain this constellation at full complement have been frustrated by launch vehicle and spacecraft failures, 1988 was a comparatively uneventful year, with a total of four launches maintaining the operational constellation.

US early-warning satellites

The US Satellite Early Warning System (SEWS) consists of five Defense Support Program (DSP) spacecraft. Three of these provide frontline operational service, with two additional spacecraft available as back-ups should problems emerge with the primary satellites.⁵³

Throughout 1988 five DSP spacecraft were operational. DSP F-11 and DSP F-13, launched in 1981 and 1982 respectively, were on back-up duty, and DSP F-12 and DSP F-6R, both launched in 1984, as well as DSP F-5R, launched in 1987, were the primary operational spacecraft. As their designation indicates, F-5R and F-6R are both refurbished spacecraft that were originally manufactured in the mid-1970s, but placed in storage because of the unexpectedly long operational life of the DSP series. In the early 1980s these two spacecraft were refurbished under the Sensor Evolutionary Development Satellite (SEDS) programme, which greatly improved their sensitivity.⁵⁴

The planned launch of a DSP satellite in October 1988 was delayed until the first half of 1989, primarily owing to structural problems with the Titan-4 booster. This flight carries the first of the Improved DSP (DSP-I) series, which will incorporate the upgraded sensors of the SEDS satellites, as well as improved resistance to laser attack. These satellites, nine of which are

currently under contract, will also carry a laser communications package that will enable the satellites to relay warning information to each other. This will greatly reduce the vulnerability of this system to attacks on its ground stations, since all the satellites will be able to communicate with any of the system's ground stations.⁵⁵

Soviet navigation satellites

Soviet and US navigation satellite programmes are very similar. Both have a low-altitude constellation of small satellites of modest capabilities (in the US case, the Transit system) as well as a constellation of semi-synchronous satellites providing very high-accuracy fixes (the US system is Navstar; the Soviet system is known as GLONASS, although the individual satellites are launched under the Cosmos designation).

Unlike the US Transit system, which is used by both military and civilian operators, the Soviet Union has separate constellations (of similar satellites) for military and civilian users. The military system consists of a six-satellite constellation, and there were two launches in 1988 to maintain this number.

The GLONASS system has experienced major developmental problems since its introduction in 1982,⁵⁶ and 1988 was no exception. The year's first launch of a triplet of these spacecraft was marred by the failure of the SL-12 upper stage to separate properly from the booster, which caused the satellites to re-enter the earth's atmosphere on the day after the launch. However, the second triplet, launched in May into the orbital plane occupied by Cosmos 1778-80, was successful, as was the third launch in September into the plane occupied by Cosmos 1883-85. Unlike prior launches in which one or more satellites failed to stabilize on reaching their final orbit, suggesting a spacecraft failure, by the end of the year all but one of these satellites appeared to be functioning normally. Along with Cosmos 1779 and 1780 launched in 1986 and Cosmos 1883 and 1885 launched in 1987, this brought the operational GLONASS complement to 10 satellites, still well short of the 21 spacecraft that the Soviet Union has declared to be its ultimate goal.

US navigation satellites

The conclusion of the long-running Transit navigation satellite programme approached with the final three launches of these satellites in 1988. Transit 23 and Transit 24 were launched on a Scout booster in April, and Transit 25 and Transit 26 were orbited in August. These two launches were the third and fourth flights of the Stacked Oscar On Scout (SOOS) launch programme. The more capable NOVA 2 was launched by a Scout booster on 16 June (somewhat confusingly, this launch was the third NOVA launch, NOVA 3 having been launched out of numerical sequence in October 1984).

These launches brought the total number of operational and operable spare Transit satellites to 13. Most of these spacecraft were launched over the past few years, but the total includes Oscar 13, launched in 1967, as well as Oscar 11 (TRANSAT), launched in 1977. The unexpectedly long life of many of these

satellites has enabled the USA to maintain a higher level of data-gathering activity than had originally been envisaged. This is compounded by the impending introduction of the more capable Navstar Global Positioning System (GPS) into operational service in the early 1990s. Most military users of Transit, such as the Navy's ballistic missile submarines that were the original impetus for Transit, will soon shift to Navstar. However, the current Transit constellation will potentially serve civilian users through the end of the century. The Navy dropped plans for additional Transit launches that were originally scheduled for 1990, saving the Scout boosters for other missions.

Six Navstar navigation satellites, launched between 1980 and 1985, continued in service in 1988. These satellites have been used for the development and testing of Navstar receivers and user equipment, but the full complement of 18 active and 3 spare satellites will be required before the system can provide nearly continuous global coverage. In the aftermath of the Challenger accident, the Air Force decided to remove all but two Navstars from a shuttle manifest, and to launch them on an improved version of the proven Delta launch vehicle, known as the Delta-2.⁵⁷

Soviet weather satellites

Unlike the United States, the Soviet Union does not operate a separate low-altitude military weather satellite network. Presumably the Soviet military uses data from Meteor 2 and Meteor 3 satellites, of which several are usually operational. One of each of these spacecraft was launched in 1988, although the Meteor 3, the second in the series, apparently suffered a failure of its primary camera system shortly after launch.⁵⁸

US weather satellites

Although the US military is a major user of data from the civilian low-altitude weather satellites of the National Oceanic and Atmospheric Administration (NOAA), the Air Force also maintains a constellation of two Defense Meteorological Support Program (DMSP) satellites. The DMSP spacecraft are very similar to their civilian NOAA counterparts and are manufactured by the same contractor using many common subsystems. The fourth DMSP 5D-2 was launched in early February to replace the second DMSP 5D-2, which had reached the end of its operational lifetime.

V. Launch vehicles

Several developments in 1988 heralded the beginning of a new era in space transportation systems, with the return to flight status of the US space shuttle, as well as the first flight of the long-awaited Soviet shuttle. In addition, the launch of the first of a new fleet of US expendable launch vehicles (ELVs) also marked the beginning of a new phase in military operations in space.

First flight of the Soviet shuttle

In the culmination of an effort that began in the early 1970s,⁵⁹ the Soviet Union launched its first reusable space shuttle on 15 November 1988. This first launch came after an attempt on 29 October was aborted because of problems with launch support equipment.⁶⁰

The USSR apparently has the same doubts about the utility of shuttle-type spacecraft as have arisen in the USA. Glavcosmos Director Aleksander Dunayev noted that: 'It would be incorrect to say the reusable systems are entirely beneficial in all spheres of space activity. In short, the question of including reusable craft in the sphere of space activity requires in-depth study'.⁶¹ He noted that expendable rockets 'cost only a tenth as much to use as Buran does'.⁶²

US shuttle returns to flight status

With two successful flights in 1988, the US space shuttle programme has taken another step on the slow road to recovery from the Challenger accident of January 1986. However, major uncertainties remain.

The maximum sustainable flight rate of the shuttle systems has been revised downward, from at least 24 per year projected prior to the Challenger accident, to 12–16 flights per year.⁶³ It will probably take several years of flight experience to permit a more precise determination of the shuttle's potential. In the meantime, the shuttle is fully booked through 1992 with payloads delayed by the Challenger accident, and most military and commercial payloads previously booked on the shuttle have found accommodation on US and European ELVs.⁶⁴

By the mid-1990s, however, the post-Challenger back-log of payloads will be eliminated. If by that time the shuttle fulfils optimal expectations, with a flight-rate in the neighbourhood of 15 flights per year, NASA is unlikely to be able to provide enough payloads to fully utilize the shuttle's launch capacity, and some (if not many) of the types of payload that have recently been lost to ELVs may return.

The US military's response to the Challenger accident was a major expansion of ELV programmes.⁶⁵ As of January 1989 a total of 14 Titan-2s were on order for launching White Cloud naval surveillance satellites, DMSP military weather satellites, NOAA weather satellites, and the LANDSAT 6 resource monitoring satellite.⁶⁶ At least 23 Titan-4s will be used to launch KH-12 photoreconnaissance satellites, Lacrosse imaging-radar spacecraft, Milstar communications satellites and DSP early-warning satellites.⁶⁷ The 11 Atlas-2s will be used almost exclusively for DSCS III communications satellites,⁶⁸ and the 20 Delta-2s are for Navstar navigation satellites.⁶⁹ Most of these launches are planned to occur prior to the end of 1993.

The first flight of this renewed ELV programme, initially scheduled for April 1988,⁷⁰ came on 5 September 1988, with the successful launch of a converted Titan-2 ICBM carrying a White Cloud naval ocean surveillance payload.

The launching of the first Titan-4 was postponed from late 1988 to the first

half of 1989, owing to concerns about the structural integrity of the protective shroud that covers the payload during the rocket's ascent through the atmosphere.⁷¹ The first flight of the Delta-2, carrying a Navstar navigation satellite, was delayed from late 1988 to February 1989, owing to a variety of minor problems.⁷²

VI. Military satellite programmes of other countries

China

China continued its active photoreconnaissance programme in 1988 with the launch on 5 August of its 23rd satellite, which returned to earth after eight days in orbit. China also launched two geostationary communications satellites in 1988, joining two earlier spacecraft of this class launched in 1984 and 1986. The users of these satellites undoubtedly include the Chinese military, although there is no public confirmation of this. The first Feng Yun polar weather satellite, launched in September, apparently experienced problems shortly after reaching orbit.⁷³

France

French military communications received a boost in March with the launch of the Telecom 1C civilian communications satellite, which is host to the Syracuse I military communications package. The latter joins another Syracuse package operational on Telecom 1A since late 1984. Plans continue for a more capable Syracuse II system that would use about half the capacity of the Telecom 2 satellites to be launched starting in 1991. Unlike its predecessor, Syracuse II will have the capability to communicate with airborne warning and control system (AWACS) aircraft, Avions Station Relais de Transmissions Exceptionnelles (ASTARTE) submarine communications aircraft, and ground forces equipped with the Réseau Intégré de Transmission Automatique (RITA) tactical data network.⁷⁴

The French Helios photographic reconnaissance satellite continues in development with Italian and Spanish participation.⁷⁵ The first flight of this spacecraft, based on the Système Probatoire d'Observation de la Terre (SPOT) remote sensing satellite, is slated for 1993 or 1994.

The United Kingdom

The British Skynet military communications network received a much needed boost in December 1988 with the launch of Skynet 4-B, which joined the Skynet 2-B spacecraft operational since 1974.

Israel

Israel surprised the world in 1988 with the launch of its first satellite, Ofeq 1. While several more launches of this type of small science and technology

satellite are anticipated over the next several years, there are reports that a more capable intelligence collection satellite remains the ultimate goal of the effort. The main significance of this year's event is the proof it offers of Israeli medium-range ballistic missile capabilities.⁷⁶

Notes and references

¹ The treatment here of many aspects of Soviet military space activities is based on discussions with Nicholas Johnson, Geoffrey Perry and Saunders Kramer. Their assistance in the preparation of this work, in ways too numerous to individually footnote, is greatly appreciated, although the responsibility for the interpretation in this chapter is the author's alone.

² Department of Defense, *Soviet Military Power 1987* (US Government Printing Office: Washington, DC, Mar. 1987), pp. 21–22.

³ Gouze, D., 'Soviet radars: the eyes of Soviet defenses', *Military Technology*, no. 5 (1988), pp. 36–38.

⁴ Smith, J., 'Soviet radar not a missile defense, guests say', *Washington Post*, 9 Sep. 1988, pp. A-1, A-18.

⁵ Gertz, B., 'CIA warns of verification woes in future treaty', *Washington Times*, 21 Dec. 1988, p. A-3.

⁶ Talbot, S., 'A shield against arms control', *Time*, 2 Feb. 1987, p. 25.

⁷ Office of the Under Secretary of Defense for Acquisition, 'Report of the Defense Science Board Task Force Subgroup on Strategic Air Defense (SDI Milestone Panel)' (Department of Defense: Washington, DC, May 1988).

⁸ Gilmartin, T., 'Pentagon advisory panel chairman urges gradual evolutionary approach to SDI', *Defense News*, 25 July 1988, p. 30.

⁹ According to 1987 plans, phase one of the outlined Strategic Defense System would consist of the following space- and ground-based systems: (a) The first layer would be comprised of the Booster Surveillance and Tracking System (BSTS), a network of about 12 satellites (probably in near-geosynchronous orbits) that would detect the launch of Soviet missiles and provide initial tracking of their trajectories. BSTS would relay target data to Space-Based Interceptor (SBI) platforms, orbiting a few hundred kilometres above the earth. The initial flight of the BSTS satellite is planned for 1995. (b) Each of 300 SBI platforms would carry 5–10 interceptor rockets, each weighing about 100 kg, that would home in on the hot exhaust plume of Soviet missiles using initial target track data from sensors on the SBI launch platform. These interceptors would also be used to attack Soviet post-boost vehicles as they dispense their multiple warheads. The initial tests of the SBI are planned for 1990. (c) The next layer of the defence would attack Soviet warheads during the mid-course of their flight, using the Exo-atmospheric Reentry-vehicle Interception System (ERIS), which is a smaller and more sophisticated version of the Homing Overlay Experiment that successfully intercepted a warhead in 1984. (d) A combination of sensors would be used to identify and track warheads in this phase. The Space Surveillance and Tracking System (SSTS), a network of 20 satellites orbiting at an altitude of approximately 5000 km, would use cryogenically refrigerated long-wave infra-red sensors for tracking. (e) The Ground-based Surveillance and Tracking System (GSTS) would use similar sensors that would be lofted into space on ballistic trajectories upon warning of a Soviet attack. These sensors could be supplemented by the Ground-Based Radar (GBR) which could be deployed on railway cars to improve its survivability. Tests of all three of these mid-course systems are planned for the early 1990s.

¹⁰ Norman, C., 'Cut price plan offered for SDI deployment', *Science*, 7 Oct. 1988, pp. 24–25.

¹¹ Adams, P., 'Warhead interceptor will undergo eye checkup in 1990 test', *Defense News*, 28 Nov. 1988, p. 42.

¹² Under Secretary of Defense for Acquisition, 'Ground-Based Laser (GBL) ASAT Options Study (The Kendall Commission)' (Department of Defense: Washington, DC, 30 June 1988).

¹³ 'Chemical lasers step up with Zenith Star', *Military Space*, 19 Dec. 1988, pp. 1, 8.

¹⁴ Anderson, J., 'Secret plan for winning nuclear war', *Washington Post*, 6 Apr. 1988, p. E-17.

¹⁵ 'Air Force sets higher sites for ASAT', *Military Space*, 16 Mar. 1987, pp. 1, 7–8.

¹⁶ Gilmartin, T., 'US works to resuscitate antisatellite program', *Defense News*, 17 Oct. 1988, p. 5.

¹⁷ 'Joint program office being considered for ASATs', *Defense Daily*, 21 Oct. 1988, p. 273.

¹⁸ Industry Observer, 'ASAT meeting', *Aviation Week & Space Technology*, 2 Jan. 1988, p. 23.

¹⁹ Broad, W. J., 'Military to ready laser for testing as space weapon', *New York Times*, 1 Jan. 1989, pp. 1, 20.

- ²⁰ Stroebel, W., 'Anti-satellite laser funds restored', *Washington Times*, 15 Dec. 1988, p. A-2.
- ²¹ Foley, T. M., 'ASAT tests to be conducted with upgraded MIRACL laser', *Aviation Week & Space Technology*, 19 Dec. 1988, p. 29.
- ²² Broad (note 19).
- ²³ 'Army milspace', *Military Space*, 5 Dec. 1988, p. 7.
- ²⁴ Broad, W. J., 'Star Wars gets offensive role: satellite killer', *New York Times*, 27 Nov. 1988, p. 1.
- ²⁵ Postol, T., Letter to Rep. Charles Bennett, US House of Representatives, Stanford University, 22 Mar. 1988.
- ²⁶ 'Navy expresses interest in ASATs at sea', *Defense Daily*, 18 Apr. 1988, p. 273.
- ²⁷ Industry Observer, 'ASAT allies', *Aviation Week & Space Technology*, 20 June 1988, p. 11.
- ²⁸ 'Sea-launched ASAT draws new interest', *Military Space*, 21 Nov. 1988, p. 2.
- ²⁹ 'Pentagon preparing to restart antisatellite program in January', *Aviation Week & Space Technology*, 14 Nov. 1988, pp. 33-34.
- ³⁰ *Department of Defense Appropriations for 1988*, Hearings before the Subcommittee of the Defense Department of the Committee on Appropriations of the House of Representatives, 100th Congress (US Government Printing Office: Washington, DC, 1987), Part 6, p. 716.
- ³¹ Rawles, J., 'Military satellites: the next generation', *Defense Electronics*, May 1988, pp. 43-63.
- ³² *Aerospace Daily*, 29 Mar. 1988, p. 480.
- ³³ 'Soviets launch 14 satellites, most on military missions', *Aviation Week & Space Technology*, 31 Oct. 1988, p. 20.
- ³⁴ Johnson, N., 'Soviet space: second GLONASS failure', *Jane's Defence Weekly*, 26 Mar. 1988.
- ³⁵ Johnson, N., 'Soviet space: reconnaissance problems remain', *Jane's Defence Weekly*, 21 May 1988.
- ³⁶ Covault, C., 'Atlantis radar satellite payload opens new reconnaissance era', *Aviation Week & Space Technology*, 12 Dec. 1988, pp. 26-28.
- ³⁷ Gertz, B., 'Senate panel asks for radar funds', *Washington Times*, 5 Apr. 1988, p. A-3.
- ³⁸ See also Burrows, W., *Deep Black* (Random House: New York, 1986), pp. 227, 302-5; Richelson, J., *The U.S. Intelligence Community* (Ballinger: Cambridge, Mass., 1985), pp. 114-15.
- ³⁹ 'Satellite with 150-ft span set for launch on mission 27', *Aviation Week & Space Technology*, 7 Nov. 1988, p. 25.
- ⁴⁰ *Department of Defense Air Force FY 1984 RDT&E Descriptive Summary* (Department of Defense: Washington, DC, 1984), p. 690.
- ⁴¹ 'USAF, NASA discuss shuttle use for satellite maintenance', *Aviation Week & Space Technology*, 17 Dec. 1984, p. 14.
- ⁴² Leopold, G., 'Worries over E-8A survivability prompt Air Force JSTARS review', *Defense News*, 16 Jan. 1989, p. 16.
- ⁴³ Benedict, H., 'Failure to reach proper orbit renders spy satellite useless', *Washington Post*, 4 Dec. 1988, p. A-3.
- ⁴⁴ Richelson (note 38), p. 122.
- ⁴⁵ 'Soviets confirm Cosmos 1900 difficulties', *Aerospace Daily*, 16 May 1988, pp. 252-53.
- ⁴⁶ Foley, T., 'Soviet nuclear-powered satellite expected to reenter within 30 days', *Aviation Week & Space Technology*, 19 Sep., 1988, pp. 20-21.
- ⁴⁷ 'Safety systems aboard Cosmos 1900 described', *Foreign Broadcast Information Service—Soviet Union*, 30 Sep. 1988, p. 71.
- ⁴⁸ Harwood, B., 'Crippled Soviet satellite fires reactor into graveyard orbit', *Washington Post*, 2 Oct. 1988, p. A-6.
- ⁴⁹ Aftergood, S., *Statement on Cosmos 1900 and the Future of Space Nuclear Power Before the Committee on Energy and Natural Resources, United States Senate* (Committee to Bridge the Gap: Los Angeles, 13 Sep. 1988).
- ⁵⁰ Richelson (note 38), pp. 140-43.
- ⁵¹ 'General Dynamics win MLV II competition', *Aerospace Daily*, 4 May 1988, p. 185.
- ⁵² 'Navy satellites approach critical replacement stage', *Aviation Week & Space Technology*, 21 Mar. 1988, pp. 46, 51.
- ⁵³ Kenden, A., 'Military manoeuvres in synchronous orbit', *Journal of the British Interplanetary Society*, vol. 36 (Feb. 1983), pp. 88-91.
- ⁵⁴ Cushman, J., 'AF seeks invulnerable warning satellites', *Defense Week*, 16 Jan. 1984, pp. 1, 10-14.
- ⁵⁵ Cushman (note 54), p. 12.
- ⁵⁶ Daly, P., 'GLONASS status', *Aviation Week & Space Technology*, 14 Sep. 1987, p. 108.

⁵⁷ Smith, B., 'USAF awards McDonnell Douglas contract to build, operate MLVs', *Aviation Week & Space Technology*, 26 Jan. 1988, pp. 20-21.

⁵⁸ According to Geoffrey Perry in 'Soviets launch Cosmos 1960', *Aerospace Daily*, 2 Aug. 1988, p. 172.

⁵⁹ Gatland, K. W., 'A Soviet space shuttle?', *Spaceflight*, vol. 20, no. 9 (Sep. 1978), pp. 322-26.

⁶⁰ Covault, C., 'Soviet space shuttle prepared for second launch attempt', *Aviation Week & Space Technology*, 7 Nov. 1988, pp. 26-27.

⁶¹ Oberg, J. E., 'Soviet shuttle mysteries', *Aerospace America*, June 1987, pp. 24-27.

⁶² Parks, M., 'Drone shuttle flight elates Soviets', *Washington Post*, 16 Nov. 1988, p. A-22.

⁶³ *Post-Challenger Assessment of Space Shuttle Flight Rates and Utilization* (National Research Council: Washington, DC, Oct. 1988).

⁶⁴ Foley, T., 'Reagan bars shuttle from competing for new satellite launch contracts', *Aviation Week & Space Technology*, 25 Aug. 1988, pp. 22-25.

⁶⁵ 'Military launcher program meeting critical milestones', *Aviation Week & Space Technology*, 1 Feb. 1988, pp. 36-38.

⁶⁶ 'Martin converts USAF Titan 2 to launch vehicle for placing defense payloads into polar orbit', *Aviation Week & Space Technology*, 10 Aug. 1987, p. 18.

⁶⁷ Furniss, T., 'Replacing the shuttle', *Flight International*, 29 Oct. 1988, pp. 26-28.

⁶⁸ Note 51.

⁶⁹ Smith (note 57).

⁷⁰ 'First Titan II launch set for April', *Defense Daily*, 5 Aug. 1987, p. 193.

⁷¹ Kolcum, E., 'Air Force cannot meet 1989 launch schedule', *Aviation Week & Space Technology*, 23 Jan. 1989, pp. 21-22.

⁷² Kolcum (note 71).

⁷³ 'Chinese weather satellite reported to be tumbling', *Aerospace Daily*, 26 Oct. 1988, p. 131.

⁷⁴ 'French milspace', *Military Space*, 5 Dec. 1988, p. 5.

⁷⁵ 'Helios to deliver imagery to 3 nations', *Military Space*, 21 Nov. 1988, pp. 1-3.

⁷⁶ Kifner, J., 'Israel launches space program and a satellite', *New York Times*, 20 Sep. 1988, pp. 1, 12. See chapter 7 in this *Yearbook* for further discussion of the Israeli ballistic missile potential.

Appendix 3A. Military satellites launched in 1988

Type/Country/ Spacecraft name	Alternative name	Designation	Launch date	Booster	Facility	Mass (kg)	Perigee (km)	Apogee (km)	Inclination (deg)	Period (min)	Comments
Imaging intelligence											
<i>USSR</i>											
THIRD-GENERATION—MEDIUM-RESOLUTION											
Cosmos 1921	SU PHOTO 3M-101	1988-011A	19 Feb.	SL-4	TT	6300	215	408	70.20	90.4	Recovered 5 Mar. 1988
Cosmos 1973	SU PHOTO 3M-102	1988-088A	22 Sep.	SL-4	TT	6300	353	411	72.90	92.2	Operated 18 days, instead of normal 14 days
Cosmos 1976	SU PHOTO 3M-103	1988-094A	13 Oct.	SL-4	PL	6300	191	366	72.90	90.0	Recovered
Cosmos 1982	SU PHOTO 3M-104	1988-105A	30 Nov.	SL-4	PL	6300	215	403	70.00	90.4	Recovered
THIRD-GENERATION—HIGH-RESOLUTION											
Cosmos 1915	SU PHOTO 3H-250	1988-004A	26 Jan.	SL-4	PL	6000	207	402	72.90	90.3	Recovered 9 Feb. 1988
Cosmos 1923	SU PHOTO 3H-251	1988-015A	10 Mar.	SL-4	PL	6300	205	332	72.80	89.5	Observed Honduras exercise (<i>Aerospace Daily</i> , 29 Mar. 1988, p. 480)
Cosmos 1938	SU PHOTO 3H-252	1988-030A	11 Apr.	SL-4	PL	6000	221	287	72.90	89.6	Recovered 24 Apr. 1988
Cosmos 1941	SU PHOTO 3H-253	1988-035A	28 Apr.	SL-4	TT	6300	217	293	70.30	89.3	Recovered 12 May 1988
Cosmos 1945	SU PHOTO 3H-254	1988-042A	19 May	SL-4	TT	6300	229	318	70.40	90.0	Recovered 19 May 1988
Cosmos 1952	SU PHOTO 3H-255	1988-049A	11 June	SL-4	TT	6300	227	283	70.00	89.6	Recovered 25 June 1988; first high-resolution launch at 70° since Cosmos 1787
Cosmos 1962	SU PHOTO 3H-256	1988-068A	8 Aug.	SL-4	TT	6300	215	297	70.00	89.6	Recovered 22 Aug. 1988
Cosmos 1964	SU PHOTO 3H-257	1988-072A	23 Aug.	SL-4	PL	6300	226	280	70.00	89.6	Recovered 7 Sep. 1988
Cosmos 1967	SU PHOTO 3H-258	1988-079A	6 Sep.	SL-4	TT	6300	209	250	72.90	89.1	Recovered 5 days early on 15 Sep. 1988; covered NATO 'Teamwork' naval exercise
Cosmos 1978	SU PHOTO 3H-259	1988-097A	27 Oct.	SL-4	TT	6300	191	364	72.80	90.0	No photo coverage 13-24 Nov.; missed B-2 roll-out 22 Nov.
Cosmos 1981	SU PHOTO 3H-260	1988-103A	24 Nov.	SL-4	PL	6300	228	271	62.80	90.5	First of 3 launches at this inclination, first-day orbit was 239×355 km
Cosmos 1983	SU PHOTO 3H-261	1988-107A	8 Dec.	SL-4	PL	6300	245	261	62.80	89.5	Second high-resolution satellite at this unusual inclination
Cosmos 1984	SU PHOTO 3H-262	1988-110A	16 Dec.	SL-4	PL	6300	244	260	62.80	89.5	Third high-resolution satellite launched at this inclination in 1988

THIRD-GENERATION—MILITARY MAPPING AND CIVIL REMOTE SENSING

Cosmos 1920	SU PHOTO 3E-38	1988-010A	18 Feb.	SL-4	PL	6300	193	268	82.60	88.8	Recovered 3 Mar. 1988; mission was not announced
Cosmos 1951	SU PHOTO 3E-39	1988-047A	31 May	SL-4	PL	5500	254	270	82.30	89.8	Recovered 14 June 1988
Cosmos 1956	SU PHOTO 3E-40	1988-055A	23 June	SL-4	PL	5500	329	364	82.40	91.5	Recovered 7 July 1988; announced as civil remote sensing mission
Cosmos 1957	SU PHOTO 3E-41	1988-057A	7 July	SL-4	PL	5500	256	270	82.60	89.8	Recovered 21 July 1988
Cosmos 1965	SU PHOTO 3E-42	1988-073A	23 Aug.	SL-4	PL	5500	195	265	82.30	88.7	Recovered 22 Sep. 1988, after unusual 30-day mission
Cosmos 1968	SU PHOTO 3E-43	1988-082A	9 Sep.	SL-4	PL	5500	255	270	82.35	89.8	Recovered 23 Sep. 1988

FOURTH-GENERATION

Cosmos 1916	SU PHOTO 4-83	1988-007A	3 Feb.	SL-4	TT	6500	174	358	64.90	98.8	Destroyed on command 26 Feb. over USSR following payload failure
Cosmos 1935	SU PHOTO 4-84	1988-025A	24 Mar.	SL-4	PL	6500	179	356	67.00	89.5	Covered Afghanistan, returned after 15 days versus normal 56 days
Cosmos 1942	SU PHOTO 4-85	1988-037A	12 May	SL-4	PL	6500	171	314	67.10	89.4	Covered Iran-Iraq front; recovered 4 July 1988
Cosmos 1955	SU PHOTO 4-87	1988-054A	22 June	SL-4	PL	6500	180	335	67.00	89.5	Recovered 20 Aug. 1988
Cosmos 1963	SU PHOTO 4-88	1988-070A	16 Aug.	SL-4	TT	6500	181	360	64.80	89.8	Recovered
Cosmos 1969	SU PHOTO 4-89	1988-084A	15 Sep.	SL-4	PL	6500	170	353	67.10	89.7	Recovered 13 Nov. 1988

FOURTH-GENERATION MILITARY MAPPING

Cosmos 1944	SU PHOTO 4-T86	1988-041A	18 May	SL-4	TT	6500	211	261	64.80	89.2	Recovered 23 June 1988; topographic mapping mission
Cosmos 1986	SU PHOTO 4-T90	1988-116A	29 Dec.	SL-4	TT	6500	..	..	..	..	Topographic mapping mission

FIFTH-GENERATION

Cosmos 1936	SU PHOTO 5-9	1988-027A	30 Mar.	SL-4	TT	6500	180	290	64.80	89.0	Recovered 18 May after 49 days, instead of expected 230 days
-------------	--------------	-----------	---------	------	----	------	-----	-----	-------	------	--

China

China 23	PRC PHOTO	1988-067A	5 Aug.	CZ-2C	JI	3500	204	312	63.00	90.0	Recovered 27 Aug. 1988; also carried West German microgravity experiment
----------	-----------	-----------	--------	-------	----	------	-----	-----	-------	------	--

USA

Lacrosse 1	..	1988-106B	2 Dec.	STS	ETR	14500	675	700	57.00	93.5	Imaging radar satellite to support real-time, all-weather targeting
------------	----	-----------	--------	-----	-----	-------	-----	-----	-------	------	---

Type/Country/ Spacecraft name	Alternative name	Designation	Launch date	Booster	Facility	Mass (kg)	Perigee (km)	Apogee (km)	Inclination (deg)	Period (min)	Comments
Electronic intelligence systems											
<i>USSR</i>											
THIRD-GENERATION											
Cosmos 1908	SU ELINT 3-29	1988-001A	6 Jan.	SL-14	PL	4 375	650	678	82.50	97.7	Replaced Cosmos 1782
Cosmos 1933	SU ELINT 3-30	1988-020A	15 Mar.	SL-14	PL	4 375	650	675	82.50	97.7	Replaced Cosmos 1758
Cosmos 1953	SU ELINT 3-31	1988-050A	14 June	SL-14	PL	4 375	629	663	82.50	97.7	Replaced Cosmos 1892
Cosmos 1975	SU ELINT 3-32	1988-093A	11 Oct.	SL-14	PL	4 375	649	679	82.50	97.8	Replaced Cosmos 1862
FOURTH-GENERATION											
Cosmos 1943	SU ELINT 4-7	1988-039A	15 May	SL-16	TT	12 500	844	851	71.00	101.9	
Cosmos 1980	SU ELINT 4-8	1988-102A	23 Nov.	SL-16	TT	12 500	849	854	71.00	102.0	
<i>USA</i>											
Chalet 4	Vortex 4	1988-077A	2 Sep.	Titan 34D	ETR	1 100	500	35 800	28.00	725.0	Trans-stage failed; spacecraft stranded in transfer orbit; elements estimated
Naval intelligence											
<i>USSR</i>											
PASSIVE											
Cosmos 1949	SU EORSAT 1-27	1988-045A	28 May	SL-11	TT	4 250	401	416	65.00	92.8	
Cosmos 1979	SU EORSAT 1-28	1988-101A	18 Nov.	SL-11	TT	4 250	408	432	65.00	92.8	
RADAR											
Cosmos 1932	SU RORSAT 1-33	1988-019A	14 Mar.	SL-11	TT	5 000	247	267	65.00	89.7	
<i>USA</i>											
NOSS 9	White Cloud	1988-078A	5 Sep.	Titan 2	WTR	450	1 150	1 075	63.40	107.5	
NOSS-SSU 9-1	White Cloud	1988-078B	5 Sep.	Titan 2	WTR	45	1 150	1 075	63.40	107.5	
NOSS-SSU 9-2	White Cloud	1988-078C	5 Sep.	Titan 2	WTR	45	1 150	1 075	63.40	107.5	
NOSS-SSU 9-3	White Cloud	1988-078D	5 Sep.	Titan 2	WTR	45	1 150	1 075	63.40	107.5	

Communications

USSR

Cosmos 1924	SU COM 1-321	1988-016A	11 Mar.	SL-8	PL	45	1 460	1 515	74.01	115.7	
Cosmos 1925	SU COM 1-322	1988-016B	11 Mar.	SL-8	PL	45	1 459	1 498	74.01	115.5	
Cosmos 1926	SU COM 1-323	1988-016C	11 Mar.	SL-8	PL	45	1 460	1 480	74.00	115.4	
Cosmos 1927	SU COM 1-324	1988-016D	11 Mar.	SL-8	PL	45	1 455	1 468	74.00	115.2	
Cosmos 1928	SU COM 1-325	1988-016E	11 Mar.	SL-8	PL	45	1 455	1 462	74.01	115.0	
Cosmos 1929	SU COM 1-326	1988-016F	11 Mar.	SL-8	PL	45	1 430	1 461	74.01	114.8	
Cosmos 1930	SU COM 1-327	1988-016G	11 Mar.	SL-8	PL	45	1 415	1 462	74.01	114.7	
Cosmos 1931	SU COM 1-328	1988-016H	11 Mar.	SL-8	PL	45	1 399	1 461	74.01	114.5	
Cosmos 1937	SU COM 2-42	1988-029A	5 Apr.	SL-8	PL	750	774	813	74.00	100.6	
Cosmos 1954	SU COM 2-43	1988-053A	21 June	SL-8	PL	750	777	803	74.10	100.7	
Cosmos 1909	SU COM 3-25	1988-002A	15 Jan.	SL-14	PL	400	1 408	1 411	82.60	113.8	
Cosmos 1910	SU COM 3-26	1988-002B	15 Jan.	SL-14	PL	400	1 397	1 410	82.60	113.8	
Cosmos 1911	SU COM 3-27	1988-002C	15 Jan.	SL-14	PL	400	1 408	1 470	82.60	113.8	
Cosmos 1912	SU COM 3-28	1988-002D	15 Jan.	SL-14	PL	400	1 404	1 409	82.60	113.8	
Cosmos 1913	SU COM 3-29	1988-002E	15 Jan.	SL-14	PL	400	1 388	1 408	82.60	113.8	
Cosmos 1914	SU COM 3-30	1988-002F	15 Jan.	SL-14	PL	400	1 392	1 409	82.60	113.8	
Cosmos 1961	SU COM 4-7	1988-066A	1 Aug.	SL-12	TT	2 120	35 773	35 802	1.30	1436.2	Replaced Cosmos 1738; data relay for fifth-generation photoreconnaissance satellites
Molniya 1-71	..	1988-017A	11 Mar.	SL-6	PL	1 250	716	39 629	63.10	717.6	Replaced Molniya 1-65
Molniya 1-72	..	1988-022A	17 Mar.	SL-6	PL	1 250	556	39 795	63.30	717.7	Replaced Molniya 1-64
Molniya 1-73	..	1988-069A	16 Aug.	SL-6	PL	1 250	617	40 754	62.90	717.7	Replaced Molniya 1-66

USA

AFSATCOM D-9	..	1988-006A	3 Feb.	Atlas E	WTR	..	825	825	98.70	101.3	On DMSP 5D-2/4
SDS F-6	..	1988-099A	5 Nov.	Titan 34D	WTR	2 500	400	39 700	63.00	712.0	Orbital elements are estimated

UK

Skynet 4-B	..	1988-109A	10 Dec.	Ariane 4	KO	790	35 800	35 800	0.00	1436.0	3 SHF transponder 4 channel 60, 80 or 135 MHz bandwidth
------------	----	-----------	---------	----------	----	-----	--------	--------	------	--------	---

France

Syracuse I-C	..	1988-018B	11 Mar.	Ariane 3	KO	..	35 780	35 789	0.05	1435.9	On Telecom 1C
--------------	----	-----------	---------	----------	----	----	--------	--------	------	--------	---------------

Ballistic missile early warning^a

USSR

Cosmos 1922	SU BMEWS 1-56	1988-013A	26 Feb.	SL-6	PL	1 500	612	39 344	62.80	709.0	Replaced Cosmos 1806
Cosmos 1966	SU BMEWS 1-57	1988-076A	30 Aug.	SL-6	PL	1 500	641	39 715	62.90	717.8	Replaced Cosmos 1761

Type/Country/ Spacecraft name	Alternative name	Designation	Launch date	Booster	Facility	Mass (kg)	Perigee (km)	Apogee (km)	Inclination (deg)	Period (min)	Comments
Cosmos 1974	SU BMEWS 1-58	1988-092A	4 Oct.	SL-6	PL	1 500	613	39 342	62.80	709.0	Replaced Cosmos 1774
Cosmos 1977	SU BMEWS 1-59	1988-096A	25 Oct.	SL-6	PL	1 500	613	39 342	62.80	709.0	Replaced Cosmos 1851
Navigation											
<i>USSR</i>											
Cosmos 1934	SU NAV 3-62	1988-023A	22 Mar.	SL-8	PL	750	967	1 021	83.00	104.7	Replaced Cosmos 1802
Cosmos 1959	SU NAV 3-64	1988-062A	18 July	SL-8	PL	750	952	1 005	82.90	104.7	Replaced Cosmos 1808
Cosmos 1917	GLONASS 31	1988-009A	17 Feb.	SL-12	TT	900	161	169	64.80	676.0	Upper stage failed to separate; re-entered after 1 day
Cosmos 1918	GLONASS 32	1988-009B	17 Feb.	SL-12	TT	900	161	169	64.80	676.0	Second GLONASS launch failure in last 3 attempts
Cosmos 1919	GLONASS 33	1988-009C	17 Feb.	SL-12	TT	900	161	169	64.80	676.0	Second GLONASS launch failure in last 3 attempts
Cosmos 1946	GLONASS 34	1988-043A	21 May	SL-12	TT	900	19 110	19 148	64.90	675.7	Launched into plane of Cosmos 1778-1780
Cosmos 1947	GLONASS 35	1988-043B	21 May	SL-12	TT	900	19 114	19 144	64.90	675.7	Launched into plane of Cosmos 1778-1780
Cosmos 1948	GLONASS 36	1988-043C	21 May	SL-12	TT	900	19 116	19 142	64.90	675.7	Launched into plane of Cosmos 1778-1780
Cosmos 1970	GLONASS 37	1988-085A	16 Sep.	SL-12	TT	900	19 114	19 141	64.90	675.7	Launched into plane of Cosmos 1883-1885
Cosmos 1971	GLONASS 38	1988-085B	16 Sep.	SL-12	TT	900	19 114	19 145	64.90	675.7	Launched into plane of Cosmos 1883-1885
Cosmos 1972	GLONASS 39	1988-085C	16 Sep.	SL-12	TT	900	19 122	19 243	64.80	675.8	Launched into plane of Cosmos 1883-1885
<i>USA</i>											
Transit 23	SOOS 3	1988-033A	26 Apr.	Scout G-1	WTR	60	1 014	1 303	90.40	110.0	Stacked Oscar On Scout dual launch
Transit 24	SOOS 3	1988-033B	26 Apr.	Scout G-1	WTR	60	1 014	1 305	90.40	110.0	
Transit 25	SOOS 4	1988-074A	25 Aug.	Scout G-1	WTR	60	1 035	1 180	89.97	107.5	Stacked Oscar On Scout dual launch
Transit 26	SOOS 4	1988-074B	25 Aug.	Scout G-1	WTR	60	1 035	1 181	89.97	107.5	Last Transit launch
Transit NOVA 2	..	1988-052A	16 June	Scout G-1	WTR	145	1 152	1 196	90.00	108.9	NOVA 2 & 3 were launched out of sequence
Weather^b											
<i>USA</i>											
DMSP 5D-2/4	S-9	1988-006A	3 Feb.	Atlas E	WTR	755	817	825	98.70	101.3	

Nuclear explosion detection^c

USA											
NUDETS DMSP-9 . .	1988-006A	3 Feb.	Atlas E	WTR	. .	831	814	98.70	101.4	On DMSP 5D-2/4	
Other military missions											
USSR											
RADAR CALIBRATION											
Cosmos 1960	SU RADCAL 2-18	1988-065A	28 July	SL-8	PL	950	463	512	65.80	94.4	Similar to Cosmos 1662
Cosmos 1985	SU RADCAL 4-1	1988-113A	23 Dec.	SL-14	PL	1 500	529	549	73.60	116.0	First of new type
GEODETTIC											
Cosmos 1950	SU GEOD 2-10	1988-046A	30 May	SL-14	PL	1 500	1 483	1 519	73.60	116.0	
MINOR MILITARY											
Cosmos 1958	SU MINMIL 4-4	1988-060A	14 July	SL-8	TT	950	355	401	65.80	92.1	Same type as Cosmos 1902
USA											
BALLISTIC MISSILE DEFENCE—ORBITAL^d											
STM-2	DM-43	1988-008A	9 Feb.	Delta 3920	ETR	. .	224	336	28.58	89.9	Sensor test that deployed 14 test objects over 14 hours
SPACE TEST PROGRAMME											
STP-F Battleview . .	1988-106A	2 Dec.	STS	ETR	. .	300	300	57.00	92.0	Battlefield surveillance using hand-held optical devices	
STP-F SPAVDOS Space Test Program	1988-106A	2 Dec.	STS	ETR	500	300	300	57.50	92.0	Spaceborne Direct View Optical System	

^a The USA made no launches in 1988.^b The Soviet military presumably uses data from the Meteor satellites.^c The Soviets presumably carry nuclear detection sensors on unidentified military satellites.^d No details on Soviet tests during 1988 are available.**Key to facility abbreviations:**

ETR = Eastern Test Range, Cape Canaveral, USA

JI = Jiuqan, China

KO = Kourou, French Guinea

PL = Plesetsk, USSR

TT = Tyuratam, USSR

WTR = Western Test Range, Vandenberg Air Force Base, USA

XI = Xichang, China

Appendix 3B. Operational military satellites in orbit on 31 December 1988

Country/Mission	Spacecraft name/ Secondary payload	Alternative name/ (Host spacecraft)	Date launched
USSR			
Photoreconnaissance	Cosmos 1984	SU PHOTO 3H262	16 Dec. 1988
Electronic intelligence	Cosmos 1805	SU ELINT 3-23	10 Dec. 1986
	Cosmos 1812	SU ELINT 3-24	14 Jan. 1987
	Cosmos 1842	SU ELINT 3-26	27 Apr. 1987
	Cosmos 1908	SU ELINT 3-29	6 Jan. 1988
	Cosmos 1933	SU ELINT 3-30	15 Mar. 1988
	Cosmos 1953	SU ELINT 3-31	14 June 1988
	Cosmos 1975	SU ELINT 3-32	11 Oct. 1988
	Cosmos 1943	SU ELINT 4-7	15 May 1988
	Cosmos 1980	SU ELINT 4-8	23 Nov. 1988
	Cosmos 1961	SU ELINT 5-1	1 Aug. 1988
Ocean ELINT	Cosmos 1949	SU EORSAT 1-27	28 May 1988
	Cosmos 1979	SU EORSAT 1-28	18 Nov. 1988
Military communications	Cosmos 1794	SU COM 1-305	21 Nov. 1986
	Cosmos 1795	SU COM 1-306	21 Nov. 1986
	Cosmos 1796	SU COM 1-307	21 Nov. 1986
	Cosmos 1797	SU COM 1-308	21 Nov. 1986
	Cosmos 1798	SU COM 1-309	21 Nov. 1986
	Cosmos 1799	SU COM 1-310	21 Nov. 1986
	Cosmos 1800	SU COM 1-311	21 Nov. 1986
	Cosmos 1801	SU COM 1-312	21 Nov. 1986
	Cosmos 1852	SU COM 1-313	16 June 1987
	Cosmos 1853	SU COM 1-314	16 June 1987
	Cosmos 1854	SU COM 1-315	16 June 1987
	Cosmos 1855	SU COM 1-316	16 June 1987
	Cosmos 1856	SU COM 1-317	16 June 1987
	Cosmos 1857	SU COM 1-318	16 June 1987
	Cosmos 1858	SU COM 1-319	16 June 1987
	Cosmos 1859	SU COM 1-320	16 June 1987
	Cosmos 1924	SU COM 1-321	11 Mar. 1988
	Cosmos 1925	SU COM 1-322	11 Mar. 1988
	Cosmos 1926	SU COM 1-323	11 Mar. 1988
	Cosmos 1927	SU COM 1-324	11 Mar. 1988
	Cosmos 1928	SU COM 1-325	11 Mar. 1988
	Cosmos 1929	SU COM 1-326	11 Mar. 1988
	Cosmos 1930	SU COM 1-327	11 Mar. 1988
	Cosmos 1931	SU COM 1-328	11 Mar. 1988
	Cosmos 1503	SU COM 2-31	12 Oct. 1983
	Cosmos 1624	SU COM 2-34	17 Jan. 1985
	Cosmos 1741	SU COM 2-36	18 Apr. 1986
	Cosmos 1763	SU COM 2-37	16 July 1986
	Cosmos 1814	SU COM 2-39	21 Jan. 1987
	Cosmos 1850	SU COM 2-40	9 June 1987
	Cosmos 1937	SU COM 2-42	5 Apr. 1988
	Cosmos 1954	SU COM 2-43	21 June 1988
	Cosmos 1875	SU COM 3-19	8 Sep. 1987
	Cosmos 1876	SU COM 3-20	8 Sep. 1987
	Cosmos 1877	SU COM 3-21	8 Sep. 1987
	Cosmos 1878	SU COM 3-22	8 Sep. 1987

Country/Mission	Spacecraft name/ Secondary payload	Alternative name/ (Host spacecraft)	Date launched
	Cosmos 1879	SU COM 3-23	8 Sep. 1987
	Cosmos 1880	SU COM 3-24	8 Sep. 1987
	Cosmos 1909	SU COM 3-25	15 Jan. 1988
	Cosmos 1910	SU COM 3-26	15 Jan. 1988
	Cosmos 1911	SU COM 3-27	15 Jan. 1988
	Cosmos 1912	SU COM 3-28	15 Jan. 1988
	Cosmos 1913	SU COM 3-29	15 Jan. 1988
	Cosmos 1914	SU COM 3-30	15 Jan. 1988
	Molniya 1-67	..	30 July 1986
	Molniya 1-68	..	5 Sep. 1986
	Molniya 1-69	..	15 Nov. 1986
	Molniya 1-70	..	26 Dec. 1986
	Molniya 1-71	..	11 Mar. 1988
	Molniya 1-72	..	17 Mar. 1988
	Molniya 1-73	..	16 Aug. 1988
	Molniya 1-74	..	28 Dec. 1988
	Cosmos 1888	Potok 5	1 Oct. 1987
	Cosmos 1894	Potok 6	28 Oct. 1987
Early warning	Cosmos 1661	SU BMEWS 1-40	18 June 1985
	Cosmos 1684	SU BMEWS 1-42	24 Sep. 1985
	Cosmos 1785	SU BMEWS 1-50	15 Oct. 1986
	Cosmos 1793	SU BMEWS 1-51	20 Nov. 1986
	Cosmos 1849	SU BMEWS 1-53	4 June 1987
	Cosmos 1903	SU BMEWS 1-55	21 Dec. 1987
	Cosmos 1922	SU BMEWS 1-56	26 Feb. 1988
	Cosmos 1966	SU BMEWS 1-57	30 Aug. 1988
	Cosmos 1974	SU BMEWS 1-58	4 Oct. 1988
	Cosmos 1977	SU BMEWS 1-59	25 Oct. 1988
Navigation	Cosmos 1745	SU NAV 3-54	23 May 1986
	Cosmos 1759	SU NAV 3-55	18 June 1986
	Cosmos 1802	SU NAV 3-56	25 Nov. 1986
	Cosmos 1864	SU NAV 3-59	6 July 1987
	Cosmos 1904	SU NAV 3-61	23 Dec. 1987
	Cosmos 1959	SU NAV 3-63	18 July 1988
	Cosmos 1779	GLONASS 23	16 Sep. 1986
	Cosmos 1780	GLONASS 24	16 Sep. 1986
	Cosmos 1883	GLONASS 28	16 Sep. 1987
	Cosmos 1885	GLONASS 30	16 Sep. 1987
	Cosmos 1946	GLONASS 34	21 May 1988
	Cosmos 1947	GLONASS 35	21 May 1988
	Cosmos 1948	GLONASS 36	21 May 1988
	Cosmos 1970	GLONASS 37	16 Sep. 1988
	Cosmos 1971	GLONASS 38	16 Sep. 1988
	Cosmos 1972	GLONASS 39	16 Sep. 1988
Geodetic	Cosmos 1589	SU GEOD 2-5	8 Aug. 1984
	Cosmos 1803	SU GEOD 2-8	2 Dec. 1986
	Cosmos 1732	SU GEOD 2-7	11 Feb. 1986
	Cosmos 1950	SU GEOD 2-10	30 May 1988
Minor military	Cosmos 1868	SU MINMIL 3-3	14 July 1987
	Cosmos 1958	SU MINMIL 4-4	14 July 1988
	Cosmos 1578	SU MINMIL 6-1	28 June 1984
Radar calibration	Cosmos 1960	SU RADCAL 2-18	28 July 1988
	Cosmos 1508	SU RADCAL 3A-6	11 Nov. 1983
	Cosmos 1776	SU RADCAL 3B-6	3 Sep. 1986
	Cosmos 1985	SU RADCAL 4-1	23 Dec. 1988

Country/Mission	Spacecraft name/ Secondary payload	Alternative name/ (Host spacecraft)	Date launched
Military mapping	Cosmos 1986	SU PHOTO 4-T90	29 Dec. 1988
China			
Communications	STW-1	China 15	8 Apr. 1984
	STW-2	Tungfanghung 2	1 Feb. 1986
	STW-3	China 22	7 Mar. 1988
	STW-4	China 25	22 Dec. 1988
USA			
Photoreconnaissance	KH-11/6	..	4 Dec. 1984
	KH-11/8	..	26 Oct. 1987
Electronic intelligence	Chalet 3	Vortex 3	31 Oct. 1981
	Jumpseat 4	..	8 Feb. 1985
	Jumpseat 5	..	14 Feb. 1987
	Magnum 1	..	24 Jan. 1985
Ocean ELINT	NOSS 6	White Cloud	5 Feb. 1984
	NOSS-SSU 6-1	..	5 Feb. 1984
	NOSS-SSU 6-2	..	5 Feb. 1984
	NOSS-SSU 6-3	..	5 Feb. 1984
	NOSS 7	White Cloud	9 Feb. 1986
	NOSS-SSU 7-1	..	9 Feb. 1986
	NOSS-SSU 7-2	..	9 Feb. 1986
	NOSS-SSU 7-3	..	9 Feb. 1986
	NOSS 8	White Cloud	15 May 1987
	NOSS-SSU 8-1	..	15 May 1987
	NOSS-SSU 8-2	..	15 May 1987
	NOSS-SSU 8-3	..	15 May 1987
	NOSS 9	White Cloud	5 Sep. 1988
	NOSS-SSU 9-1	..	5 Sep. 1988
	NOSS-SSU 9-2	..	5 Sep. 1988
	NOSS-SSU 9-3	..	5 Sep. 1988
Imaging radar	Lacrosse 1	..	2 Dec. 1988
Military communications	AFSATCOM D-8	(DMSP 5D-2/3)	19 June 1987
	AFSATCOM D-9	(DMSP 5D-2/4)	3 Feb. 1988
	AFSATCOM F-1	(FLTSATCOM 1)	9 Feb. 1978
	AFSATCOM F-2	(FLTSATCOM 2)	4 May 1979
	AFSATCOM F-3	(FLTSATCOM 3)	18 Jan. 1980
	AFSATCOM F-4	(FLTSATCOM 4)	31 Oct. 1980
	AFSATCOM F-6	(FLTSATCOM 6)	4 Dec. 1986
	AFSATCOM S-5	(SDS F-5)	31 July 1983
	AFSATCOM S-5A	(SDS F-5A)	28 Aug. 1984
	AFSATCOM SCT-4	(DSCS III-B4)	3 Oct. 1985
	AFSATCOM SCT-1	(DSCS III-A1)	30 Oct. 1982
	AFSATCOM SCT-5	(DSCS III-B5)	3 Oct. 1985
	SDS F-5	..	31 July 1983
	SDS F-5A	..	28 Aug. 1984
	SDS F-6	..	6 Nov. 1988
	LES 8	AFSATCOM	15 Mar. 1976
	LES 9	AFSATCOM	15 Mar. 1976
	NATO 3-A	..	22 Apr. 1976
	NATO 3-C	..	19 Nov. 1978
	NATO 3-D	..	14 Nov. 1984
	DSCS II-8	DSCS 9438	12 May 1977
	DSCS II-11	DSCS 9441	13 Dec. 1978
	DSCS II-12	DSCS 9412	13 Dec. 1978
	DSCS II-13	DSCS 9443	21 Nov. 1979

Country/Mission	Spacecraft name/ Secondary payload	Alternative name/ (Host spacecraft)	Date launched
	DSCS II-14	DSCS 9444	21 Nov. 1979
	DSCS II-15	DSCS 9445	30 Oct. 1982
	DSCS III-A 1	DSCS A-1	30 Oct. 1982
	DSCS III-B 4	DSCS B-4	3 Oct. 1985
	DSCS III-B 5	DSCS B-5	3 Oct. 1985
	FLTSATCOM 1	..	9 Feb. 1978
	FLTSATCOM 2	..	4 May 1979
	FLTSATCOM 3	..	18 Jan. 1980
	FLTSATCOM 4	..	31 Oct. 1980
	FLTSATCOM 6	FLTSATCOM F-7	4 Dec. 1986
	Leasat 1	Syncom IV F-2	30 Aug. 1984
	Leasat 2	Syncom IV F-1	8 Nov. 1984
	Leasat 3	Syncom IV F-3	12 Apr. 1985
	Gapfiller 1	(Marisat 1)	19 Feb. 1976
	Gapfiller 2	(Marisat 2)	10 June 1976
	Gapfiller 3	(Marisat 3)	14 Oct. 1976
Early warning	DSP 9	F-11	16 Mar. 1981
	DSP 10	F-13	6 Mar. 1982
	DSP 11	F-12	14 Apr. 1984
	DSP SED 12	F-6R	22 Dec. 1984
	DSP SED 13	F-5R	29 Nov. 1987
Navigation	Transit 14	Oscar 13 NS30130	18 May 1967
	Transit 19	Oscar 24 SOOS 1	3 Aug. 1985
	Transit 20	Oscar 30 SOOS 1	3 Aug. 1985
	Transit 21	Oscar 27 SOOS 2	16 Sep. 1987
	Transit 22	Oscar 29 SOOS 2	16 Sep. 1987
	Transit 23	SOOS 3	26 Apr. 1988
	Transit 24	SOOS 3	26 Apr. 1988
	Transit 25	Oscar 23 SOOS 4	25 Aug. 1988
	Transit 26	Oscar 32 SOOS 4	25 Aug. 1988
	Transit NOVA 1	..	15 May 1981
	Transit NOVA 2	..	16 June 1988
	Transit NOVA 3	..	12 Oct. 1984
	Transit TIP-4	Oscar 11 TRANSAT	28 Oct. 1977
	Navstar 1A-5	..	9 Feb. 1980
	Navstar 1A-6	..	26 Apr. 1980
	Navstar 1A-8	..	14 July 1983
	Navstar 1R-9	..	13 June 1984
	Navstar 1R-10	..	8 Sep. 1984
	Navstar 1R-11	..	9 Oct. 1985
Weather	DMSP 5D-2/3	S-8	19 June 1987
	DMSP 5D-2/4	S-9	3 Feb. 1988
Nuclear detection	NUDETS DSP-9	(DSP-9)	16 Mar. 1981
	NUDETS DSP-10	(DSP-10)	6 Mar. 1982
	NUDETS DSP-11	(DSP-11)	14 Apr. 1984
	NUDETS DMSP-8	(DMSP 5D-2/3)	19 June 1987
	NUDETS DMSP-9	(DMSP 5D-2/4)	3 Feb. 1988
	IONDS 1	(Navstar 1A-8)	14 July 1983
	IONDS 2	(Navstar 1R-9)	13 June 1984
	IONDS 3	(Navstar 1R-10)	8 Sep. 1984
	IONDS 4	(Navstar 1R-11)	9 Oct. 1985
Geodetic	Geosat	..	13 Mar. 1985
Military science	STP P83-1 Hilat	Oscar 16	27 June 1983
	STP P87-1	Polar Bear	14 Nov. 1986

Country/Mission	Spacecraft name/ Secondary payload	Alternative name/ (Host spacecraft)	Date launched
UK			
Military communications	Skynet 2B	9354	23 Nov. 1974
	Skynet 4-B	. .	10 Dec. 1988
France			
Military communications	Syracuse I-A	(Telecom 1A)	4 Aug. 1984
	Syracuse I-C	(Telecom 1C)	11 Mar. 1988

4. Chemical and biological warfare: developments in 1988*

S. J. LUNDIN

I. Introduction

1988 was a dramatic year with respect to developments regarding chemical warfare (CW). The question of chemical weapons definitely moved out of the theoretical realm of concern about their possible use in a future conflict in Europe into the grim reality of their increasing and unrestricted use in an atrocious war in one of the world's politically most unstable regions. This horrendous reality has led to increased instability and diminished security in other potential conflict areas where chemical weapons allegedly exist, as described below in this chapter. In the Gulf War the use of chemical weapons underwent an obvious transformation from regular military use to increasing use as a weapon of mass destruction against the civilian population. The international reaction of unanimous condemnation was, however, neither strong enough nor accompanied by sufficiently strong efforts to curb this violation of international law.

The international consequences of the use of chemical weapons are complex. On the one hand fear was expressed that Iraq's example might be followed by other countries, thereby leading to the uncontrolled spread of chemical weapons, particularly in areas of regional conflict and instability. On the other hand the leaders of the superpowers expressed their continued support for the rapid conclusion of a comprehensive chemical weapons convention (CWC). An attempt to strengthen these efforts is constituted by the meeting on the 1925 Geneva Protocol in Paris in January 1989. Further, the United Nations was able to continue and expand its investigative power in 1988 by dispatching no fewer than four investigations into the use of chemical weapons in the Gulf War. Exchange of data and other confidence-building efforts such as the bilateral visits between the UK and the USSR took place. The allocation of money for the production of binary chemical weapons in the USA was limited and did not reach the level originally planned. The negotiations on the CWC proceeded, although more slowly than hoped for owing in part to the complicated nature of the subject, to the point where work on technical problems finally could start in a context of political agreement regarding the verification issues.

Unfortunately, new concerns were voiced regarding the Biological Weapons Convention (BWC). These concerns seemed to be related not only to lingering distrust between the superpowers regarding the intent of each other's

* Dr Thomas Stock and Dr Rabinder Nath of the SIPRI CBW Programme have assisted in preparing references and data for this chapter. The references were gathered from the SIPRI CBW Programme Data Base and were also kindly provided by J. P. Perry Robinson, Science Policy Research Unit, University of Sussex, UK, from the Sussex-Harvard information bank.

protective programmes against biological warfare (BW), but also to public concern about the risks of the development of new biological weapons based on new genetic engineering techniques and advanced biotechnology. The confidence-building measures (CBMs) instituted by the Review Conference of the BWC in 1986, which aim to secure information from the parties about their activities as related to the BWC, continued and shed some additional light on the activities. However, a concern in this context is the fact that only relatively few states parties to the BWC, among them the UK, the USA and the USSR, have provided such information, and that the information provided has been rather sparse. It might still be some time before the information procedure is fully developed and can thus better serve the aim of increasing confidence in the BWC.

An unusually large number of significant chemical and biological weapon events and developments occurred during 1988. It is impossible to cover them here except in rather broad terms. The aim of this chapter is therefore to review the events rather than to discuss them in detail; some of the more important trends are described and commented upon. A wealth of information is now also available on practically all of the subjects covered in the chapter. It is hoped that some of the references may serve as a guide to obtaining further knowledge about the developments in chemical and biological warfare (CBW).

II. Allegations of and non-compliance with the CW treaties

During 1988, as in recent years, the predominant chemical-weapon issue related to the Iraq-Iran War. A detailed US review of the development of CW in the Gulf War, as well as of how Iran and Iraq used and built up their CW capabilities, was presented during the US Senate discussions regarding sanctions against Iraq.¹ The frequency and intensity of the chemical-weapon attacks by Iraq seemed to increase before the cease-fire. Compilations of both alleged and documented attacks by Iraq can be found in the *Arms Control Reporter*.² Iran published an account of the number of Iraqi chemical-weapon attacks alleged to have occurred during the period January 1981 to March 1988 in a Conference on Disarmament (CD) document, according to which 44 000 people fell victim in 242 attacks.³ A list of chemical-weapon military operations carried out by Iraqi forces between 14 April 1987 and early August 1988, as claimed by the Iraqi Kurdistan Front, was reproduced in the US Senate *Congressional Record* in September 1988.⁴ Corresponding information has not been provided by Iraq, as far as is known.

One new and ominous element in the Iraqi use of chemical weapons in 1988 was constituted by the attacks against civilians, mainly civilian Kurds. The most noted of these attacks before the cease-fire was the attack on the Iraqi city of Halabja in March 1988. It was suggested that one reason for the attack may have been because of the Kurds' support of the Iranian forces.⁵ Iraq, however, suggested that the attack may have been of Iranian origin.⁶ This was denied by Iran.⁷ The number of victims was estimated as between 3000 and 5000.⁸ The Iraqi Vice President admitted in November the Iraqi use of chemical weapons in Halabja.⁹

After the August cease-fire between Iran and Iraq reports continued of Iraqi use of chemical weapons against the Kurds living within the borders of Iraq.¹⁰ However, these allegations were strongly denied by Iraq, which claimed that chemical weapons were not used against the Kurds in the military operations in Kurdistan. According to Iraq, action was taken only against traitors collaborating with the enemy and against those who had committed crimes against their own people.¹¹ Further, it was claimed that it would not have been technically possible to use chemical weapons in the areas where the attacks allegedly took place.¹² Despite a large number of reports from different sources of chemical-weapon use, final proof seems not to have been brought forward. Investigations by physicians from different organizations working among Kurdish refugees, both in Kurdistan and in Turkey, as well as chemical analyses were not deemed to be conclusive.¹³ Turkey officially declared that no victims of CW were treated in Turkey.¹⁴ Iraq also resisted efforts to hold a UN investigation regarding the allegations, on the grounds that this was a question of sovereignty.¹⁵ However, new Kurdish allegations of Iraqi chemical-weapon use continued during 1988.¹⁶

The alleged attacks against the Kurds after the cease-fire gave rise to efforts in the UK and in the USA not only to condemn chemical-weapon use but also to take action to bring sanctions against Iraq. The USA felt that sufficient proof of Iraqi chemical-weapon use existed, based in part upon intercepted radio messages.¹⁷ The US Congress voted for sanctions, the Senate for more severe ones than the House, which watered down the suggested measures in obvious deference to domestic trade pressures. The Administration opposed the legislative measures arguing that they might not contribute to getting Iraq to cease the use of chemical weapons.¹⁸ In the end the Congress did not vote for sanctions against Iraq.¹⁹ The UK later took the position that sanctions would not be beneficial and that evidence was not conclusive.²⁰

The UN Secretary-General dispatched four investigative teams in 1988 in order to clarify events. These investigations were requested mainly by Iran, but in one instance also by Iraq, which claimed that Iraqi soldiers had been hit by Iranian chemical weapons. The results of the investigations are given in table 4.1. As a result of the investigations the UN, the European Parliament and the Western European Union condemned the use of chemical weapons by Iraq.²¹ However, even these protests continued to be low-level, and suggestions for international sanctions were not successful.

There has not as yet been much evaluation of the military aspects of the use of chemical weapons in the Iraq-Iran War. The manner of chemical-weapon use has been mentioned occasionally in newspaper reports and elsewhere.²² The examples quoted point to another ominous development, that is, that Iraq now also seems to have developed effective tactics in its use of chemical weapons. Open, more thorough analyses seem not yet to have been published. However, the International Institute for Strategic Studies devoted a chapter of its annual publication, *The Military Balance 1988-89*, to CBW giving a general overview and also concluding that the effect of the use of chemical weapons on the cease-fire is open to debate, but that the use of chemical weapons probably encouraged rather than discouraged their use in future regional conflicts.²³

Table 4.1. The 1988 UN investigations of allegations of use of chemical weapons in the Iraq–Iran War

UN document number and publication date	Date of investigation	Members of inspection team	Site(s) of investigation	Main conclusions of report
S/19823 25 Apr. 1988	28–31 Mar. 1988 8–11 Apr. 1988	Manuel Dominguez, James Holger Manuel Dominguez, James Holger	Iran: some hospitals in Tehran; Bakhtaran Iraq: Al Rasheed Military Hospital, Baghdad; As Sulaymaniyah	<p>‘(a) On the basis of the clinical examinations I conducted in the Islamic Republic of Iran, I was able to determine that patients had been affected by chemical weapons. A considerable number of those affected were civilians; (b) The main aggressive chemical used in these cases was <u>yperite</u> (mustard gas) but an <u>acetylcholine esterase-inhibiting substance</u> had also been used; (c) On the basis of clinical examinations I conducted in Iraq, I was able to determine that the patients—all military personnel—had been affected by chemical weapons; (d) The aggressive chemical used in these cases was <u>yperite</u> (mustard gas). There were some indications that an <u>acetylcholine esterase-inhibiting substance</u> may also have been used in small concentrations, but there was no conclusive evidence to that effect; (e) It was not possible to make an independent determination in either of the two phases of the investigation of the extent of the use of chemical warfare agents and the means by which the chemical agents had been delivered; (f) Testimony furnished by the patients I examined in both countries regarding the dates on which they had suffered the effects of chemical weapons was generally consistent with the findings of my medical investigation.’</p>
S/20060 20 July 1988	1–5 July 1988	Erik Dahlgren, Manuel Dominguez, Vicente Berasategui	Iran: Bakhtaran; Ahvaz	<p>‘(a) On the basis of the clinical examinations we conducted in the Islamic Republic of Iran, we were able to determine that patients had been affected by chemical weapons; (b) The aggressive chemicals used in these cases were <u>yperite</u> (mustard gas) and an <u>acetylcholine esterase-inhibiting substance</u>; (c) In the Hamid area south-west of Ahvaz, inspected by the mission, <u>chemical analysis of soil samples and weapon fragments showed that chemical weapons had been used against Iranian positions</u>. The chemical agent present was mustard gas, (<u>yperite</u>); (d) From the examination of weapon fragments it can be concluded that bombs similar to those used in <u>1984, 1986 and 1987 have again been used against Iranian forces on Iranian territory, indicating their repeated utilization by Iraqi forces</u>; (e) While it has not been possible, owing to constraints of time and</p>

resources, to make a precise determination of the extent of the use of chemical warfare agents, the findings of the present mission together with those of preceding missions support the conclusion that such use has become more intense and frequent.'

S/20063
25 July 1988

9-11 July 1988

Erik Dahlgren,
Manuel Dominguez,
Vicente Berasategui

Iraq: As Sulaymaniyah
and Rasheed hospitals
in Baghdad; Tariq
military camp;
As Sulaymaniyah

'(a) On the basis of the clinical examinations of nine Iraqi soldiers, we were able to determine conclusively that their injuries had been produced by yperite (mustard gas); (b) In an examination of fragments of mortar grenades found after an alleged Iranian attack in As Sulaymaniyah, these fragments were confirmed to contain yperite (mustard gas); (c) The CAM gave positive indication of the presence of a blister agent in the crates where the grenades, said to have been captured from Iranian forces at Salamcha, east of Basra, were kept, but the analysis of the liquid samples from one of them could not confirm the presence of any chemical warfare agent; (d) The examination of mortar ammunition claimed to have been captured from Iranian forces confirmed that they were 81 mm mortar grenades, designed to be filled with solid or liquid material, which could include chemical warfare agents. It should also be noted that 81 mm grenades can be fired with 82 mm mortars; (e) On the basis of the present investigation, the number of casualties and the extent of their injuries seemed less extensive than in previous investigations.'

S/20134
19 Aug. 1988

12-14 Aug. 1988

Erik Dahlgren,
Ulrich Imobersteg,
A. N. P. van Heijst,
Vicente Berasategui

Iran: Oshnaviyeh;
Sheikh Sarmast
Hospital in
Oroumiyeh

'(a) Clinical examinations conducted in Oroumiyeh showed that patients had been affected by chemical attack, the symptoms of which are characteristic of mustard gas; (b) The results of the chemical analyses confirmed the presence of mustard gas in the area of the attack; (c) From the examination of a bottom plate and several splinters present in the area, it can be concluded that bombs similar to those found in 1984, 1986, 1987 and 1988 have been used against Iranian civilians, indicating their utilization during an Iraqi air attack on Oshnaviyeh.'

Allegations have been made that chemical weapons were used in *Angola* by Angolan Government forces, Cuban forces and by South Africa.²⁴ The allegations against South Africa, implicating US co-operation, were met by US reactions that this was part of a disinformation effort by the USSR.²⁵ Investigators in their private capacities analysed samples taken in the area of alleged chemical-weapon use by Angolan Government forces, and, according to descriptions of the symptoms of the alleged victims, mustard and nerve gas would have been the agents used.²⁶ However, the samples were taken in the area some time after the alleged use of chemical weapons, when the remnants of any CW agents may have disappeared or degraded. The findings seem not to have been corroborated by others.

Ethiopia was accused of having used nerve gas in Eritrea,²⁷ but this has not been confirmed.

Laos accused *Thailand* 'of using chemical weapons . . . to clear the inaccessible area[s]', an accusation which Thailand denied.²⁸ A number of other allegations were made regarding the use of chemical weapons in Laos and Kampuchea by neighbouring countries. However, the available information does not give clear indications of which chemical weapons may have been used.

Where no new information has appeared, previous allegations are not repeated in this chapter, and the reader is referred to previous *SIPRI Yearbook* chapters.²⁹ In this context it should be pointed out that the reporting of allegations in this chapter in no way implies that these allegations are true.³⁰ However, their appearance illustrates the role of chemical weapons in today's security policy discussions, which motivates reporting them.

III. Chemical weapons

Developments in CW armament

This section deals with a number of CW-related events which took place in various countries during 1988.

In the *USA* President Reagan gave clearance on 19 January 1988 for production of the Bigeye binary bomb, in which the CW agent technically is not formed until the munition is on its way to the target.³¹ However, in its authorization bill of 14 July the Congress authorized only \$15 million for programme continuity pending certification of readiness for full-scale production.³² Failure of the Bigeye prototypes to meet reliability standards seems to be the underlying cause of the drastic slashing of funds.³³ For fiscal year 1989 the binary programme as a whole, which included the Bigeye programme, production of the 155-mm GB-2 artillery round and the development of chemical capability for the multiple launch rocket system (MLRS), received a total of \$77.4 million.³⁴ The final authorization act for fiscal year 1989 confirmed the decision.³⁵

In the *USA* the responsibility for the destruction of stockpiles of old and obsolete chemical weapons belongs to the US Army which has recommended that the stockpiles be incinerated at their present sites. It has been ascertained that such destruction cannot be completed until 30 April 1997, not by 1994 as

previously planned.³⁶ New developments, including some public resistance to destruction plants as well as the need for further testing of destruction methods, have led to amendment of the previous decision. The authorization bill stated that destruction methods should be worked out at the Johnston Island destruction facility by 31 December 1990, before use at any other site.³⁷ The cost of destruction of the US stockpile is now estimated to be at least \$2.7 billion.³⁸ However, as early as 1985 the so-called Stoessel Report stated that the actual cost 'would far exceed that estimate [\$2 billion], perhaps by two- or threefold'.³⁹

In a working paper to the CD the USA presented the information given to the Soviet delegation visiting the Tooele base in November 1987, including information on what types of chemical-weapon munition the USA currently possesses.⁴⁰ A summary of the data given by the USA is presented in table 4.2.

A compilation of the contents of the US stockpiles is given in table 4.3. Julian P. Perry Robinson estimated the US chemical-weapon stockpile at slightly more than 30 000 agent tonnes.⁴¹ Although much new information regarding the US CW capability has been made available officially, it has not included figures of the total amount of US stocks of chemical weapons. In 1988 the USA also officially declared to the CD its production facilities.⁴² This information has actually been known for some time.⁴³

The US concern regarding the CW threat can be illustrated by the opinion expressed in this context that US 'forces will have to be highly mobile and capable of operating and supporting themselves in distant theaters'.⁴⁴ That placing binary weapons on Navy ships or transport aircraft would be one way to meet such requirements has also been pointed out earlier.⁴⁵

In early 1988 French representatives repeated the decision in *France* to start production of binary chemical weapons⁴⁶ within the present five-year plan.⁴⁷ Before the announcement in September 1988 by President Mitterrand of France's new position on chemical weapons (see below), there was much speculation regarding the reasoning behind the French position on the need for production of chemical weapons⁴⁸ and the view presented by France at the CD regarding the need for 'security stocks' and the right to 'modernize' by means of new production of chemical weapons even under a future CWC, which would, of course, prohibit the production and stockpiling of chemical weapons.⁴⁹ The French approach to the security-stock concept was presented in a Working Paper to the CD⁵⁰ and is presently reflected in footnotes in the so-called 'rolling text', that is, the continuously negotiated and expanded text of the future CWC, which, however, is not yet binding on the parties participating in the negotiations.

A study undertaken at the Research Institute of the Friedrich-Ebert Foundation in FR Germany⁵¹ points to a number of interesting circumstances which may have led France in the very security-conscious direction it has taken over the past decade or so. Until recently the question of chemical weapons, as well as of other weapons of mass destruction, has been of purely military concern. If politicians discussed these questions at all, the emphasis was put on nuclear not chemical weapons. There were no strong differences based on party politics, and the whole question was shrouded in secrecy.

Table 4.2. US chemical-weapon munitions as presented in the official material for the 1987 Tooele visit

Type/calibre	Agent(s)	Ammunition (lb)	Agent fill (lb or gal)
<i>Artillery munitions</i>			
M360, 105 mm	GB (sarin)	32	1.63 lb
M121A1, 155 mm	GB (sarin)	98.9	6.5 lb
M426 GB W/burster M83, 8 inch	GB (sarin)	197	14.5 lb
M2 mortar, 4.2 inch	HT (mustard)	24.67	5.75 lb
M687, 155 mm, GB binary	DF/OPA	93	10.1/14.5 lb
<i>Chemical bombs (air-launched)</i>			
MK116 MOD O Weteye	GB (sarin)	562.5	347.5 lb
MK94 MOD O 500 lb	GB (sarin)	441	108 lb
MC-1	GB (sarin)	725	220 lb
M43, 750 lb	BZ	800	86 lb
M44, 175 lb	BZ	175	39 lb
<i>Rocket</i>			
M55, 115 mm	GB (sarin)	58	10.7 lb
<i>Spray tanks</i>			
Aero 14B spray tank	VX/GB (sarin)	664	90 gal
Ton container	GB (sarin)	1600	170 gal
TMU-28/B spray tank	VX	567	160.4 gal
<i>Land-mine</i>			
M23 land-mine	VX	22.87	10.5 lb
<i>Close combat chemical weapons</i>			
M7 hand grenade	CN/CS		
M7A1	CN	1.16	0.78 lb
M7A3	CS	0.97	0.74 lb
M25 hand grenade	CN/CS		
M25A1	CNI	0.47	0.2 lb
M25A2	CSI	0.5	0.13 lb
M47 hand grenade	CS		
M32 hand grenade	CSX	0.23	0.13 lb
M36 hand grenade	CR	0.24	0.15 lb

Source: US Army, 'Information presented to the visiting Soviet Delegation at the Tooele Army Depot', 18-21 Nov. 1987, annex to US Conference on Disarmament document CD/830, 19 Apr. 1988.

The reasoning behind the French attitude, according to the West German study, seems to be the following:

1. The Soviet threat—although officially recognized as a threat rather recently—requires a response.
2. Chemical weapons might offer a possibility to enhance deterrence by providing a flexible response, offering a choice in addition to nuclear weapons, including neutron weapons, and conventional weapons.
3. From the point of view of disarmament policy, the reasoning seems to follow the line: arm in order to disarm. According to this reasoning, military security would require some kind of insurance should a CWC be abrogated.

Table 4.3. Size and holdings of CW agent in the US stockpiles

Storage location	Holdings, as a proportion of the total US CW-agent holdings
Tooele Army Depot Tooele, Utah	42.3% (H, HD, HT, L, GA, GB, VX)
Pine Bluff Arsenal Pine Bluff, Arkansas	12.0% (HD, HT, GB, VX, [BZ])
Umatilla Army Depot Activity Hermiston, Oregon	11.6% (HD, GB, VX)
Pueblo Army Depot Activity Pueblo, Colorado	9.9% (HD, HT)
Anniston Army Depot Anniston, Alabama	7.1% (HD, HT, GB, VX)
Aberdeen Proving Ground Edgewood, Maryland	5.0% (HD)
Newport Army Ammunition Plant Newport, Indiana	3.9% (VX)
Lexington-Blue Grass Depot Activity Richmond, Kentucky	1.6% (H, GB, VX)
Overseas	6.6% (mustard, GB, VX)

Source: Perry Robinson, J. P., 'Review: World CW armament', *Chemical Weapons Convention Bulletin*, no. 2 (autumn 1988), p. 16.

4. France is concerned about the spread of chemical weapons in the Third World and might prefer that this take place openly rather than in secrecy.

5. France attaches strong emphasis to the principle of equality and refuses to allow the superpowers a constant superiority. This is the background to the French demand that the parties to the CWC be given the right to keep so-called security stocks. In other words, there should be no question of preventing those countries which have no chemical weapons from acquiring them while allowing chemical-weapon possessor states to retain their superiority.

The latter argument is precisely the one which poses the most serious threat to work on the CWC since it would encourage states to acquire chemical-weapon stockpiles and thereby make compliance with the CWC much more difficult to verify.⁵²

However, a reversal of the previous French position occurred in a 29 September statement to the UN General Assembly⁵³ where President Mitterrand withdrew the French position that France wished to retain the possibility to produce and modernize 'security stocks' under a future CWC. He also stated that France possesses no chemical weapons. Commentators, mindful of earlier apprehensions that France might actually possess chemical weapons, advanced the idea that this might imply that France had already acquired binary chemical weapons.⁵⁴ Another explanation might be that France had not 'weaponized' its bulk stockpiles of CW agents, that is, had not filled munitions with them. The question of the definition of 'chemical weapons' thus cannot be overlooked. However, it does not seem credible that the French President would indulge in technical hair-splitting. One may ask why France worked out and maintained its earlier position in the negotiations

in Geneva, if it did not in fact have chemical weapons. As mentioned above, France even fought a hard battle to get its views incorporated in the rolling text of the CWC as late as mid-September 1988 when the report was to be accepted by the CD—only about a fortnight before President Mitterrand announced the new French view at the UN.⁵⁵ It will thus be interesting to observe the extent to which the new thoughts influence the future French position in the CWC negotiations. However, there is currently no prohibition on the production and stockpiling of chemical weapons; France has declared that it intends to produce chemical weapons; and, in view of the probable two to three years before a CWC may be ready to be signed, France may in reality not have given up its immediate security goals in Europe and elsewhere since President Mitterrand has declared that France will not deprive itself of any types of weapon held by other powers, including chemical weapons.⁵⁶ None the less, its apparent new stand certainly would facilitate the progress on a CWC and is to be welcomed.

Legal complaints in the *Federal Republic of Germany* against US stockpiling of chemical weapons in the Federal Republic were rejected in 1987 by the Federal Constitutional Court in Karlsruhe.⁵⁷ The issue was the subject of further discussions during 1988. On the one hand, the USA promised to remove these stockpiles before 1992, and President Reagan assured Chancellor Kohl that the promise would be binding on the next US President.⁵⁸ On the other hand, according to the judicial ruling, there is obviously no legal pressure to do so. This may also imply that it would be legally possible to stockpile US binary chemical munitions in FR Germany without further consultation. The issue was the subject of further talks between the governments of FR Germany and the USA. The outcome of these legal considerations may have alleviated French concerns about the future need for French chemical weapons. It is not clear whether the UK will ultimately allow the basing of binary chemical weapons on British soil in time of crisis. Actually there is no agreed NATO position concerning the circumstances under which US binary chemical weapons would be moved to Europe.⁵⁹

No new official information on *Soviet* chemical weaponry appeared during 1988. Comments in the West continued to be sceptical with regard to the declared size of not more than 50 000 agent tonnes for the Soviet chemical-weapon stockpile. The USSR maintained its declaration⁶⁰ but, for the first time, declared its willingness to disclose the locations of its chemical-weapon production plants, if the USA would reveal the size of its chemical-weapon arsenal.⁶¹ Further, the USSR declared in March in the CD that it did not have foreign chemical weapons on its territory; that it possesses chemical-weapon production facilities; that it has not transferred to other states technology or equipment for production of chemical weapons; and that it has not since 1 January 1946 received foreign chemical weapons, or technology or equipment for their production.⁶²

There were also allegations that the chemical weaponry demonstrated in 1987 by the USSR at Shikhany represented at best only old munitions, and even that has been questioned. Many Western sources further maintain that no information has been given by the USSR about its programme for the development of new chemical weapons. One of these sources maintains that

the USSR is in the process of converting to a new generation of chemical and biological munitions for the 1990s, among them a cluster bomb suitable for chemical munitions.⁶³

As early as December 1987 a report was made available which announced the Soviet construction of a plant to destroy chemical weapons in the city of Chapayevsk in Kazakhstan. The report did not describe the destruction technique beyond noting that it would result in end-products which could not be re-utilized for toxic-substance production. All equipment will be of Soviet origin.⁶⁴

It seems appropriate to end this section by summarizing what is today indisputably *known* about the possession of chemical weapons. The *USA* and the *USSR* have declared that they possess chemical weapons. *France* has long been said to possess chemical weapons, but has now declared that it does not. However, France plans to start production of chemical weapons. *Iraq* has admitted the use of chemical weapons and, thereby, possession of them. *Iran* has issued conflicting statements and may have the capability to produce chemical weapons, may have produced them, or may be considering acquiring them. If *Iraq's* allegations that *Iran* has used chemical weapons are true, that would, of course, mean that *Iran* is also a chemical-weapon possessor state.

About 30 other countries have been mentioned in previous *SIPRI Yearbooks* as *alleged* possessors of chemical weapons. The nature of the allegations has ranged from mutual allegations by parties to a conflict, to press reports to official allegations by other countries, usually based on secret intelligence information. In these cases *SIPRI* only reports allegations and denials without being able to judge the actual situation. It is, however, important to register the flow of allegations, denials and other information, since these reports, in themselves, constitute a measure of the extent to which chemical weapons may be involved in military planning.

Measures to hinder the spread of chemical weapons⁶⁵

The so-called *Australian Group*, now comprising 19 members,⁶⁶ continued its efforts to curb the export of sensitive chemicals and technologies which could be utilized for the production of chemical weapons. In several of the member countries regular export restrictions already exist.⁶⁷ The chemicals of concern to the Australian Group⁶⁸ relate mostly to the peaceful production of pesticides and insecticides and are accordingly legitimately traded. However, it is difficult for the international chemical industry to behave in a discriminatory way towards its customers, who generally have no intention of producing chemical weapons. This does not seem to exclude that questionable transactions of chemicals that are useful as precursors, for instance thiodiglycol for producing mustard gas, have been made and in some circumstances have also led to prosecution of the chemical companies involved.⁶⁹ No new compounds seem to have been added to the list of chemicals on the Australian Group's warning list. However, another meeting was to take place before the end of 1988, the outcome of which might eventually be made known. Japan's Ministry of International Trade and Industry (MITI) has announced that it will regulate

exports of nine chemicals that could be used to make CW agents.⁷⁰ Similar regulating efforts are being undertaken in the East European countries, as was reported in *SIPRI Yearbook 1988*.⁷¹

In this context note should be taken of the UN list of chemicals which have been banned, withdrawn, severely restricted or not approved by governments because of the harmful effects to health and the environment which they constitute.⁷²

However, as is evident from the references given above as well as other sources, it is not only the trade in chemical products which is subject to regulation. Know-how also constitutes a necessary component as does equipment for the production of CW agents, such as non-corrosive pipes for the production of sarin. In addition a new element has now been added owing to the development and sale of missiles⁷³ as is described below.

It is increasingly clear, however, that chemical companies—state-owned or private—have been instrumental in providing countries in the Gulf area and the Middle East with chemicals and technical know-how, which could be utilized for chemical-weapon purposes. Companies in Belgium, FR Germany, the Netherlands, Switzerland and the USA, among others, have allegedly been involved.⁷⁴ Some of these companies are involved in legal proceedings in their countries.⁷⁵ It is obvious that the trade in chemicals must be given increased attention, both in the context of today's export-regulating activities and also under a future CWC.

Thus far little attention has been given in the CWC negotiations to the problem of regulating the peaceful trade in chemicals except for a few, very general provisions.⁷⁶ The UN Security Council passed a resolution, as a result of one of the fact-finding missions sent to Iran by the UN Secretary-General, which called upon all nations to establish strict export regulations on chemicals that could be used for the production of chemical weapons.⁷⁷ In his speech to the UN General Assembly President Mitterrand indicated that the January 1989 Paris Conference on the 1925 Geneva Protocol should discuss export regulations.⁷⁸

Spread of chemical weapons

Reports continued to appear during 1988 about the purported growing CW capability in the Middle East. Syria was said to have increased its chemical-weapon production capability,⁷⁹ but these allegations were denied by Syria.⁸⁰ Speculation was raised about the intent of the March visit to Syria by the head of the Soviet chemical forces.⁸¹ However, in the course of confirming the visit, it was later explained that the visit had concerned protection against chemical weapons and the danger of the spread of chemical weapons, together with a presentation of Soviet efforts to reach a world-wide ban on chemical weapons. A denial of allegations that the USSR had co-operated with Syria in developing chemical weapons was issued.⁸² It has also been claimed that Syria has acquired Soviet missiles capable of delivering chemical warheads.⁸³

Allegations were repeated during 1988 regarding the acquisition by Libya of a chemical-weapon production capability. US sources indicated a possible

production site at Matan as Sarra, about 100 kilometres north of the Chadian border, and also that this facility might be capable of producing nerve gas.⁸⁴ Other allegations made in 1988⁸⁵ were also denied by Libya.⁸⁶ An alleged production facility is situated at Rabta, 56 kilometres from the Mediterranean coast. Libya claims that it is a 'medical plant' and has invited international visits upon its inauguration in the early spring of 1989.⁸⁷ US reports alleged that West German companies were involved in the construction and operation of the facility.⁸⁸ President Reagan repeated the allegations at the end of December and added that he had consulted with US allies about the possible option of bombing the facility.⁸⁹ Libya, in a letter to the UN Secretary-General, again denied the allegations, accusing the USA of using them as a pretext for a US attack against Libya. The Arab League supported Libya.⁹⁰ According to the Chairman of the all-party Parliamentary Human Rights Group in the UK, Libya has been said to have shipped nerve gas to *Somalia*,⁹¹ but this was characterized as a false accusation by the Somali Ambassador to Great Britain and by Libya.⁹²

Israel showed concern during 1988 about the increased chemical-weapon threat in the region. One Israeli response has been to increase training of the civilian population in chemical-weapon protection and the provision of protective equipment to civilians.⁹³ However, Israel's Arab neighbours and others have expressed the conviction that Israel has a full-fledged CW capability, and concerns have been expressed that Israel might choose to make a pre-emptive strike against perceived chemical-weapon production facilities.⁹⁴

Some new information became available during 1988 about the chemical-weapon production capacities of Iran and Iraq. *Iran* hinted on several occasions that it possesses a production capability or, alternatively, that it needs to acquire such a capability.⁹⁵ A press report alleges that Iran possesses a facility for filling warheads with chemical-warfare agents in the city of Damghan in northern Iran and has tested a missile containing nerve gas.⁹⁶ Allegations of possible routes for the delivery of chemicals to Iraq, particularly via Mersin in Turkey, were also denied.⁹⁷ *Iraq* is said by US sources to possess two production centres at Samarra, 100 kilometres north-west of Baghdad, and at al-Fallujah, 65 kilometres west of Baghdad. A CW research centre is claimed to have been built at Salman Pak, 40 kilometres south-east of the capital.⁹⁸

A number of allegations have previously been presented with respect to possession of chemical weapons and CW capabilities of countries in the Near and Far East.⁹⁹ *South Korea* has been accused by North Korea of acquiring chemical weapons from the USA¹⁰⁰ while *North Korea* has been accused by South Korea of producing and stockpiling chemical weapons.¹⁰¹

A profound CW-capability issue during 1988 was the sale of ballistic missiles and the technology for building these missiles. This has been of particular concern not only to the USA but also to the USSR, and the two countries are involved in measures to attempt to curb the spread of ballistic missile technology.¹⁰² Particular concern has been raised by the Chinese sale of Silkworm missiles to Iran and Italy and by alleged West German support to Argentina and Egypt for development of missiles, which—if this has occurred—would be a violation of the 1987 Missile Technology Control

Regime.¹⁰³ Many more missile deals have been mentioned.¹⁰⁴ Such missiles may also carry chemical payloads, which (as mentioned above) is of particular concern in the Middle East. It is obvious that the threat of CW increases when countries capable of producing chemical weapons also acquire the technology for long-range bomber, or missile, chemical attacks against an adversary. In particular the situation in the Middle East now seems to have become unstable with the development of the means for chemical-weapon attack over long distances. (For a further discussion of the trade in ballistic missiles, see also chapter 7.)

Although the spread of chemical weapons is of increasing concern, a number of countries have also declared that they do not possess chemical weapons or have chemical weapons from other countries placed on their territories. During 1988 a number of states declared, via their CD delegations, that they do not possess chemical weapons.¹⁰⁵ Over the years many countries have made such declarations.

Bilateral visits

A Soviet delegation, headed by the Soviet ambassador to the CD, visited British CBW protection facilities on 24–26 May 1988.¹⁰⁶ The bilateral visits which earlier had taken place between the USA and the USSR, and the FRG and the USSR, thereby continued. The visitors were shown the Chemical Defence Establishment (CDE), a British pilot-plant facility for destruction of toxic laboratory wastes and munitions from the two world wars, as well as a facility for biological-weapon protection. An exercise in protection against chemical weapons was also demonstrated.

A British team made a reciprocal visit to Shikhany on 30 June–2 July 1988. The team visited a number of places in the military facility including laboratories, test ranges, and so on. Several of these were visited at the request of the British delegation. The British requests were granted by the Soviet hosts with only one exception, where it was claimed that the facility in question belonged to the Ministry of Chemistry and that there was not sufficient time to obtain a permit to visit it, as the request was made at the very end of the visit.¹⁰⁷

The British visit may not only have resulted in confidence building, as was the intent of these visits. The incident of denial of access to a facility and later doubts expressed by the British as to whether the weapons displayed are really the only ones possessed by the USSR¹⁰⁸ point to the need for further discussion of the prerequisites for these types of visit. The British visit appears to have assumed the character of an on-site inspection, which may have surprised the Soviet hosts, since their visit to Great Britain did not have that character. It seems highly doubtful whether a foreign delegation, invited to a voluntary display of facilities and weapons in another country, could expect to have all of its demands fulfilled, much less utilize the incident to undermine the confidence-building value of the visit. One must remember that changes in regard to openness in the chemical-weapon field are a very recent phenomenon and need to be nurtured with care to the stage of complete openness through sincere commitment and co-operation.

Information exchanges took place within the bilateral talks between the USA and the USSR. These talks, now 10 in number, appear to fulfil their function well although no detailed open information on the actual results is available. It is questionable whether there is sufficient time—and personnel—to cover all of the subjects which need to be discussed. However, the agenda of the talks has been said to include information on weaponry, the destruction of stockpiles, the order of such destruction, definitions of production facilities, spread of chemical weapons, and so on.¹⁰⁹ The talks have resulted among other things in drafts for the rolling text of the CWC and on definitions of production facilities and the destruction of stockpiles, as is discussed below.

Chemical weapon-free zones

During 1988 the parties which initiated the idea of chemical weapon-free zones (CWFZs)—the *German Democratic Republic*, *Czechoslovakia*, the Social Democratic Party in the *Federal Republic of Germany*, and the WTO states as a group—made new statements about the need to institute a CWFZ in Europe.¹¹⁰ Informal talks were held in Geneva between the leaders of the disarmament delegations of *Czechoslovakia*, FR Germany and the GDR without any concrete results.¹¹¹ West German Social Democrats advocated a global chemical-weapon ban but warned that, if such a ban did not appear, it would be necessary to revive the talks on a CWFZ in Europe. One argument for a zone agreement is that it is claimed to be verifiable.¹¹² A formal suggestion was also put forward by *Czechoslovakia* and the GDR to the Government of FR Germany to start negotiations on a CWFZ in Europe. However, this invitation was declined by FR Germany.¹¹³

The question of CWFZs was the subject of new efforts in other areas during 1988. In the Third UN Special Session on Disarmament (SSOD III) the Prime Minister of *Israel* called for the institution of a CWFZ in the Middle East.¹¹⁴ No response to this suggestion has been recorded thus far, but the suggestion must be regarded as one expression of Israeli concern about the perceived buildup of chemical weapons in the Middle East.

An initiative for a CWFZ in the Pacific was made by *Australia*.¹¹⁵ The effort was prompted by the increased concern, as mentioned above, that several states in South-East Asia may now be possessors of chemical weapons, or in the process of acquiring them.

No other initiatives regarding CWFZs seem to have been taken during 1988, although Greece and Turkey were reported to have expressed opposing views regarding a CWFZ in the Balkans.¹¹⁶ The increased interest for this solution in other parts of the world than Europe may be a sign that the expectations of attaining a global CWC are sinking at the same time as the threat from chemical weapons gains credibility. If this tendency continues, the efforts to obtain a global chemical-weapon ban will certainly be diluted. Another important aspect may be that, if several CWFZ agreements were concluded, one can assume that they would also have very different verification arrangements and other provisions. Once they had been implemented, these would be extremely difficult to reconcile under a global ban.

IV. Developments related to the Biological Weapons Convention

An attempt was made to resolve the long-standing dispute between the USA and the *USSR* as to whether the 1979 outbreak of anthrax in the city of Sverdlovsk in the *USSR* was the result of an accident at the alleged biological-weapon laboratory¹¹⁷ in Sverdlovsk or the result of a natural outbreak of anthrax due to the consumption of contaminated meat. On the invitation of the American Academy of Arts and Sciences, Soviet experts went to the USA on 10–17 April 1988 and presented material which had not previously been made known, aimed at demonstrating the natural cause of the outbreak.¹¹⁸ The visit took place on the initiative of Dr Matthew Meselson, long an advocate of CBW disarmament in the USA. Although the explanation was accepted by Meselson, who also later called for further mutual discussions between the *USSR* and the USA,¹¹⁹ US authorities continued to maintain that the explanation was unsatisfactory and that US secret intelligence information showed that the outbreak had in fact resulted from the release of anthrax spores from the military facility in Sverdlovsk.¹²⁰

Another round of information was provided during the spring of 1988 as a confidence-building measure under the Biological Weapons Convention (BWC), according to the agreement reached during the second BWC Review Conference in 1986 and the subsequent meeting of experts in 1987.¹²¹ Eighteen states participated in the first round of information exchange on 15 October 1987; 23 states took part in the second round on 15 April 1988. The information provided varied considerably in length and detail. Further, it is obvious that only a minority of the states parties to the Convention gave the requested information—25 out of 111. The reason the majority of the states parties did not answer, even if only to state that they do not have any pertinent information, needs to be elucidated. One possible explanation for this behaviour may be that many states parties may consider the information exchange as completely voluntary. However, the information exchange was, in fact, agreed upon by a consensus of the Review Conference, as were the modalities for the exchange which were worked out by the Expert Group at the Review Conference. Further, the agreement was made in the context of interpreting Articles V and X of the BWC as a means of co-operation, which is binding for the states parties to the Convention.¹²²

In 1986 the USA presented its Program for Biological Weapons Defense.¹²³ While US authorities stress the defensive character of the programme, it nevertheless evoked controversy within the USA as to whether the programme did not in fact also imply active work on an offensive biological-warfare capability.¹²⁴ In the discussion of this problem doubts were also expressed about the nature of the new BW testing laboratory to be built by the US Army at the Dugway Proving Ground in Utah.¹²⁵ Internal governmental criticism about safety in the US CBW research facilities was expressed in general terms in a report by the US General Accounting Office.¹²⁶ Although the need for CBW research for protective purposes was underlined by Army representatives in hearings and other contexts, it was ultimately ruled that the facility should be smaller and built for a lower biosafety level than initially planned.¹²⁷

According to unspecified US sources *Iraq* is in the process of acquiring a biological-weapon production capability at a complex south-east of Baghdad. This conclusion is said to have been reached based on the alleged purchase of certain equipment and the architecture of the purported production facility.¹²⁸ No official Iraqi reaction to this allegation has been noted. There were also allegations that Iraq used biological weapons against Kurds in As Sulaymaniyah.¹²⁹ *Iran* has also been accused of possessing biological-weapon production facilities, and the possible need for such facilities has also been expressed officially.¹³⁰ A US official has stated that as many as 10 nations may be developing biological weapons.¹³¹

A number of books and articles were published in 1988 which argued that a risk to the BWC may be constituted by the application of progress in biotechnology and genetic engineering to the development of biological and toxin weapons in violation of the BWC. However, views have also been expressed that this risk may be overestimated. It is not possible to analyse this difficult problem here.¹³² This applies particularly to the question of toxins—substances which are already covered by the BWC but which, by definition, will have to be covered also by a future CWC.¹³³ It can be pointed out, however, that it is exactly this problem of distrust of the intentions of national as well as foreign authorities—irrespective of existing international agreements—that is intended to be alleviated by the CBMs provided for in the BWC. It is hoped that these measures will be particularly useful in evaluating the extent to which both national and international peaceful research and development activities actually constitute risks to the BWC. It would certainly be useful if researchers and their professional societies discussed the subject more widely and did not allow the discussion to become the province of public opinion-makers who have particular goals in mind and are in possession of widely varying amounts of knowledge.

V. Developments influencing the CWC negotiations

Two of the most important events of 1988, both with respect to the development of CW and to the prospects for the negotiations on the CWC, were the use of chemical weapons and the cease-fire in the Iraq–Iran War. CW developments are dealt with above. Since the cease-fire, the negotiations can now continue without the pressure of ongoing CW, which is not being sufficiently and straight-forwardly renounced by the world powers. However, from an international point of view, the alleged use by *Iraq* of chemical weapons against the Iraqi Kurds seems to present even greater difficulties, and certainly needs further clarification. This applies not least to the Iraqi refusal to allow UN investigations of the allegations.

The cease-fire may also make it possible to evaluate in more detail how Iraq's acquisition of chemical weapons went as unobserved as it initially did. Finding out more about this process may actually improve the negotiations on the CWC by providing a better understanding of what trade and transfer regulations are needed for the convention. The security considerations of Iraq and Iran, and also of nearby countries, may continue to result in maintenance of a CW

posture in the area. As has been argued before,¹³⁴ this situation cannot be remedied until a CWC is completed and ready to be signed and ratified.

A new initiative to attempt to curb the use of chemical weapons was taken by President Reagan in his UN statement in the autumn, when he appealed to the signatories of the 1925 Geneva Protocol and other concerned states 'to convene a conference to consider actions that we can take together to reverse the serious erosion of this treaty'.¹³⁵ The suggestion was endorsed during the following days by the Soviet and British Foreign Ministers.¹³⁶ President Mitterrand also expressed approval of a meeting of the signatories to the Protocol to find ways of strengthening the Geneva Protocol.¹³⁷ Speakers in the General Assembly, as well as others, underlined the need for the institution of the CWC at the earliest possible opportunity. The meeting which grew out of these proposals took place in Paris on 7–11 January 1989. In the invitation to the Paris Conference the following aims were presented: (a) confirmation by all parties of their full adherence to the Protocol; (b) registration of the adherence of new parties; and (c) recognition of the urgent character of the negotiation of a comprehensive ban on chemical weapons.¹³⁸

Discussions continued about what the Paris Conference would actually accomplish and what preparations might be needed.¹³⁹ In his speech to the UN, President Mitterrand suggested several more issues for consideration by the Paris Conference: the prevention of the proliferation of chemical weapons, the improvement of the UN investigative procedures regarding use of chemical weapons, and sanctions which would make it impossible for any state to use chemical weapons with impunity in settling its internal or external problems.¹⁴⁰ Although the initiative to strengthen the prohibition on the use of chemical weapons is most welcome, it is desirable that no action be taken in this context which might in any way delay or reduce the urgency of the finalization of the comprehensive CWC. However, the Conference took place as planned and produced an agreed declaration, which among other things renounced the use of chemical weapons, called for rapid completion of a comprehensive global convention on chemical weapons, and supported a strengthening of the UN Secretary-General's power to investigate alleged use of chemical weapons.¹⁴¹ The full text of the declaration is given in appendix 4A, and the issue will be dealt with further in the next *SIPRI Yearbook*.

The chemical industry showed an increased interest in the negotiations on the CWC in 1988. As in 1987 a meeting of chemical industrial experts was held in July in Geneva¹⁴² in order to provide the negotiators with advice. Earlier during 1988 chemical industry organizations held meetings to discuss the implications of the CWC.¹⁴³ It is to be hoped that the chemical industry and its organizations will continue to contribute to the negotiations by providing basic information as regards the production of chemicals subject to regulation under the future convention. Efforts in these directions were again undertaken during 1988 by some CD delegations which provided information on such chemicals.¹⁴⁴

One result of the 1988 negotiations was the recommendation that negotiating countries start so-called trial inspections in their countries in order to provide national experience.¹⁴⁵ Such experience may form the basis for the more

detailed working out of the provisions for international verification activities. The experience gained in this way¹⁴⁶ would constitute a welcome attempt to come to grips with the problems which will have to be solved if the verification of the chemical industry is to be a workable system. One can only hope that these efforts will also lead to the institution of a mechanism to deal with the practical technical problems which will have to be solved parallel to the remaining negotiating of the CWC text proper.

Ideas have been expressed previously that a Group of Experts, similar to the Group of Seismic Experts which assists the CD in its negotiations on a comprehensive test ban, should be instituted by the CD.¹⁴⁷ However, owing to the great complexity of the CWC negotiations, a better solution might be to involve continuous consultation with all of the different types of expert involved. A more thorough evaluation of the existing export regulations is merely one aspect of the negotiations which would benefit from such expert assistance. The Australian Group was discussed above; the United Nations Environment Programme (UNEP) has also produced a list of chemicals which are regulated in different countries owing to their danger to humans or the environment,¹⁴⁸ and the Organization for Economic Co-operation and Development (OECD) has vast experience as well.¹⁴⁹ It is probably not necessary to involve these organizations in formal co-operation with the CD but rather to ask for their assistance on specific questions, as has been done in the past.¹⁵⁰

New international efforts to curb the use of fluorocarbons and the emission of nitrogen oxides into the air might also contain useful ideas.¹⁵¹ International agreements such as the Drug and Narcotics Act may also be of importance for work on the CWC. The CWC will affect national military security, and therefore great emphasis will be placed on the verification of the agreement. There is thus good reason to apply experiences from technically very similar international attempts to meet potentially dangerous developments.

Suggestions as to how the question of verification of the non-production of chemical weapons by chemical industry might be solved are presented continuously at the CD. FR Germany has provided ideas concerning so-called spot-check verification¹⁵² (see also chapter 12). An interesting analysis was presented in 1988 by Julian P. Perry Robinson, who discussed how to find the trade-off between *adequacy* and *feasibility* of verification measures with respect to the chemical industry.¹⁵³ His thinking underlines the increasingly obvious need to find reasonable methods and procedures for verification activities which have a variety of applications, rather than to overburden the convention with too tightly knitted and rigid measures, which might ultimately be useless owing to their cumbersomeness.

It might be recalled in this context that individual countries have contributed greatly to the work in the CD for many years by undertaking national technical efforts, particularly in the area of verification.¹⁵⁴ This type of work could usefully be undertaken by some countries, choosing separate tasks, which are now in urgent need of consideration. However, these endeavours would also need to be co-ordinated with the work of the CD, not least in order to obtain feedback from the experts of other countries.

As mentioned above, the bilateral discussions between the USA and the USSR have led to an agreement to exchange data on the chemical weapons possessed by the two countries. These contacts have also led to a bilateral proposal for possible verification of chemical-weapon production facilities.¹⁵⁵ A step has also been taken towards solving the difficult question of the definition of 'production capacity'.¹⁵⁶

The French views on chemical weapons and the shift in position announced by President Mitterrand earlier in 1988¹⁵⁷ are discussed above. It seems that France, with this development of its thinking, is now willing to facilitate the conclusion of a CWC. At the least, its position will not hinder a final agreement on the question of how, and in what order, to destroy chemical-weapon stock-piles and to eliminate production facilities.

Problems of assistance and co-operation are of more general concern. The international discussion continues in many contexts and is reflected in the CD, where, among others, Argentina raised the assistance and co-operation issues in 1988.¹⁵⁸ While these issues may not currently constitute a serious political hindrance, it is certainly necessary to give them continuous careful thought.

The UN SSOD III did not produce a final report. From the point of view of the CW negotiations this was unfortunate since such a report might have demonstrated a consensus for the negotiation work which might have been useful as support.¹⁵⁹

One development of importance for the further investigation of alleged use of chemical and biological weapons is the work of the Group of Qualified Experts, from Bulgaria, Egypt, France, Sweden, the USA and the USSR, asked by the UN Secretary-General to investigate methods and suggest rules for such future UN investigations. The expert group presented an interim report on its work in August 1988.¹⁶⁰

Another development which, it is to be hoped, will have a positive influence on the CWC negotiations is the implementation of the INF Treaty. The INF inspection teams have been able to perform their tasks without difficulty.¹⁶¹ At the same time it is obvious that the verification activity, as such, is an extensive as well as an expensive undertaking. Hopefully this fact will be recognized in the CW negotiations.¹⁶² It should be noted, however, that there is not yet much background material from which to estimate the future costs for verification of a CWC. In the CD the most recent attempt to judge the size of the verification organization was made in a Canadian Working Paper.¹⁶³ An independent study was also made during 1988 in an effort to elucidate the factors involved. This study concluded, among other things, that: from the economic point of view the coming into force of a CWC could be advantageous; labour costs would probably constitute up to 90 per cent of the cost of the verification measures; the major part of the cost will relate to the international verification activities, probably about three times those of the International Atomic Energy Agency (IAEA) given the conditions of the study; after the 10-year destruction period the size of the cost will depend primarily on the extent of control of the chemical industry; and the economic influence of the CWC on the chemical industry (under the given assumptions of the study) will be low.¹⁶⁴ Recognizing that far from all relevant aspects can as yet be estimated correctly, the study

nevertheless constitutes a valuable attempt to analyse the very important aspect of the cost of the future verification regime.

During 1988, more or less pessimistic statements were made by both US and Soviet officials about the possibility of reaching a chemical weapons accord in the near future.¹⁶⁵ The US representative at the Strategic Arms Reduction Talks (START) is even quoted as having told a closed meeting of NATO ambassadors to the CD that the USA did not want to have a CWC since it was impossible to verify.¹⁶⁶ However, George Bush presented the US draft convention to the CD in Working Paper CD/500 in 1984, and repeated during his presidential election campaign his commitment to achieve a CWC. Bush seems thus to be strongly politically bound to forceful efforts to obtain a CWC and has even stated that he wished to be remembered for 'a complete and total ban on chemical weapons'.¹⁶⁷

VI. Conclusions

1988 was a horrendous year as regards the use of chemical weapons and the threat they constitute. In addition, efforts to curb this use and stop the spread of chemical weapons failed or were defeated outright. Only the fact that a cease-fire was attained in the war between Iraq and Iran may have averted still worse atrocities in the use of chemical weapons in at least one international conflict. The threat at the end of 1988 of new hostilities over the alleged Libyan production facility may not bode well for 1989. A small, but hopefully significant positive development was that the Secretary-General of the United Nations was able to perform expert investigations regarding the use of chemical weapons in the Gulf War.

With regard to official technical information about national and international developments regarding CBW matters it must be said again that this is more readily available from Western countries in general than from Eastern countries and other countries with strong restrictions on the flow of information. Further, lack of familiarity in the West with technical literature in non-Western languages may be a factor. However, the recent changes and activities, in particular in the USSR, seem to offer a new prospect for more extensive information in the future.

The attempts to increase the amount of information in the CBW field provided by governments and thereby induce confidence in the work on the CWC, and in the BWC, have actually been a dominant feature of 1988. These attempts include: data exchanges; publications concerning the US CW weaponry and production facilities; visits to research establishments in the UK and the USSR; expanded Soviet explanations of the 1979 anthrax incident; and the CBMs produced for the BWC. Although the information is still far from complete, a process has been started, and it is right to note it positively and ask for the patience to allow it to develop further in spite of some voices of distrust.

Another conclusion is that there now seems to exist a genuine political will, at least in the East-West context, actually to obtain a comprehensive CWC, irrespective of military security concerns that may continue to exist about the value of such a convention. Such a conclusion is based upon the repeated

express commitments of the leaders of the superpowers to achieve a CWC; the increase in the flow of information mentioned above; and not least the opening that now may be constituted between the end of the Gulf War and the next open conflict somewhere in the world, which might involve the use of chemical weapons.

A new working method may be needed in order to maintain the momentum of the negotiations. This might concern, on the one hand, the negotiations on remaining political issues related to the actual convention text, and, on the other hand, the elaboration of the technical provisions, which largely appear in annexes to the convention. The technical part of the negotiations could, while directed politically by the negotiating body (CD), be carried out in one or several more loosely organized working groups. The negotiations might thus avoid getting bogged down in technical details, which in some cases may not be completely resolved until the CWC has entered into force. Two moves in this direction are the meeting with chemical industry experts and the work on 'trial inspections' now being undertaken by individual nations participating in the negotiations in Geneva. These efforts were not directly incorporated in the negotiating process but were initiated and have been directed by the course of the negotiations.

The complex chemical industry functions legitimately to meet many human wants and needs. The consequent risks and dangers of these activities have to be dealt with politically. In this context it should be remembered that the main purpose of the future CWC is to make certain that *nations* do not possess or acquire chemical weapons and to secure the destruction of existing chemical weapons. Its central aim is not to regulate the chemical industry only, even if tools and procedures to assure compliance with the convention and to investigate alleged violations of it must be made available under the CWC.

Finally, the increased risk of the spread of chemical weapons and chemical warfare is now recognized globally, and particularly so in 1988. Each country is able to draw its own conclusions about how to cope with that risk. Those which choose to acquire chemical weapons of their own certainly contribute to increasing the risk, and without a convention which would make chemical weapons unavailable to all nations and provide a basis for security, the latter option will probably prevail. This is the strongest argument for the rapid conclusion of a CWC.

It is not only the negotiations on the CWC which constitute an expression of international will to remove this threat. The 1989 Paris Conference on the 1925 Geneva Protocol, the continued efforts of the Australian Group to regulate exports of chemicals, the continuing and widened discussions on CWFZs in different parts of the world and similar efforts are also expressions of that will. As long as they help to curb the threat, particularly during the period before the CWC enters into force, they are certainly to be welcomed. However, it is increasingly clear that they cannot substitute for a comprehensive CWC; in fact they may render its conclusion more difficult by instituting regulations which may not even be compatible—not flowing from a common and overriding view of what chemical weapons are and how they should be got rid of. This is again a strong argument for the CWC.

Notes and references

¹ Mr McCain, Senator from Arizona, in a statement to the US Senate, *Congressional Record*, US Senate, 30 Sep. 1988, pp. S 13804-7.

² Monthly compilations of alleged attacks are given in the 'Chronology 1988 on chemical weapons', in the *Arms Control Reporter*, 1988, pp. 704.B.257 ff.

³ Iran, Conference on Disarmament document CD/827, 11 Apr. 1988.

⁴ *Congressional Record*, US Senate, 9 Sep. 1988, p. S 12135.

⁵ Oschwald, H., 'Gas als Privatsache', *Die Welt*, 17 Sep. 1988.

⁶ See, for example, Petrossian, T. and Fairhall, D., 'Iraq's weapon of terror', *The Guardian*, 24 Mar. 1988, p. 23.

⁷ 'Tehran says it will not use gas warfare', *The Independent*, 1 Apr. 1988, p. 13; Iran, Conference on Disarmament document CD/PV.456, 12 Apr. 1988, p. 7.

⁸ See, for example, Gold, D., 'The menace of chemical arms', *Jerusalem Post* (intl edn), 21 May 1988, p. 8.

⁹ 'Chemical weapon use admitted', PM 1011111088, Paris, *Le Monde*, in French, 10 Nov. 1988, p. 12; FBIS-WEU-88-218, 10 Nov. 1988, pp. 13-14; Morris, H., 'Kurds describe massacre in Iraqi gas attack', *The Independent*, 22 Nov. 1988 (quotes chemical analytical results indicating remains of mustard gas).

¹⁰ See, for example, Parry, G. and Foreman, A., 'Iraq "using gas against Kurds"', *The Guardian*, 24 Aug. 1988, p. 1.

¹¹ See, for example, 'Announcement', Sep. 1988, Iraqi Embassy; 'Explanatory statement by the Ambassador about his recent meeting at the Foreign Office', *International Herald Tribune*, 21 Sep. 1988.

¹² See, for example, Tyler, P. E., 'Iraq defiant on charge that it gassed Kurds', *International Herald Tribune*, 16 Sep. 1988.

¹³ Press release by Physicians for Human Rights, 'Medical Team Finds Evidence of Iraqi Use of Chemical Weapons on Kurds', 22 Oct. 1988; Morris (note 9); Teimourian, H., 'Chemists prove mustard gas use', *The Times*, 28 Nov. 1988. See, for example, Haberman, C., 'Kurds' wounds of war and peace', *International Herald Tribune*, 13 Sep. 1988; Kelsy, T., 'Gastro-enteritis rages in Kurdish refugee camps', *The Independent*, 14 Sep. 1988, p. 13.

¹⁴ Goltz, T., 'Turkey says its report does not clear Iraq', *International Herald Tribune*, 15 Sep. 1988.

¹⁵ See, for example, Fairhall, D., 'Britain and US seek Iraq gas inquiry', *The Guardian*, 14 Sep. 1988, p. 6.

¹⁶ Howard, J., 'Kurds claims confirmed', *The Guardian*, 17 Oct. 1988, p. 8; Teimourian, H., 'Kurds accuse Iraq of killing civilians in nerve gas attacks', *The Times* (London), 19 Oct. 1988, p. 11; Bulloch, J., 'Kurds say Iraq used gas again', *The Independent*, 19 Oct. 1988, p. 1.

¹⁷ See, for example, Train, M. and Boseley, S., 'Iraqi messages "confirm chemical war on Kurds"', *The Guardian*, 16 Sep. 1988, p. 1; 'Chemical weapons in Kurdistan: Iraq's final offensive', a staff report to the Senate Committee on Foreign Relations, 21 Sep. 1988; Viorst, M., 'Iraq and the Kurds: Where is the proof of poison gas?', *International Herald Tribune*, 7 Oct. 1988.

¹⁸ 'Sanctions against Iraqi Chemical Weapons Use Act', *Congressional Record*, US House, 27 Sep. 1988, pp. H 8427-28. (The bill was passed by the House by a vote of 388 yeas, 18 nays and 27 not voting.) See, for example, Barber, L., 'Congressmen vote for sanctions against Iraq', *Financial Times*, 29 Sep. 1988, p. 3.

¹⁹ Graham, H., 'Iraq sanctions fail', *The Observer*, 23 Oct. 1988, p. 23.

²⁰ Rosen, J., 'Howe against sanctions on Iraq', *The Guardian*, 30 Sep. 1988, p. 12; Lynch, T., 'Chemical weapons claims "not conclusive"', *Financial Times*, 1 Dec. 1988.

²¹ Security Council Resolution 612 of 9 May 1988, and Resolution 620, 26 Aug. 1988. Resolution 620 deals with the 'continued use of chemical weapons in the conflict between Iran and Iraq and that such use against Iranians has become more intense and frequent'. Osborn, A., *Daily Telegraph*, 16 Sep. 1988, p. 14; Assembly of Western European Union, 34th Ordinary Session (2nd part), *Europe and the Aftermath of the War between Iran and Iraq*, document 1162, 10 Nov. 1988.

²² See, for example, Trainor, B. E., 'Chemical weapons: New fear', *International Herald Tribune*, 6-7 Aug. 1988:

'Iraq first began extensive use of chemical warfare in 1983, when its army was on the defensive and having difficulty stopping human-wave attacks by Iran's Revolutionary Guards. "At first, it was an act of desperation," a U.S. general said, "But as the war progressed, the Iraqis incorporated the use of chemicals in their artillery planning as a standard practice."

The general said the Iraqis, when defending against an Iranian attack, used persistent chemical

agents, usually mustard gas, so the effect would linger and contaminate the areas through which the Iranians were attacking.

Later, when they themselves were on the offensive, the Iraqis systematically used dissipating chemicals against Iranian command posts, artillery and supply points to kill and disable, but to leave the targets free of chemicals by the time attacking Iraqi troops reached them. In most cases, both defensively and offensively, the Iraqis used artillery barrages to release the chemicals.' *Europäische Wehrkunde*, no. 9 (1988), p. 519, quotes an Italian military correspondent on Iraqi tactics in using chemical weapons: 'For twelve hours mustard gas was spread over an area of 30 km wide and 20 km deep. In the center of these areas only nerve gas is used. The Iranian soldiers fled towards the sides of the area if they had not been incapacitated and left a corridor in the middle. After about five hours—when the effect of the nerve gas has disappeared—the Iraqi tanks could strike through the central corridor' (translation by the author). See also McCain (note 1), who claims that the use of chemical weapons never had a decisive impact on the fighting.

²³ International Institute for Strategic Studies, *The Military Balance 1988–1989* (IISS: London, 1988), pp. 242–49.

²⁴ See, for example, 'South Africa is using chemical arms', *Soviet Weekly*, 16 Jan. 1988; the USSR denied allegations that it had provided the Government of Angola with chemical munitions according to TASS, 3 Feb. 1988. 'Unita claims evidence of chemical warfare', MB161708, London, *BBC World Service*, in English, 1515 GMT, 16 Mar. 1988 in FBIS-88-A; 'South Africa denied the allegations that it had used CW in Angola', Johannesburg domestic radio, 9 June 1988 in FBIS-BA 9 June 1988, in *Arms Control Reporter*, June 1988, p. 704.B293.

²⁵ See, for example, Ottaway, D. B., 'U.S. links Soviets to disinformation', *Washington Post*, 17 Feb. 1988, p. A3.

²⁶ See, for example, AP, 'Cuba accused of gas use in Angola', *International Herald Tribune*, 27–28 Aug. 1988, p. 6.

²⁷ Kirkham, N., 'Eritrea faces big offensive', *Sunday Telegraph*, 17 Apr. 1988, p. 7.

²⁸ 'Thai aircraft shot down in border fighting with Laos', *Financial Times*, 5 Jan. 1988, p. 3.

²⁹ Perry Robinson, J. P., SIPRI, 'Chemical and biological warfare: developments in 1986', *SIPRI Yearbook 1987: World Armaments and Disarmament* (Oxford University Press: Oxford, 1987), pp. 97–115; Lundin, S. J., et al., SIPRI, 'Chemical and biological warfare: developments in 1987', *SIPRI Yearbook 1988: World Armaments and Disarmament* (Oxford University Press: Oxford, 1988), pp. 101–25.

³⁰ Lundin, S. J., 'Alleged to have gas', *International Herald Tribune*, 6 Oct. 1988.

³¹ 'Certification of production facilities for the BIGEYE binary chemical bomb', Presidential Determination no. 88–7 of 19 Jan. 1988, Presidential Documents, *Federal Register*, vol. 53, no. 27 (10 Feb. 1988).

³² 'FY 1989 DOD Authorization Bill', section 116, *Congressional Record*, 7 July 1988, p. H 5052.

³³ GAO/PEMD-88-26 of 20 May 1988 (according to *Chemical Weapons Convention Bulletin* (summer 1988), p. 13); *Congressional Record*, US House, 3 May 1988, p. H 2848; '6 June, US military tests indicated the Bigeye was unreliable', *Arms Control Reporter*, July 1988, p. 704.B.293; 'Congress casts doubt on Bigeye', *Jane's Defence Weekly*, 18 June 1988, p. 1203. However, see also statement by Deputy Assistant Secretary of Defence for Chemical Weapons Programs, Thomas Welch, who testified to the House Armed Services Subcommittee on Procurement and Military Nuclear Systems that 'the weapon exceeded requirements for accuracy and lethality', *Defence News*, 14 Mar. 1988, p. 16.

³⁴ '14 July, Congress passed the FY 89 DOD authorization bill', *Arms Control Reporter*, Nov. 1988, p. 704.B.297.

³⁵ US House of Representatives, *National Defense Authorization Act*, Report no. 100-989, 100th Congress, 2nd session (US Government Printing Office: Washington, DC, 1988).

³⁶ 'FY 1989 DOD Authorization Bill', section 118, *Congressional Record*, 7 July 1988, p. H 5053; see also 'Pentagon adds three more years to weapons disposal estimate', *Journal of Commerce*, 22 Mar. 1988, p. 93.

³⁷ See note 36.

³⁸ Ahem, T., '1000 leaking chemical weapons plague Army', *Washington Times*, 13 Apr. 1988, p. 5.

³⁹ Stoessel, W. J., Jr, *Report of the Chemical Warfare Review Commission*, June 1985 (US Government Printing Office: Washington, DC, 1988), pp. 59–60.

⁴⁰ USA, Conference on Disarmament document CD/830, 19 Apr. 1988.

⁴¹ Perry Robinson, J. P., 'Review: World CW armament', *Chemical Weapons Convention Bulletin*, no. 2 (autumn 1988), pp. 12–18.

⁴² USA, Conference on Disarmament document CD/849, 28 July 1988.

⁴³ McCarthy, R. D., *The Ultimate Folly* (Alfred A. Knopf: New York, 1970), p. 37.

⁴⁴ Undersecretary for Political Affairs Michael H. Armacost, 'Military power and diplomacy: The Reagan legacy', *Current Policy*, no. 1108 (US Department of State, Bureau of Public Affairs: Washington, DC, Sep. 1988).

⁴⁵ Former Deputy Undersecretary of the US Army Amoretta Hoeber in introductory speech to a small group session on 'The assessments of US/Soviet biological and chemical warfare capabilities in Europe', in eds W. T. Wander and K. N. Luongo, *Colloquium, Proceedings, Science and Security: Nuclear and Conventional Forces in Europe*, 28-29 Sep. 1987, Arlington, Va., Program on Science, Arms Control, and National Security of the American Association for the Advancement of Science (American Association for the Advancement of Science: Washington, DC, Oct. 1988), p. 153.

⁴⁶ Ravery, J.-P., 'Tarbes: "Révélations explosives"', *La Marseillaise*, 2 Mar. 1988, p. 3.

⁴⁷ 'M. Chirac confirm l'intention de la France d'avoir "un stock minimum" d'armes chimiques', *Le Monde*, 17 Mar. 1988.

⁴⁸ See, for example, Erhart, H.-G., 'Frankreich und das Problem der Chemischen Abrüstung', Studie nr 30 (Der Abteilung Aussenpolitik- und DDR-Forschung in Forschungsinstitut der Friedrich-Ebert-Stiftung: Bonn, May 1988).

⁴⁹ Lundin, S. J., et al., *SIPRI Yearbook 1987* (note 29), p. 117.

⁵⁰ France, Conference on Disarmament document CD/CW/WP.199, 7 Apr. 1988. The French views were reflected also as footnotes in the rolling text; see Conference on Disarmament document CD/874, pp. 16-17, 23, 24, 26, 38.

⁵¹ See note 48.

⁵² See note 49.

⁵³ Fitchett, J., 'At UN, Mitterrand ties France to initiatives on arms control and debt', *International Herald Tribune*, 30 Sep. 1988, p. 2.

⁵⁴ 'Wende in Frankreichs C-Waffen-Kurs?', *Neue Zürcher Zeitung*, 2 Oct. 1988, p. 3.

⁵⁵ See note 50.

⁵⁶ 'France will keep up in arms race', *Jane's Defence Weekly*, 22 Oct. 1988, p. 1003.

⁵⁷ See, for example, Brügge, B., 'Chemical weapons: Coincidence of symbolic significance', *The Week in Germany*, 3 Jan. 1988, p. 2.

⁵⁸ President Reagan's agreement with Chancellor Kohl at the summit meeting in Tokyo, 1986, and their further correspondence. See, for example, Cadorff, C.-A., 'Kohl dringt auf weitere Abrüstung', *Süddeutsche Zeitung*, 13 Feb. 1988; 'Wir sind nicht die Nachrüstungs-Weichmacher', *Der Spiegel*, 22 Feb. 1988, pp. 18-21.

⁵⁹ Defence Committee, House of Commons, 'Statement on the Defence Estimates 1988: Seventh Report', 28 June 1988 (Her Majesty's Stationery Office: London, 1988).

⁶⁰ 'Low Soviet war stock claim surprises West', *Chemistry in Britain*, Feb. 1988, p. 110. However, the figure is not contested in the US publication, *Soviet Military Power 1988*, 7th edn (Department of Defense: Washington, DC, Apr. 1988), pp. 77-78. See, for example, USSR, Conference on Disarmament document CD/PV.460, 26 Apr. 1988, p. 20.

⁶¹ '23 Sep., USSR Foreign Minister Shevardnadze in a press conference after meeting in Washington', *Arms Control Reporter*, Nov. 1988, p. 704.B.318.

⁶² USSR, Conference on Disarmament document CD/PV.448, 15 Mar. 1988, p. 13.

⁶³ See *Chemistry in Britain* (note 60), and also 'Soviet intelligence: A new generation of CB munitions', *Jane's Defence Weekly*, 30 Apr. 1988, p. 852. Critical notes have been provided also by Hemsley, J., 'The Soviet bio-chemical threat: The real issue', *Royal United Services Institute Journal*, vol. 133, no. 1 (spring 1988), p. 15; and by Douglass, J. D., Jr, 'Soviet surge in biochemical warfare: West remains drugged with apathy', *Armed Forces Journal International* (Aug. 1988), p. 54.

⁶⁴ Gorokhov, A. and Serbin, A., 'Garrison in the steppeland: Dispatch from the construction site of a chemical weapons destruction plant', *Soviet Military Review* (supplement), Dec. 1987, p. 15. See also, Stachevsky, G., *Disarmament: The view from Moscow, chemical weapons* (Novosti Press Agency Publishing House: Moscow, 1988), pp. 48-49; ADN, 'Werk für Vernichtung von C-Waffen in der UdSSR vor der Inbetriebnahme', *Neues Deutschland*, 22 Nov. 1988, p. 5.

⁶⁵ After discussions between researchers in the field it has been considered useful to abandon the concept of proliferation with its connotations that some possessors of these weapons might be allowed to possess the weapons once acquired, i.e., proliferation as the term has been applied to nuclear weapons. The expression 'spread of chemical weapons' is intended only to describe the phenomenon of more countries acquiring the capability to produce and possess chemical weapons.

⁶⁶ The 12 EC countries, Australia, Canada, Japan, New Zealand, Norway, Switzerland and the USA, according to Simonitsch, P., 'Wehrmacht-Gas im Golfkrieg, Experten: Irak setzt deutsches Tabu ein', *Frankfurter Rundschau*, 28 Apr. 1988, pp. 1, 3.

⁶⁷ 'MITI to control export of poison chemicals', OW 20090518888, Tokyo, KYODO, in English, 0303 GMT, 20 Sep. 1988, FBIS-EAS-88-182, 20 Sep. 1988. See, for example, Dickman, S., 'Nerve gas cloud hangs over West German firms', *Nature*, vol. 332 (14 Apr. 1988), p. 573.

⁶⁸ See list in table 5.2, *SIPRI Yearbook 1988* (note 29), p. 105.

⁶⁹ See, for example, Fialka, J. J., 'Fighting dirty: Western industry sells Third World the means to produce poison gas', *Wall Street Journal*, 19 Sep. 1988, pp. 1, 14.

⁷⁰ 'MITI to control export of poison chemicals', OW 20090518888, Tokyo, KYODO, in English, 0303 GMT, 20 Sep. 1988, FBIS-EAS-88-182, 20 Sep. 1988.

⁷¹ *SIPRI Yearbook 1988* (note 29), pp. 101-25. See also, 'Verordnung über den Export von speziellen Chemikalien, die für friedliche Zwecke bestimmt sind, aber für die Herstellung von chemischen Waffen geeignet sind: Verordnung über den Export spezieller Chemikalien, 25 Juni 1987', *Gesetzblatt der Deutschen Demokratischen Republik* (Berlin), part 1, no. 16 (15 July 1987), p. 184. The following chemicals are listed: cyanogen chloride, phosgene, hydrogen cyanide, phosphorus oxychloride, phosphorus trichloride, chloropicrine, thiodiglycol, dimethylamine hydrochloride, 2-chloroethanol, and compounds with methyl-phosphorus bonds.

⁷² United Nations, *Consolidated List of Products Whose Consumption and/or Sale Have Been Banned, Withdrawn, Severely Restricted or not Approved by Governments*, 2nd edn, prepared in accordance with General Assembly Resolutions 37/137, 38/149 and 39/229 (United Nations: New York, 1987).

⁷³ See, for example, 'US arrests in chemicals case', *The Times* (London), 27 June 1988, p. 9. The chemicals referred to are not CW chemicals; the reference deals with smuggling of missile chemicals and technology from the USA to Egypt. See also note 103.

⁷⁴ See note 69. However, according to Swiss sources, trade with relevant chemicals has stopped since new export regulations were instituted. 'Schweiz liefert Chemikalien zur Giftgasherstellung', *Frankfurter Allgemeine Zeitung*, 4 May 1988, p. 6.

⁷⁵ See note 72.

⁷⁶ Provisions in Article IV, and in the Annexes to Article VI, prohibit the transfer of certain chemicals except for peaceful and protective purposes and stipulate that the export and import of other chemicals shall be declared and reported. See, further, the 'rolling text' in Conference on Disarmament document CD/874, 12 Sep. 1988.

⁷⁷ UN Resolutions S/RES/612, 9 May 1988 and S/RES/620, 26 Aug. 1988. See also, 'UN calls for stricter controls on export of chemicals', *Jane's Defence Weekly*, 21 May 1988, p. 995.

⁷⁸ See the speech by President Mitterrand of France to the 43rd Session of the UN General Assembly, 29 Sep. 1988.

⁷⁹ Alleged production facilities in northern Syria according to Colvin, M. and Whitherow, J., 'Syrian nerve gas warheads alarm Israel', *Sunday Times*, 10 Jan. 1988.

⁸⁰ Wallace, C. P., 'Syria disputes charges it makes chemical arms', *Los Angeles Times*, 14 Jan. 1988, p. 13.

⁸¹ Col-Gen. V. K. Pikalov arrived at Damascus on 23 March. 'Soviets chemical war chief alerts West with Syria visit', *Washington Times*, 8 Apr. 1988, p. 9.

⁸² Lieut-Col Markushin, V., 'Krasnaya Zvezda: Allegations on Soviet chemical weapons in Syria groundless', TASS (Moscow), 9 Oct. 1988, VORIO-881010DR35.

⁸³ Delivery to Syria of SS-21 and Scud missiles, for which the Syrians may have developed particular warheads. See, e.g., note 1, note 79; 'Israel may hit Syrians nerve-gas plant', *Washington Post*, 24 Feb. 1988, p. D14; and Ottaway, D. B., 'Israel is worried Syria will get Soviet bomber', *International Herald Tribune*, 26 Oct. 1988, pp. 1, 2.

⁸⁴ Wayne, E. A., 'Libya seeks chemical weapons in war against Chad, US charges', *Christian Science Monitor*, 5 Jan. 1988, p. 1.

⁸⁵ Concerning US concerns about a Libyan chemical plant approximately 70 km south-west of Tripoli and possible Japanese involvement in its construction, see Oberdorfer, D., 'US troubled by plant Japanese built in Libya', *International Herald Tribune*, 17-18 Sep. 1988, p. 3; and Ottaway, D. B., 'CIA Director says Libya is building a large chemical weapons plant', *International Herald Tribune*, 27 Oct. 1988.

⁸⁶ Ottaway, D. B., 'The Mideast's high-tech powder keg: From chemical weapons to missiles, Israel sees dangerous threats', *International Herald Tribune*, 20 Dec. 1988, pp. 1, 6.

⁸⁷ AP, 'Gadhafi denies chemical arms assertion', *International Herald Tribune*, 28 Oct. 1988, p. 8; 'Memorandum submitted to UN on US Allegations', LD 1511105488, Tripoli, JANA, in Arabic, 0945 GMT, 15 Nov. 1988, FBIS-NES-88-220, 15 Nov. 1988, p. 15.

⁸⁸ Blundy, D., 'US uncovers German deal with Gaddafi', *Sunday Telegraph*, 4 Dec. 1989, p. 23.

⁸⁹ Ottaway, D. and Cannon, L., 'US weighs strike on Libyan complex', *International Herald Tribune*, 23 Dec. 1988, p. 1.

⁹⁰ Reuters, 'Arab League backs Libya over plants', *International Herald Tribune*, 27 Dec. 1988, p. 2.

⁹¹ Morris, H., 'Libya ships nerve gas consignment to the Somalians', *The Independent*, 23 Nov. 1988, p. 11.

⁹² Abdulle, A., 'Nerve gas denied', *The Independent*, 24 Nov. 1988, p. 29; 'Foreign liaison bureau denies supplying nerve gas', LD 2411152688, Tripoli, JANA, in Arabic, 1440 GMT, 24 Nov. 1988, FBIS-NES-88-277, 25 Nov. 1988.

⁹³ Williams, D., 'Suspicious of Syria: Israel hopes to deter attack of poison gas', *Los Angeles Times*, 9 Oct. 1988, p. 1; La Guardia, A., 'Scramble for masks in Israeli gas alert', *Daily Telegraph*, 28 Nov. 1988; 'IDF using new measures to fight chemical warfare', TA0308060888, *Jerusalem Domestic Service*, in Hebrew, 0400 GMT, 3 Aug. 1988.

⁹⁴ Anderson, J. and Van Atta, D., 'Israel may hit Syrian nerve-gas plant', *Washington Post*, 24 Feb. 1988, p. 1; Cooley, J. K., 'Poison gas: No place to hide in the Middle East', *International Herald Tribune*, 13 Oct. 1988.

⁹⁵ See *SIPRI Yearbook 1988* (note 29), p. 115; and *Arms Control Reporter*, 19 Oct. 1988, Nov. 1988, p. 704.B.321.

⁹⁶ Bazoff, F. and George, A., 'Revealed: Iran's chemical weapons', *The Observer*, 13 Mar. 1988, p. 23.

⁹⁷ 'Chemical weapons row', *The Independent*, 23 Apr. 1988, p. 7; for a description of the alleged transportation routes, see Miller, A., 'Chemicals at work and war', *Chemistry and Industry*, 2 May 1988, p. 286.

⁹⁸ 'Iraq now Middle East's biggest chemical weapons producer', *Jane's Defence Weekly*, 27 Feb. 1988, p. 336.

⁹⁹ See, for example, *SIPRI Yearbook 1988* (note 29), p. 102. Denials sometimes reach SIPRI; e.g., letter from the Ambassador of Burma to the Conference on Disarmament to SIPRI, 15 Mar. 1988, stating that Burma does not possess chemical weapons and will not acquire them. See also note 105.

¹⁰⁰ 'Paper on South's producing chemical weapons', SK080708, *Pyongyang Domestic Service*, in Korean, 2153 GMT, 7 Feb. 1988, FBIS-EA, 8 Feb. 1988.

¹⁰¹ AP, '8 chemical arm plants in North, Seoul asserts', *International Herald Tribune*, 31 Dec. 1988, p. 2.

¹⁰² Secretary of State George Shultz, in a speech in San Francisco on 28 Oct. 1988, Press Release no. 229, 31 Oct. 1988, US Department of State; Gordon, M. R., 'U.S. and Soviet aides discuss curb on missile sales to the Third World', *International Herald Tribune*, 28 Sep. 1988, p. 4.

¹⁰³ Fitchett, J., 'Italian and German firms accused over sales of rocket technology', *International Herald Tribune*, 24-25 Sep. 1988; 'Washington besorgt über Raketenbau in Argentinien', *Frankfurter Allgemeine Zeitung*, 20 Sep. 1988, p. 1. See also chapter 7.

¹⁰⁴ Kemp, G., 'Missile mania, from the Mediterranean to India', *International Herald Tribune*, 28 Mar. 1988, p. 4.

¹⁰⁵ According to official 1988 CD/PV documents, 22 states made declarations of non-possession of chemical weapons: Argentina (CD/PV.465), Austria (CD/PV.457), Brazil (CD/PV.460), Bulgaria (CD/PV.457), Burma (CD/PV.452), China (CD/PV.453), Egypt (CD/PV.459), the Federal Republic of Germany (CD/PV.437), Finland (CD/PV.441), the German Democratic Republic (CD/PV.481), Hungary (CD/PV.437), India (CD/PV.459), Indonesia (CD/PV.437), Italy (CD/PV.437), Mongolia (CD/PV.442), New Zealand (CD/PV.445), Norway (CD/PV.479), Peru (CD/PV.472), Poland (CD/PV.457), Romania (CD/PV.440), Sweden (CD/PV.481) and the United Kingdom (CD/PV.474).

¹⁰⁶ UK Ministry of Defence, London, News Release 37/88, 17 May 1988; '24-26 May, Thirteen Soviet officials visited the British chemical weapons establishment at Porton Down', *Arms Control Reporter*, June 1988, pp. 704.B.291-2; 'Glasnost down in Wiltshire', *Chemistry in Britain*, vol. 24, no. 7 (1988), p. 63.

¹⁰⁷ See, for example, 'CW chief deplores UK approach to exchange', PM0807103388, Moscow, *Pravda*, in Russian, (2nd edn), 7 July 1988, p. 5; FBIS-SOV-88-132, 11 July 1988.

¹⁰⁸ Peel, Q., 'Row over British visit to Soviet chemical arms site', *Financial Times*, 5 July 1988, p. 2; Mr William Waldegrave, Minister of State, *Disarmament*, 28 July 1988, p. 772; Gurganov, S., 'Openness, a British delegation's visit to a Soviet chemical troops installation' *Soviet Military Review*, no. 9 (Sep. 1988), p. 52.

¹⁰⁹ See, for example, 'Soviet-US joint statement', *Soviet News*, 28 Sep. 1988, p. 369; Nitze, P. H., 'Beyond the summit: Next steps in arms control', *Department of State Bulletin*, Feb. 1988, p. 83.

¹¹⁰ See, for example, 'Warsaw Treaty Foreign Ministers' Address to Nato', *Soviet News*, 6 Apr. 1988, p. 126; 'Ban Chemical Weapons, Joint Statement issued by the Socialist Unity Party of

Germany, the Communist Party of Czechoslovakia and the Social Democratic Party of Germany', Statement issued by the Embassy of the German Democratic Republic, 5 Apr. 1988.

¹¹¹ See, for example, 'CSSR delegate on relations', LD092056, Prague, CTK, in English, FBIS-EEU-88-047, 10 Mar. 1988, p. 4.

¹¹² FRG, Social Democrat representative to the Bundestag, Karsten D. Voigt, in an interview, *International Herald Tribune*, 29 Feb. 1988, p. 2.

¹¹³ Marsh, D., 'Bonn rejects Honecker play on nuclear arms', *Financial Times*, 21 Apr. 1988, p. 2.

¹¹⁴ Prime Minister Y. Shamir of Israel, in an address to the UN General Assembly at the Third Special Session on Disarmament, 7 June 1988.

¹¹⁵ Richardson, M., 'Australia holding chemical arms talks', *International Herald Tribune*, 13-14 Aug. 1988, p. 2; 'Australian delegation discusses chemical weapons', BK 1211153488, Hanoi, VNA, in English, 1448 GMT, 12 Nov. 1988, FBIS-EAS-88-219, 14 Nov. 1988.

¹¹⁶ Steen, E., 'Greece and Turkey agree on arms talks', *The Independent*, 26 Feb. 1988, p. 12.

¹¹⁷ The facility in question later was identified as a military laboratory for studying the spread of diseases in the information given by the USSR as a confidence-building measure as requested after the 1986 Review Conference on the Biological Weapons Convention; Marshall, E., 'Sverdlovsk: Anthrax capital?', *Science*, vol. 240, no. 4851 (22 Apr. 1988), p. 383.

¹¹⁸ '15 Apr. 1988, Three Soviet health officials explained the anthrax outbreak of 1979', *Arms Control Reporter*, Apr. 1988, pp. 701.B.38-40.

¹¹⁹ Meselson, M. S., 'The Biological Weapons Convention and the Sverdlovsk anthrax outbreak of 1979', *Journal of the Federation of American Scientists* (FAS), F.A.S. Public Interest Report, vol. 41, no. 7 (1988), p. 1.

¹²⁰ *The President's Unclassified Report on Soviet Noncompliance with Arms Control Agreements*, text of a letter, dated 2 Dec. 1988, from US President Ronald Reagan to the Speaker of the House of Representatives and President of the Senate transmitting the President's report as required by Public Law 99-145.

¹²¹ Second Review Conference of the Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction BWC/CONF. II/3, 30 Sep. 1986; Ad Hoc Meeting of Scientific and Technical Experts from States Parties to the Convention of the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, BWC/CONF.II/EX/2, 15 Apr. 1987.

¹²² The Final Declaration of the Second Review Conference (see note 121) relating to the implementation of Articles V and X of the BWC agrees that the Parties 'are to implement, on the basis of mutual co-operation' measures to strengthen the confidence in the Convention. Article V of the BWC relates to co-operation in solving any problems in relation to the objective of application of the BWC; Article X relates to peaceful co-operation in activities related to the Convention.

¹²³ US Department of Defense, 'Biological Defense Program', Report to the Committee on Appropriations, House of Representatives, May 1986.

¹²⁴ See, for example, Norman, C., 'Biological defense defended', *Science*, 20 May 1988, p. 981.

¹²⁵ See, for example, Smith, R. J., 'Army plans Utah lab for germ warfare tests', *Washington Post*, 5 Feb. 1988, p. 3.

¹²⁶ US General Accounting Office, testimony, 'DOD's Risk Assessment and Safeguards Management of Chemical and Biological Warfare Research and Development Facilities', Statement for the record by Eleanor Chelimsky, Director Program Evaluation and Methodology Division, before the Subcommittee on Oversight of Government Management, Committee on Governmental Affairs, US Senate, 27 July 1988.

¹²⁷ See, for example, Norman, C., 'Army shifts on Dugway Lab', *Science*, 30 Sep. 1988, p. 1749.

¹²⁸ *Jane's Defence Weekly*, 9 Jan. 1988, p. 3.

¹²⁹ 'Kurds claim Iraq bombed city with typhoid', *New Scientist*, 22 Sep. 1988, p. 25.

¹³⁰ '19 Oct., The Iranian Acting Armed Forces Commander in Chief said that chemical and biological weapons should be considered "for our defense"', *Arms Control Reporter*, Nov. 1988, p. 704.B.321.

¹³¹ Cushman, J. H., Jr, 'US cites increase in biological arms', *New York Times*, 4 May 1988, p. 9.

¹³² The following report gives a recent overview of the problem area: National Defence Research Institute, *Genetic Engineering and Biological Weapons*, FOA Report A 40058-4.4, Umeå, Sweden, Nov. 1987 (translated from the Swedish for Office of International Affairs, National Technical Information Service, Springfield, Va., May 1988).

¹³³ Wilke, T., 'Genetics "threat to chemical arms ban"', *The Independent*, 10 Dec. 1988, p. 5.

¹³⁴ *SIPRI Yearbook 1988* (note 29), p. 121.

¹³⁵ President Reagan in his speech to the 43rd session of the UN General Assembly, 26 Sep. 1988, as quoted in *Current Policy*, no. 1109, p. 5; US Department of State, *Bureau of Public Affairs*, Washington, DC, Sep. 1988.

¹³⁶ Soviet Foreign Minister Shevardnadze in his speech to the 43rd session of the UN General Assembly, 27 Sep. 1988, *Soviet News*, 28 Sep. 1988, p. 367; Sir Geoffrey Howe, Foreign Minister of the UK, in his speech to the 43rd session of the UN General Assembly, 28 Sep. 1988.

¹³⁷ President Mitterrand in his speech to the 43rd session of the UN General Assembly, 29 Sep. 1988.

¹³⁸ The invitation to the meeting and the date were given in a speech by the French Ambassador to the Conference on Disarmament in his speech in the First Committee of the 43rd session of the UN General Assembly, 20 Oct. 1988.

¹³⁹ See, for example, 'Why an international conference on chemical weapons use?', US State Department *Fact Sheet* (1340) on the Paris meeting, United States Information Service, Press Section, EUR-306, Stockholm, 14 Dec. 1988, pp. 5-7.

¹⁴⁰ See, for example, note 137.

¹⁴¹ See, for example, Fitchett, J., 'Forum bolsters prospect of ban on toxic arms', *International Herald Tribune*, 12 Jan. 1989, p. 1.

¹⁴² '21-22 July, Chemical industry representatives from the US, Canada, Japan and Europe met in Geneva', *Arms Control Reporter*, Nov. 1988, p. 704.B.298; see also Conference on Disarmament document CD/PV.469, 28 July 1988, pp. 2-7.

¹⁴³ See chapter 12; see also Olson, K. B., 'The proposed chemical weapons convention: An industry perspective', *Chemical Weapons Convention Bulletin*, no. 2 (autumn 1988), p. 1.

¹⁴⁴ Such information was given in the following Conference on Disarmament documents: the German Democratic Republic, CD/871, 12 Sep. 1988; the Netherlands, CD/CW/WP.203, 19 July 1988; the United Kingdom, CD/CW/WP.206, 10 Aug. 1988; the Federal Republic of Germany, CD/CW/WP.207, 16 Aug. 1988; Hungary, CD/PV.452, 29 Mar. 1988; and Poland, CD/PV.457, 14 Apr. 1988.

¹⁴⁵ Conference on Disarmament document CD/CW/WP.213, 12 Sep. 1988.

¹⁴⁶ Sweden, 'Report on a Swedish national trial inspection', Conference on Disarmament document CD/CW/WP.216, 9 Dec. 1988.

¹⁴⁷ *SIPRI Yearbook 1988* (note 29), p. 119.

¹⁴⁸ See footnote 72 as regards the UN list of dangerous chemicals.

¹⁴⁹ See, for example, excerpts from 'Final Report of the Expert Group on Model Forms of Agreement for the Exchange of Confidential Data on Chemicals', *OECD Environment Monograph*, no. 14, OECD, Mar. 1988.

¹⁵⁰ WHO and UNEP toxic register experts were consulted when the procedures for toxicity determination were worked out; see Annexes III and IV to Conference on Disarmament document, 'Report of the Chairman of the Working Group on Chemical Weapons on the consultations on issues relating to toxicity determinations', CD/CW/WP.30, and Corr 1., 22 Mar. 1982.

¹⁵¹ Bollag, B., '35 countries unite in drive to fight "greenhouse effect"', *International Herald Tribune*, 14 Nov. 1988, p. 4; Barry, J., 'UN official wants the world to breathe easier', *International Herald Tribune*, 15 Dec. 1988, p. 6.

¹⁵² FR Germany, Conference on Disarmament document CD/791, 25 Jan. 1988.

¹⁵³ Perry Robinson, J. P., *Verifying a Ban on Chemical-Warfare Weapons*, Faraday Discussion Paper no. 12, Council for Arms Control (Brassey's Defence Publishers: London, July 1988).

¹⁵⁴ See, for example, reports on such efforts in the Conference on Disarmament documents of Finland, CD/843, 25 July 1988 and CD/873, 12 Sep. 1988; and Norway CD/857, 12 Aug. 1988 and CD/861, 22 Aug. 1988.

¹⁵⁵ CD/874, Annex to Article V.

¹⁵⁶ CD/874, p. 119, Appendix II, 'Report on how to define "production capacity"'.

¹⁵⁷ See the speech by President Mitterrand of France to the 43rd session of the UN General Assembly 1988.

¹⁵⁸ On the question of assistance for protection against chemical weapons, see Argentina, Conference on Disarmament document CD/809, 26 Feb. 1988.

¹⁵⁹ Wurst, J., 'The document that isn't', *Disarmament Times*, vol. 11, no. 8, special issue 7 (30 June 1988), p. 1.

¹⁶⁰ Ezz, E. A., Chairman of the Group of Qualified Experts established in pursuance of General Assembly resolution 42/37C, Letter to the UN Secretary-General, Javier Pérez de Cuéllar, 19 Aug. 1988.

¹⁶¹ Smith, R. J., 'U.S. verification chief says missile inspections in Russia were success', *International Herald Tribune*, 16 Sep. 1988.

¹⁶² Zumack, A., 'Zwist im Westen um Chemie-Waffen Verbot', *Die Tageszeitung*, 13 Sep. 1988, p. 7.

¹⁶³ Canada, Conference on Disarmament document CD/823, 31 Mar. 1988.

¹⁶⁴ Beck, H., 'Verifying the Projected Chemical Weapons Convention: A Cost Analysis', AFES-PRESS no. 13, Mosbach, 1988.

¹⁶⁵ See, for example, Cohen, N., 'Porton Director pessimistic over weapons ban', *The Independent*, 14 Apr. 1988; Pick, H., 'Worldwide convention is "technically impossible": Chemical arms ban eludes superpowers', *The Guardian*, 16 Sep. 1988.

¹⁶⁶ See, for example, 'C-Waffen-Vertrag nicht vor 1989', *Neue Zürcher Zeitung*, 18 Sep. 1988, p. 4.

¹⁶⁷ See, for example, 'Bush spells out ideas to ban biological and chemical arms', *International Herald Tribune*, 22-23 Oct. 1988, p. 3.

Appendix 4A. Final Declaration of the Paris Conference

The representatives of States participating in the Conference on the Prohibition of Chemical Weapons, bringing together States Parties to the Geneva Protocol of 1925 and other interested States in Paris from 7 to 11 January 1989, solemnly declare the following:

1. The participating States are determined to promote international peace and security throughout the world in accordance with the Charter of the United Nations and to pursue an effective disarmament process. In this context, they are determined to prevent any recourse to chemical weapons by completely eliminating them. They solemnly affirm their commitments not to use chemical weapons and condemn such use. They recall their serious concern at recent violations as established and condemned by the competent organs of the United Nations. They support the humanitarian assistance given to the victims affected by chemical weapons.

2. The participating States recognize the importance and continuing validity of the Protocol for the prohibition of the use in war of asphyxiating, poisonous or other gases and bacteriological methods of warfare, signed on 17 June 1925 in Geneva. States Parties to the Protocol solemnly reaffirm the prohibition as established in it. They call upon all States which have not yet done so to accede to the Protocol.

3. The participating States stress the necessity of concluding, at an early date, a Convention on the prohibition of the development, production, stockpiling and use of all chemical weapons, and on their destruction. This Convention shall be global and comprehensive and effectively verifiable. It should be of unlimited duration. To this end, they call on the Conference on Disarmament in Geneva to redouble its efforts, as a matter of urgency, to resolve expeditiously the remaining issues and to conclude the Convention at the earliest date. All States are requested to make, in an appropriate way, a significant contribution to the negotiations in Geneva by undertaking efforts in the relevant fields. The participating States therefore believe that any State wishing to contribute to these negotiations should be able to do so. In addition, in order to achieve as soon as possible the indispensable universal character of the Convention, they call upon all States to become parties thereto as soon as it is concluded.

4. The States participating in the Conference are gravely concerned by the growing danger posed to international peace and security by the risk of the use of chemical weapons as long as such weapons remain and are spread. In this context, they stress the need for the early conclusion and entry into force of the Convention, which will be established on a non-discriminatory basis. They deem it necessary, in the meantime, for each State to exercise restraint and to act responsibly in accordance with the purpose of the present declaration.

5. The States participating in the Conference confirm their full support for the United Nations in the discharge of its indispensable role, in conformity with its Charter. They affirm that the United Nations provides a framework and an instrument enabling the international community to exercise vigilance with respect to the prohibition of the use of chemical weapons. They confirm their support for appropriate and effective steps taken by the United Nations in this respect in conformity with its Charter. They further reaffirm their full support for the Secretary-General in carrying out his responsibilities for investigations in the event of alleged violations of the Geneva Protocol. They express their wish for early completion of the work undertaken to strengthen the

efficiency of existing procedures and call for the co-operation of all States, in order to facilitate the action of the Secretary-General.

6. The States participating in the Conference, recalling the final document of the first Special Session of the United Nations General Assembly devoted to Disarmament in 1978, underline the need to pursue with determination their efforts to secure general and complete disarmament under effective international control, so as to ensure the right of all States to peace and security.

Source: Paris Conference document CPC/6 Prov., 11 Jan. 1989.

Part II. Military expenditure, the arms trade and armed conflicts

Chapter 5. World military expenditure

Chapter 6. The trade in major conventional weapons

Chapter 7. Ballistic missile proliferation in the Third World

Chapter 8. Arms trade regulations

Chapter 9. Major armed conflicts in 1988

5. World military expenditure

SAADET DEGER

I. Introduction

World military expenditure is now under searching review; all aspects of arms control, conflict resolution, technological change and economic constraints have direct and indirect bearings on how nations allocate their resources to defence. As the winds of change blow across the world arena, no areas of international relations which pertain to defence spending—security, political or economic—are sacrosanct.

World military expenditure is certainly not rising in any significant fashion, particularly as measured after adjustments are made for inflation. The United States has cut its defence budget and there are indications that the Soviet Union may be doing the same. European NATO is ambivalent about weapon modernization and worried about burden sharing. Overall, NATO's real (inflation-adjusted) military expenditure for 1988 is 3 per cent lower than for 1987. The non-Soviet Warsaw Treaty Organization (WTO) states are on a holding operation, with economic and political restructuring taking precedence above defence spending. With few, but significant, exceptions, Third World countries burdened by debt and famine are not increasing their military expenditures in any noticeable manner. The wave of democratization in Latin America and some countries of Asia is a hopeful sign. The end of the costly Iraq–Iran War should signal a reduction of defence-related spending, although it is hazardous to forecast events in such a volatile region. Reports emanating from China claim that the defence budget for 1988 is definitely lower than in the recent past.

The reasons for this pause in international militarization are many. The most appealing explanation seems to be the *entente* between the superpowers, inspired by the personalities of the leaders. Other military powers, and their leaders, are also increasingly interested in arms control and conflict resolution. However, if one believes that this phase of arms control and disarmament will last long, and that military spending may decline in the future, more fundamental structural reasons need to be found to explain its existence. A major cause may be the rapidity with which technological and socio-economic changes are taking place. The transformation of the forces of production and exchange are propelling political relations to adjust in like fashion. The security environment has been transformed as much by structural and systemic shifts as by personalities and deterrence.

The world may be witnessing the first phase of what could be called technological and economic structural disarmament. The effects of numerous factors under this broad umbrella have converged simultaneously: the prohibitive costs of modern armaments and their rapid obsolescence; increasing sophistication of research and development (R&D); fundamental changes in information technology, requiring more investment; increasing

sophistication of technological intelligence gathering, coupled with verification techniques; conservative macro-economic policies, emphasizing large budgetary cuts rather than expansion; integrated financial markets and production activities, increasing the costs of economic disruption; widening of trade relations and technology transfers which make economic and military security entwined; and so on. Taken together, these factors imply that the 'burden' or opportunity cost of defence is increasing at an accelerated rate; in addition, the level of technology is such that conflict and particularly war, however limited, can cause unprecedented economic disruption and destruction.

In explaining military expenditure trends, and security perceptions, neat categorizations are difficult to maintain. NATO and the WTO, within Europe, remain useful classifications. Yet how long will it take for them to be outmoded by the 'Atlantic to the Urals' classification? As the European Community (EC) has expanded, it has become increasingly synonymous with NATO (although Norway and Turkey remain outside). However, with the possible accession of the neutral states, Austria and maybe even Sweden, can the non-separation of defence and economics remain? In an increasingly integrated world it may be difficult to segregate the problems of the area from the Atlantic to the Urals from those of the area from 'San Francisco to Vladivostok'. In addition, 'San Francisco to Vladivostok' in the *other* direction, that is, the Pacific region, needs to be stressed as well. In what sense will the Asian-Pacific region dominate strategic thinking, as it now has begun to influence political/economic affairs?

This chapter illustrates these multi-dimensional considerations through an analysis of some of the current events in 1988 and many factors that shape the military expenditure process of some major countries and alliances.

II. The USA

President Reagan's final year in office witnessed the emergence of an *entente cordiale* between the superpowers that would have been unthinkable during his early years in office. There has been a startling transformation from the concept of the 'evil empire' to the triumphant Moscow summit meeting, the signing of the INF Treaty, the hint of more far-reaching strategic arsenal cuts and an overall thaw in East-West relations. These developments have all served to lend credence to the foreign policy of the President. The US defence budgets, however, except in terms of underlying trends, have little to do with this euphoria. Domestic considerations, the state of the economy, the level of the aggregate deficit, as well as the complex web of congressional co-operation and conflict with the Administration, are all far more important in determining the size of the budget.

President Reagan left behind an apparently healthy economy with high growth, low and falling unemployment, and a manageable rate of inflation. Nevertheless, structural problems remain, and the long-term future looks less rosy. The central difficulty, which pertains to the budget and trade deficits, will surely need major structural adjustments, sooner rather than later. The US electorate opted for the prospect of continuity by electing George Bush.

Continuity, however, may prove to be a difficult goal indeed, given the legacy of profligacy that he has inherited. Some of these problems and policies are discussed below in the context of defence expenditures.

The budget

The Wall Street crash of October 1987 and the concomitant difficulties of the world economy were salutary reminders to the Administration that the US Government and nation could not continue to be the largest corporate debtors of the world. The two macro-economic deficits, of the government budget and foreign trade, need to be tackled in a co-ordinated fashion. The Gramm-Rudman-Hollings Act¹ on budget deficit reduction had already stipulated the aggregate deficit value to be \$136 billion for the fiscal year (FY) 1989 (1 October 1988 to 30 September 1989). This Act imposes progressive targeted reductions in deficits such that a balanced budget can be achieved in 1992. However, the Act also provides for a margin of error of \$10 billion for each year's target. Hence the current target is set at \$146 billion. Breaking this ceiling would imply across-the-board cuts which would destroy the rationale of the basic fiscal structure proposed by the Executive Branch of the Government.

In February 1988 the President proposed, for FY 1989, a defence budget authority of \$299.5 billion and a defence budget outlay of \$294 billion. In monetary terms both are higher than the previous FY allocations. However, calculated under the inflationary projections made by the Office of Management and Budget (OMB), the *real* (inflation-adjusted) value of these allocations is marginally lower. This is the fourth successive real reduction of the amount specified in the defence budget authority; in terms of outlays, however, there have been cuts in only the past two fiscal years (1988 and 1989). After the dramatic increases in the early 1980s, these reductions in national defence spending clearly represent the acute difficulty that the President has faced in recent years concerning his grandiose defence projects.

Cuts were proposed in troop strength and deployment; it was planned to scale down the naval fleet; the air force would also suffer reductions; and certain weapon programmes would be cancelled. Even the most prestigious 'high-tech' aeroplane, the B-2 Stealth bomber, will be acquired much more cautiously; planned purchases will be reduced and full capacity production postponed.² The Administration requested \$4.9 billion for the Strategic Defense Initiative (SDI) programme, but the future of this programme looks less assured as its most ardent proponent is no longer in office.

It was thought that the annual ritual (a fixture of recent years) of the battle between Congress and the Executive would be absent in 1988. Most of the major expenditure decisions on defence had already been decided by the President and the bipartisan congressional leadership in a 'budget summit' two months prior to submission in early 1988. The President had agreed to cuts in defence from what he originally wanted and modest increases in taxes; the Democrat-dominated Congress allowed cuts in social expenditures. The Congress did pass almost the same aggregate amount as in the original budget but made some changes in the composition. However, the political climate

heated up when the final defence authorization bill passed by Congress was actually vetoed by the President in August 1988. Reagan claimed three areas of disagreement between his initial proposals and the subsequent changes made in the appropriations:³ reductions in funding for one SDI project (that for space-based interceptors, SBIs—anti-missile weapons operated from space) from the requested \$330 million to a ceiling of \$85 million; some arms control measures which could slow down the rate at which the air force would acquire missiles and bombers in 1989; and a one-year delay in the programme for the rail-garrison MX missiles.

Claims have been made that the decision was political, designed to help George Bush and the Republicans in the presidential contest and to show that the Democrats are 'for less defense and not more defense'.⁴ Be that as it may, the anticipated confrontation did not go very far. Congress made a few concessions: the ceiling on SBIs was removed; and a bit more funding was allocated to the Midgetman and MX missile programmes, which are currently the focus of weapon modernization. The final budget authority, at the time of writing (December 1988), is estimated to be \$298.8 billion. It is also worth noting that the real reduction for 1989 was very small. It is of the order of 0.43 per cent and far lower than the previous three reductions in defence authorizations: 4.9 per cent in 1986; 3.3 per cent in 1987; and 2.9 per cent in 1988 (all fiscal years). Presumably, an election year was not the best time to make drastic cuts in spending, which creates jobs and a booming economy.

Table 5.1 provides information on expenditure on US national defence and its composition. The figures are for budget outlays which correspond most closely to actual spending for the given year and hence are closest to the SIPRI definition for military expenditure (see the notes to the tables in appendix 5A). The time trend of the allocations reveals the nature of the cuts. Personnel and R&D expenditures are unscathed or register small increases. The brunt of the

Table 5.1. US national defence expenditure, outlays, FYs 1986–89

Figures are in US \$b., current prices.

Item	1986	1987	1988	1989
Personnel	71.5	72	75.5	77.8
O&M	75.3	76.2	80.4	82.7
Procurement	76.5	80.7	79.2	79.8
R&D	32.3	33.6	33.1	36.3
Other	2.1	2.7	0.7	0
Construction	7.9	8.8	8.4	8.9
DOD	265.6	274	277.3	285.5
Energy	7.5	7.5	7.6	7.9
Defence-related, other	0.3	0.5	0.5	0.6
National defence expenditure	273.4	282	285.4	294
National defence expenditure (constant 1989 US\$)	302.7	305	295.7	294
Rate of change (per cent)	—	0.8	-3.1	-0.6

Source: *National Defence Budget Estimates for FY 1988/89*, Office of the Assistant Secretary of Defense (Comptroller), Apr. 1988.

reductions occurs in procurement and operation and maintenance (O&M). The overall reduction, of actual spending, in the four years of Reagan's second term, FYs 1986–89, is around 2.9 per cent. The corresponding figure for authority is higher—of the order of 6.6 per cent. Clearly, given the pressures of earlier 'front-loading', it has been more difficult to curtail spending relative to authorizations.

The very scale of defence-related spending has increased concern over Pentagon waste, inefficiency, industrial fraud and graft, which remain major issues. Mid-1988 witnessed a large-scale action by the US Federal Bureau of Investigation (FBI) to uncover evidence after two years of investigations. Some predictions are dramatic: one source claimed that such corruption could trigger 'legislative intervention and moving the industry substantially closer to effective nationalization'.⁵ Senate and House legislation⁶ has enacted stringent regulations to overcome the obvious gaps in the system, but the scale of corruption is often related to the level of procurement. In spite of some cuts the total budget is still high, and spending could continue to support illegal practices.

The past

The US military capability today is far greater than it was at the beginning of the Reagan Administration. It is debatable whether US military strength was the dominant factor in bringing about the *rapprochement* with the Soviet Union, which some claim was forced to the negotiating table from a position of relative weakness. It is also controversial as to whether there has been value for money; even a purely strategic cost-benefit analysis would reveal that things could have been managed more efficiently. Some critical gaps remain:⁷ insufficient numbers of transport ships and aeroplanes to carry troops abroad in pursuance of international security interests; shortages in ammunition stockpiles still create problems; and the debate concerning the strategic nuclear forces, on the choice of missiles and their basing mode (in silos or rail-basing) still continues. Overall, however, there can be little doubt that, purely in terms of war-fighting capability and deterrence, the strategy has been successful. In particular, personnel numbers and the level of preparedness and morale are high, partly motivated by better training and pay.

Still, no country—however rich and powerful—can regard its military expenditure process in isolation from the myriad other domestic and international factors that constitute the security environment, defined in the broadest sense. From a purely historical point of view, all great nations and powers have had to balance investment, welfare and defence if they were to maintain their pre-eminent position and prevent over-stretching their economic limits. In this sense the United States is no exception. In a book published in 1987, historian Paul Kennedy makes this point clear.⁸ Indeed, the work has already created quite a stir owing to its prediction that the USA could be reaching that limit owing to its high defence spending.

Nevertheless, one has to be careful about reaching quick conclusions regarding the postulated negative impact of military expenditures. US defence

spending has been dominated by long cycles. Between 1969 and 1979, it fell in real terms by 34.6 per cent. In the past 10 years (1979–89) it has risen by 51.9 per cent. The difference is dramatic. The burden of military spending is not necessarily heavy because of the relative size of the defence sector compared with the country's resources. After all, the USA is an economic giant. During World War II it spent over 35 per cent of its gross national product (GNP) on defence and yet emerged with the most powerful economy in the world. Even during the 1950s, a period of prosperity and growth, it regularly spent 10–14 per cent of its national income on the military. The crucial point is the rapidity with which such a massive peace-time military buildup has been accomplished. This is what has created the many economic problems. Correspondingly, a reduction, if possible, could be equally troublesome if it is made too fast and too soon. Unfortunately, the economics of arms control could be as problematic as that of re-armament.

The key to the dilemma lies in the twin deficits: government budget and foreign trade. Table 5.2 gives the data for the years 1980–89. By cutting tax rates and controlling monetary growth, the increase in spending and the resultant budget deficit were financed by public borrowing. This raised US interest rates and made the dollar more attractive to world-wide investors.⁹ The consequent increase in the value of the dollar led to exports becoming more expensive and imports cheaper. The result was the trade deficit. In addition, large-scale fiscal spending created a boom in the economy directly as old-fashioned Keynesian economics have said it would. But what happens if this process is reversed quickly? A decline in government spending will reduce the need to borrow. Interest rates will fall, making the dollar weak. Furthermore, the depreciation of the dollar will make US imports more expensive. In other words, other countries will not be able to sell to one of the largest markets in the world. Countries such as the UK or France as well as

Table 5.2. US budget and trade deficits, 1980–89

Figures are in US \$b.

Year	Budget deficit (outlay) ^a	Trade balance ^b
1980	72.7	+1.9
1981	73.9	+6.9
1982	120	–8.7
1983	208	–46.3
1984	185.6	–107.1
1985	221.6	–115.1
1986	237.9	–138.8
1987	170	–154
1988	183.5	–128.9
1989	174.7	–128.7

^a Budgets are for fiscal years.

^b Trade figures are for calendar years. A (+) in this column indicates a surplus; a (–) indicates a deficit.

Sources: *Historical Tables, Budgets of the US Government FY 1989*; and International Monetary Fund, *World Economic Outlook*, Oct. 1988.

newly industrializing nations in the Third World (such as South Korea) and debtors will find it difficult to export and grow as fast as before or to service their past debt. It is generally accepted that if the dollar falls too rapidly, a 'hard landing', then world-wide economic prosperity may suffer badly. The solution to the present situation may be as difficult to handle as the original problem.

Finally, one should also note the social impact of the Reagan era.¹⁰ The priority structure (or welfare function) of this government was radically different from that of its predecessors. It has been estimated that defence expenditure will have been \$270 billion more than it would have been if pre-Reagan budgetary trends had been maintained; similarly, social security and compulsory entitlement spending (for unemployment, poverty, medicare, etc.) will be \$360 billion more; and finally, non-military and non-entitlements (such as for roads or infrastructure) will be \$300 billion less. The implications are clear: the Reagan years have contributed to an unprecedented peace-time military buildup; increased the number and deprivation of people at the lower levels of society who now need more minimal benefits from the government;¹¹ and finally, dramatically reduced state involvement in the economic infrastructure.

The future

President George Bush has already signified his determination to carry on, with some modifications, the policies he has inherited. The question is how wide-ranging the modifications will be. With regard to defence, his choices are somewhat constrained since large-scale budget authorities of previous years will carry over into spending programmes in the future, which he will not be able to curtail without serious disruption. Procurement budgets have been falling in any case, and there do not seem to be radical opportunities here without serious arms control measures. In this respect both superpowers will find it expedient, one for budgetary reasons and the other for national economic reasons, to attempt to conclude some form of arms reduction agreement. The framework of technological-economic structural disarmament mentioned above provides an upper constraint on indefinite expansion.

Cost increases of new weapon programmes have reached dizzying heights. The aggregate price index of military systems incorporates a factor for technological progress; hence it does not properly reflect the astronomical price rises of individual weapon systems because these are attributed to higher quality or effectiveness. Yet procurement budgets will have to pay for these qualitative improvements; and, if allocations do not rise in commensurate fashion, then the number of systems will have to be reduced. The B-2 bomber is a case in point. The development of stealth or low-observable (LO) technology, incorporated in the aircraft, has been conducted in great secrecy, comparable to the Manhattan Project which produced the first atomic bomb.¹² The capability of LO technology is immense; claims are made that it can defeat any practical and known air defence system. However, the cost is also correspondingly high; the most expensive aircraft ever made cost over \$500 million each. As a means of comparison the total Air Force procurement

budget for FY 1989 was estimated to be about \$16 billion.¹³ Thus this whole budget could be exhausted through the purchase of only 32 B-2 bombers. The US Air Force wishes to purchase 132 of these aircraft. It is difficult to see how the economics and procurement aspects can be squared.

Although few details are available at the time of writing, the new Administration will certainly postpone production of some arms systems and may have to cancel a few important ones. Procurement over a longer period of time and deferment of programmes until later dates are expected to be the favoured options. One possibility that has been discussed is the cancellation of the major dual-role fighter, the F-15E, although funding for 42 aircraft is included in the FY 1989 budget; naturally, the Air Force is strongly opposed, claiming that forward defence needs the relevant interdiction capability.¹⁴

The general view is that the US defence budget is facing a period of austerity, with zero growth a definite possibility (according to Bush himself).¹⁵ How this is going to be done is not clear. The election campaign and subsequent statements give few clues. A Congressional Budget Office report claims that simply to maintain the procurement programme already planned and *approved* would need a hefty 4 per cent per annum increase in real military expenditure for the next four years (1989–92).¹⁶ The outgoing Administration has already requested a 2 per cent real growth in military spending for FY 1990,¹⁷ but Congress may favour a real reduction. The reason for concentrating on defence is that it takes a major share of federal expenditure (around 26 per cent). Therefore, any attempt to eliminate the deficit will have to start with military expenditure. This will probably have to be done slowly and steadily since, as discussed above, the speed of adjustment for the US economy to these shocks is crucial to ultimate success or failure. Unfortunately, the President-elect has already forestalled, in his 'read my lips'¹⁸ statement, any major tax increases in the early years. Most independent analysts, particularly outside the United States, believe that there is simply no substitute for tax rises, however modest, at the beginning. It is difficult to reconcile Bush's pledges during the election, when he claimed that his policies will reduce government spending and the deficit by \$50 billion a year. He wants it to be done through a 'flexible freeze': the rate of growth of spending of all categories, except defence, interest payments and social security, will rise only by the rate of inflation. But, as *The Economist* has projected,¹⁹ this will hardly solve the problem by 1993 when his term will end.

The most important long-term difficulty that the US economy faces is the trade deficit which, though falling somewhat, is not low enough to continue to keep the dollar an attractive currency to hold for international investors. Yet without a stable dollar the world financial and trading system could face an unprecedented crisis. As discussed above, here the options are limited and there is a sort of 'Catch 22' situation where each alternative policy is fraught with its own pitfalls. It will require great skill for the next presidency to secure US and international security and prosperity together.

III. European NATO

According to preliminary estimates military expenditure in European NATO fell slightly during 1988. Greater reductions are dependent on the progress of arms control discussions, particularly those on conventional weapons—tanks, aircraft, artillery—and troops. The negotiations on Conventional Armed Forces in Europe (CFE), a follow-up to the Conference on Security and Co-operation in Europe (CSCE), which are due to start in 1989, will focus on conventional weapons.²⁰ Both NATO and the WTO are interested in this, since conventional arms reductions are the optimum way to curb military expenditures. Both the East and West, in Europe, are concerned about defence budgets; the former wish to release more resources for consumption and capital formation; the latter would like to curb aggregate budget deficits while reducing the tax burden in an effort to control inflation and foster incentives. The 3 per cent growth rule that NATO has twice adopted remains inoperative. There are sound theoretical economic reasons to doubt whether such across-the-board increases for all countries, irrespective of size, threat perception, free-rider behaviour, and so forth, can ever be successful.²¹ The 1988 spending figures for NATO countries show that expenditure controls are still considered vital: the finance ministers are now winning over the defence ministers, particularly in an environment of *détente*.

The burden-sharing debate

As the economic problems emanating from US military expenditures and concomitant budget deficits have increased, so also have there been increasing US calls for a more equitable participation by the European pillar of NATO in its own defence. The distribution of the economic costs of NATO towards Europe and away from the United States is now considered a prime factor in trans-Atlantic security relationships. The year 1988 saw a particularly strident call from US sources, at all levels, for a greater economic contribution by the European allies to the common defence. As a former National Security Adviser summed it up: 'Surely, 374 million Europeans with an aggregate economy of \$3.5 trillion should not need to depend for their defense as heavily as they do on 241 million Americans with an economy of \$4 trillion—against an opponent with 275 million and a GNP of only \$1.9 trillion'.²² This issue, which is bound to become more problematic in future years, is called the burden-sharing debate and is analysed below.

Although the US Administration has been committed to its contribution to NATO defence in Europe and little change is expected during the early Bush years, there are at least three important opinion-making groups which have kept the debate at the forefront. First, the academic community, through its counter-factual and 'what if' discussions, is perhaps the most wide ranging. The academic community ranges from asking whether the United States still considers itself to be a European power to asking whether the country has already begun a decline from its position as a global imperial power.²³ More influential, although narrower in scope, is the media, which has started

speculating about US force withdrawals in the near future.²⁴ Congress, however, provides the maximum immediate impact. Indeed, important sections within the Congress have begun to voice grave reservations about European contributions to NATO.²⁵

The most authoritative evidence concerning the US Congress's point of view comes in the form of the recent Report of the Defense Burdensharing Panel of the Committee on Armed Services, House of Representatives. The Panel states its case dramatically:

In 1988, concerns about the Federal deficit, the trade imbalance, high Federal spending generally and high defence spending specifically have ignited a national debate about our future defense needs and a reassessment of US global military commitments. Many Americans feel that we are competing 100 per cent militarily with the Soviets and 100 per cent economically with our defense allies. Some have said that the United States has incurred all the burdens of empire and few, if any, of the benefits.²⁶

The Report presents a number of arguments which apparently claim that European NATO countries are paying a disproportionately low share of Alliance costs; hence they are not contributing a 'fair' share of the total burden. However, some fundamental theoretical and empirical points are not clearly enunciated, and it is worth noting the implications of the analysis and (possible) allegations.

NATO members, as part of a 'club', enjoy the benefits of collective security and are required to pay a cost—so-called burden sharing. The benefits of deterrence, security and peace, however, are collective in nature. In other words, no one can be excluded, in principle, from enjoying them, irrespective of the amount that the member pays. Therefore, we have the classic case of a public good. Apportioning the cost of providing the public good can be done either in terms of the benefits received (the benefit approach) or in terms of the recipients' ability to pay (the ability-to-pay approach).

It is safe to claim that from the point of view of the benefit approach the United States should pay the maximum cost since its strategic, political and economic stakes are the highest in the Alliance. Its rewards are twofold; they encompass both the national and international dimensions. The twin pillars of NATO are North America and Europe. The former relates to US national concern—the defence of its homeland. The latter relates to the United States as a global power and *a fortiori* as a European power. It is doubtful whether, if the United States did not have a European presence, it would still be considered the most important superpower in the world. No other ally, within NATO, aspires to be a world power, in terms of politico-economic and military strengths, as much as the United States. But if the US flag does not fly over Europe, the loss of global credibility will be immense.

In terms of the ability-to-pay approach also, the United States should pay the most because its overall economy is the largest by far within NATO. Whether measured in terms of aggregate national output or resource endowment (including land area and population), it is the largest economy within the Alliance. Hence it follows that its contribution should be the highest.

That the trans-Atlantic relation is not a simple one-way street, and the US

economy benefits substantially from the partnership, is exemplified by the defence trade balance between the USA and European NATO. At a time of unprecedented overall trade deficit, and the loss of competitiveness of US industries, the defence sector shows a healthy trade surplus with Europe (going against the general trend). In FY 1983 the United States sold eight times more defence products than it bought from Europe. Although this ratio is decreasing it still remains significantly in favour of the USA. For example, in FY 1986, Europe sold \$1999 million of weapons but bought a total of \$3247 million; the US trade surplus was of the order of \$1248 million.²⁷

A more detailed quantitative breakdown of what Europe actually provides on the continent, rather than a simple financial account, is revealing. A Euro-group ministerial statement²⁸ and the recent NATO Defence Planning Committee Report²⁹ claim that the European Allies, even excluding France and Spain, provide an overwhelming proportion of NATO's operational forces and weapons in Europe and the Atlantic: 95 per cent of the divisions; 90 per cent of the manpower; 90 per cent of the artillery; 80 per cent of the tanks; 80 per cent of the combat aircraft; 65 per cent of the major warships; 70 per cent of the submarines; and most of the mine countermeasure vessels. By any criterion, European NATO's input towards the military capability of the Alliance is substantial.

Another vital input is personnel. To analyse capability, it is essential to consider total mobilization during wartime since that is the crucial indicator of strategic preparedness. Unfortunately, the actual numbers mean little since countries cannot be compared owing to variations in their size. One relative measure of the human input that a nation makes to its defence effort is the share of the total *mobilizable* force (active military manpower, civilian personnel in the defence sector and reserves) in its total labour force (the economically active population). Table 5.3 gives figures for this percentage share for most NATO countries. In a sense this measures the labour 'burden', or the share of

Table 5.3. NATO mobilizable defence personnel as a share of the labour force, 1988 projections

Figures are percentages.

Country	1988
Belgium	5.26
Denmark	3.96
FRG	5.33
Greece	11.35
Italy	2.89
Netherlands	4.97
Norway	11.19
Portugal	6.12
Spain	5.39
Turkey	5.24
UK	2.33
USA (total)	3.69
USA (excl. European forces)	3.15

Sources: NATO Defence Planning Committee Report, Dec. 1988; author's calculations.

the labour force that will be diverted to the military from its most productive functions for the economy. Here, the performance of European NATO is generally superior to that of the United States.

However, the Panel tries to make a strong case in favour of the US contribution by citing the country's military expenditure as a proportion of gross domestic product (GDP), technically called the *defence burden*. For the United States this has been, from 1982, above 6 per cent, while the Allies have generally had a much lower figure. This argument, however, obfuscates two major empirical issues. First, it is not always clear how much US defence spending is exclusively for NATO. The aggregate becomes meaningless because it includes global commitments, national protection as well as European defence. Unless these allocations are clearly specified, the NATO or European component cannot be meaningfully compared.

For the early to mid-1980s it has been reported that about 52–58 per cent of US defence spending was for the benefit of NATO.³⁰ The House Report gives a figure of 60 per cent. This figure, however, includes substantial numbers of forces and equipment deployed in the United States for reinforcements in the European theatre in case of war. Hence, this equipment is dual-capable; essentially it can be used also for purely national defence. A much smaller share of around 15 per cent of annual US military spending is thought to be required to cover the following costs for NATO: all direct costs of deploying US forces in Europe; allocated costs of new equipment as well as training, logistics and R&D; and Department of Defense (DOD) administration expenses.³¹ If these lower and upper limits of 15 per cent and 60 per cent are considered, then the 6 per cent aggregate US military burden comes down to only around 0.9 and 3.6 per cent, respectively, as the share of military expenditure (in GDP) devoted to NATO.

The second issue is equally important. A crucial factor that needs to be considered in the burden-sharing debate is that most European Allies (except the UK) use conscripts, rather than volunteers paid at the market wage, to maintain their armed forces. Thus the personnel cost is kept down at artificially low levels so that the defence burden does not reflect the true cost to the country. This is particularly true at the time of profound demographic changes implying skilled-labour shortages; conscripts are essentially diverted from the civilian sectors with concomitant implicit losses to the economy. This opportunity cost must be included in any proper assessment of what the 'true' military burden is. Alternatively, countries which opt for a paid volunteer army are allocating resources optimally since the soldiers are paid according to their productivity in a job that they wish to have. In addition, there are political costs to the compulsory conscript system since it is generally unpopular.

Table 5.4 gives the defence burden for European NATO countries which rely on conscription. A 'what if' calculation is made: What would the share of military expenditure be if the conscripts were paid a market wage? These estimated defence burdens are reported for 1985–88 and compared with the actual figures which are given in the adjacent columns. Because details of rank and force structures are not known for all the countries concerned, a simplifying assumption has been made. It is assumed that each conscript is paid the average

Table 5.4. Military expenditure as a share of GDP, selected NATO countries with volunteer armed forces, 1985–88

Figures are percentages.

Country	1985		1986		1987		1988	
	Actual	Est.	Actual	Est.	Actual	Est.	Actual	Est.
Belgium	3.1	3.6	3.0	3.4	3.0	3.4	2.9	3.3
Denmark	2.2	2.4	2.0	2.2	2.1	2.3	2.2	..
France	4.0	4.4	3.9	4.3	3.9	4.3	3.8	4.1
FRG	3.2	3.6	3.1	3.4	3.1	3.5	3.0	3.4
Greece	7.0	8.9	6.1	7.9	6.2	7.9	6.6	7.4
Italy	2.2	2.8	2.2	2.8	2.4	3.1	2.4	..
Netherlands	3.1	3.5	3.1	3.5	3.0	3.4	3.0	..
Norway	3.1	3.7	3.1	3.8	3.4	4.1	3.3	..
Portugal	3.2	3.8	3.2	n.a.	3.1	n.a.	3.1	..
Spain	2.4	2.9	2.2	2.7	2.4	2.9	2.2	..
Turkey	4.4	5.9	4.8	6.3	4.4	5.8	4.2	..
UK	5.2	5.2	5.0	5.0	4.7	4.7	4.5	4.5
USA lower ^a	n.a.	1.0	n.a.	1.0	n.a.	1.0	n.a.	0.9
USA upper ^a	n.a.	4.0	n.a.	4.0	n.a.	3.9	n.a.	3.7

^a US ratios relate to expenditures in connection with NATO. Figures not applicable (n.a.) for the USA are those related to actual US defence expenditures.

Source: Author's calculations.

annual industrial wage. Where data for wages are not available, per capita GDP is used to cost each conscripted recruit. In general, military personnel tend to be paid better than industrial workers; so these calculated figures should be considered as low estimates. For the sake of comparison, actual British figures are also provided. In the last two rows, the contribution of the United States to NATO is considered and the relevant defence burden calculated using the two limits mentioned above.

As table 5.4 shows, the alleged large disparity between US and European defence burdens tends to disappear. The bigger countries in terms of military spending, France and the UK, now tend to have a larger defence share of GDP than the upper limit of the USA; so do the poorer countries, Greece and Turkey. All European countries have a higher defence burden compared with the lower US limit. The FRG data presented here include only the cost of the conscripts. The FRG, however, also spends a large amount on the military security of Berlin which is not included in the NATO definition of defence expenditures and is not included in the calculations here. When these costs are included, the West German defence burden significantly exceeds the maximum US limit for NATO-related expenditures. (The costs for the FRG are discussed in more detail in the section on FR Germany, below.)

The conclusion is inescapable. European NATO countries tend to have lower defence burdens relative to the United States if only direct financial spending is compared. This is the core of the burden-sharing critique. However, once direct and indirect (opportunity) costs are included, and US NATO commitments alone are taken into account, it is clear that military

expenditure in the European countries generally represents a higher share of GDP. It is only fair to make the latter comparison since aggregate US military spending includes operations with which NATO cannot be directly concerned. What must really be costed is US *NATO*-related spending only, since the concern is one of *NATO* burden sharing. Within this framework the burden seems to be equitable on a national basis.

Finally, there is one perspective regarding the 'bring the boys back home' proposal that cannot be overlooked. There are around 325 000 US servicemen in Europe, and it is not clear how many would be withdrawn if the United States does reduce its commitment to Europe. It is also clear that if there is to be any budgetary impact then these forces cannot be kept in the armed forces any more and will become unemployed. The implications for US unemployment must therefore also be considered.

For analytical exposition, consider the extreme case of what will happen if all US forces are removed from Europe and released from the services. The unemployment rate could rise from the early 1988 level of 6.2 per cent to 6.5 per cent. In addition, if substantial budgetary cuts are made then it will not only be personnel that will be affected but also procurement. US arms industrial output will be seriously affected, and this will lead to retrenchment and substantial increases in defence-related job losses. Once again the implications for unemployment in the USA could be vital. Consider again the extreme case where 60 per cent of the US defence budget is used for NATO purposes. If this is eliminated totally then the impact on defence industrial employment will be extremely serious. A 60 per cent reduction of procurement would mean that the aggregate US unemployment rate would become 8.1 per cent; this implies a proportionate increase of 30 per cent of the relevant rate.³² Such a high increase would be totally unacceptable from a political point of view.

These counter-factual analyses are indicative of the basic propositions that are central to the burden-sharing debate. In terms of security, global power and a predominant role in international relations, the US contribution to the Alliance cost is not excessive. Even if the case is considered from a purely economic cost-benefit perspective, US gains are substantial in terms of both defence industrial output and trade and employment generation. In addition, Europe does contribute a high share of the total force structure and overall cost. If the indirect and opportunity costs are all accounted for, the contribution of the European pillar is substantial. Taking even a narrow measure such as the share of military expenditure in GDP, the military burden of many European countries exceeds that of the United States, where the latter's NATO contributions are concerned.

In a sense this question of burden sharing is relatively futile, particularly if the above analysis is considered. What the main concern should be is that of *burden shedding* rather than *burden sharing*. In the light of the proposed transformation in global security perceptions, perhaps that is what the twin pillars should concentrate on rather than an acrimonious debate on who should pay what.

FR Germany

As a share of GDP, West German defence spending in terms of the NATO definition was 3.1 per cent of national output in 1987; the 1988 figure is similar. The FRG has often been singled out as the country with the strongest economy in Europe but not contributing its 'fair' share of the Alliance cost of defence. The relatively low value of the defence burden (see appendix 5A, table 5A.3) is used as an argument, particularly in the United States, to demonstrate the apparent inequitable allocation of NATO expenditures. However, if one were to look at the 'true' cost to the economy in terms of economic benefits forgone, then the West German defence share in GDP would be much higher.

First, unlike the United States, the FRG has a conscript army; hence, as discussed above, personnel costs are kept artificially low by not paying market wages, as would be required for a volunteer armed force. During a period of demographic changes in which the proportion of young people entering the labour force is decreasing, the withdrawal of conscripts from the labour force also means that their productivity in the civilian economy is lost. Further, their skills are not properly utilized for the economic needs of the country and, in important industries with labour shortages, may represent a substantial opportunity cost. In a sense, adding the payment that would have to be made to a hypothesized volunteer army would better reflect the indirect costs to the economy. A West German study³³ in 1972–73 showed that a transition to an all-volunteer force, all other factors remaining constant, would require expenditures that increased the current (1972) defence budget by 30–40 per cent.

Second, the government spends large amounts of resources on West Berlin which have a military function and which are considered to be necessary to preserve the freedom or special status of the city. If these expenditures are also included, the share of defence spending in GDP would be far higher and exceed 4 per cent consistently. Table 5.5 gives estimated figures for military burden for 1983–88, incorporating these two costs. The basic assumption for the assumed volunteer force costing is that all personnel are paid the average industrial wage; since higher ranks would be paid more, in reality, the numbers here are low estimates and should be considered as the minimum costs. It is also important to note that the share of NATO-related military expenditure in GDP for the FRG is *higher* than that of the NATO-related US figure (see tables 5.4 and 5.5).

Table 5.5. Direct and indirect costs of the military burden of the FRG, 1983–88

Figures are percentages.

	1983	1984	1985	1986	1987	1988
Actual military expenditure burden	3.3	3.3	3.2	3.1	3.1	3.0
Burden with volunteer armed forces	3.8	3.7	3.6	3.5	3.5	3.4
Burden with Berlin expenditure added	4.6	4.5	4.4	4.3	4.3	4.2

Sources: NATO publications; author's calculations.

In addition, field training exercises, low-flying aircraft in military training and the associated environmental costs in a relatively small and very densely populated country impose huge costs on the economy, people and government. These are generally not measurable; certainly they form no part of military expenditure. Yet, in order appropriately to measure the true cost or burden of defence, these factors must be taken into account. An expert testimony to the US House Burdensharing Panel provides a vivid summary of these non-quantifiable costs:

You can't simply assign numbers to the burden of conscription, the political and social cost of maintaining foreign troops on your soil, or the real price of maneuver damage to towns and countryside. You know . . . how difficult it would be to run for office on a platform that called for reinstating the draft, or for deploying nuclear missiles or stationing foreign troops in your districts. The state of Oregon is roughly the size of West Germany, and much less urban. But Oregonians probably would agree that there was a cost beyond measure to hosting large numbers of nuclear weapons and 400,000 troops from seven different countries, who would conduct 5,000 field exercises and fly nearly 600,000 sorties annually.³⁴

Qualitative costs are as important as quantitative ones.

Special emphasis should be given to FRG defence spending on West Berlin since this is not included in the internationally reported spending figures. In 1988 it is estimated (according to the official NATO forecast) at over 16.8 billion DM; incorporating this figure would raise the stated defence spending by 27 per cent.³⁵ The corresponding figure for 1987 was 16.1 billion DM (equivalent to 26 per cent of reported defence spending); and for 1986 it was 15.6 billion DM.

The UK

The British armed forces perform four major external security roles, predominantly within the jurisdiction of NATO. These roles include that of the strategic nuclear force, the direct defence of the UK, military participation in the European mainland (mainly through the British Army of the Rhine) and the use of maritime forces in the Eastern Atlantic as well as the Channel. Defence spending has not been immune to the overall budgetary austerity that has characterized Prime Minister Margaret Thatcher's Government, but it has probably fared better than other public services. Both the level and the share in GDP have fallen slightly over the years from the peak around 1984. Still, the military burden, currently around 4.5 per cent, is among the highest in NATO. In terms of equipment expenditure as a proportion of total defence spending, the UK ranks second, after the United States, within the Alliance; its relevant share is 24.7 per cent.³⁶

The defence budget for FY 1988–89 was £19.215 billion, higher than the previously forecasted levels in the Supply Estimates and the earlier White Paper.³⁷ Threatened cuts had failed to materialize because the overall fiscal budget, presented by the Chancellor of the Exchequer, Nigel Lawson, had a surplus.³⁸ The transformation of the public sector borrowing requirement

(PSBR, the budget deficit) into the public sector debt retirement (PSDR, a budget surplus) was heralded by tax cuts and an easing of expenditure controls.

One of the major weapon system procurements for the UK is the Trident programme. This will be a principal component of the strategic force, with the replacement of the Polaris by a four-submarine naval force armed with the Trident II D-5 nuclear system. Both the cost and the work-sharing agreements with the United States have been controversial. According to the Ministry of Defence (MOD) the cost of the programme at FY 1987-88 prices is estimated to be over £9 billion; but the exchange-rate seems unrealistic, and it is possible that at an appropriate exchange-rate the cost could exceed £10 billion at constant prices. Clearly, in current prices this will be substantially more by the time the system is operational in the mid-1990s. Considering that the British defence budget is less than £20 billion, the total cost of this one project represents a substantial burden.

The missiles are being built in the United States, which will spend about 36 per cent of the total cost. In addition, after instalment, they will be regularly serviced in the USA. The British Government has repeatedly claimed that this will reduce capital and current expenditures but will have no effect on the independence of the Government to deploy and use the deterrent. However, sceptics are not fully satisfied about the economics of allowing the United States to share 36 per cent of total MOD spending on the Trident programme and are concerned about whether total control will remain in British hands.

In spite of the political rhetoric of the Government, military spending has probably reached a plateau.³⁹ The budgetary and economic constraints are mainly responsible, since both the Government and the Conservative Party would like to increase the defence budget in real terms but are foiled by the economic environment and cost escalation. The economy continues to have a high growth rate fuelled principally by a consumption boom but also by rising investment from a deep trough.⁴⁰ However, in late 1988 there were signs of over-heating, manifested in terms of a high and rising trade deficit. The Government has refused to change its tax policy and has continuously relied on only one instrument of macro-economic policy, that is, the interest rate. In 1988 the interest rate increased nine times to choke off aggregate demand and control spending.⁴¹

The British case is contrary to that of the United States. Owing to asset sales and privatization, there is no problem with the budget deficit. Indeed, as mentioned above, the budget actually has a surplus, and tax cuts have been possible due to buoyant revenues. However, these tax reductions have led to high spending which has been concentrated on foreign goods. The surge of imports has produced a massive trade deficit which threatens to depreciate the pound and increase inflation. The British lesson shows that controlling the budget may not be sufficient to control trade imbalances. As discussed above, it is the latter which creates international economic problems and is at the core of trade and financial disruption.

IV. The USSR

President Gorbachev's speech at the UN⁴² in December 1988 was the clearest indication to date of the extent of Soviet desires for arms control and disarmament. He announced a unilateral reduction of the armed forces by 500 000 troops and corresponding cuts in conventional weapon systems; the withdrawal of six tank divisions, 5000 tanks and 50 000 men from Eastern Europe; an overall reduction within the WTO of Soviet arms by 10 000 tanks, 8500 artillery systems and 800 combat aircraft; and a sizeable troop reduction and withdrawal from the Asian part of the country and Mongolia.

The significance of these proposals could be far-reaching. They not only affect the conduct of foreign policy and external security relations but also have implications for the domestic economy and the military budget. The global impact has been widespread and generally favourable. However, in spite of the international successes of Soviet policy, the record at home remains patchy. The impact of *perestroika* and its concomitant *glasnost* has been more evident on the international scene than within the country. Yet the expectations raised by the prospects of change are difficult to control, and herein lies the major problem for the authorities—the difference between the actual and expected performance of the economy as well as the economic rewards of the reforms. As a Soviet minister has claimed, the effectiveness of *perestroika* depends upon 'what you have in the shops'.⁴³

Economic constraints are clearly a dominant factor in Soviet desires for arms control. In a supply-constrained economy, where aggregate demand is too high relative to total output, resources devoted to the military must be at the expense of some other category of national expenditures. Because large investment programmes have inevitably had first priority, given the high-growth strategy, it has been consumption that has suffered when defence spending has been forced up to increased levels owing to the arms race between the superpowers. Thus, economic reforms aimed at increased consumption must entail reductions in the defence budget. The interrelationship between Soviet domestic economic liberalization and international security concerns was emphasized by Foreign Minister Eduard Shevardnadze as: 'The main thing is that the country not incur additional expenses in connection with the need to maintain its defence capacity and protect its legitimate foreign policy interests'.⁴⁴

There is now some evidence that the USSR is contemplating significant reductions in defence expenditures. In his Moscow speech of 18 January 1989, Gorbachev claimed that reductions of the order of 14.2 per cent in the military budget and 19.5 per cent for arms production and procurement are being considered.⁴⁵ These large cuts—one-seventh of defence expenditure and one-fifth of weapon output—could indeed be a remarkable phase of disarmament. But, of course, the position is not absolutely clear. Information on force structures and capabilities shows that technological improvements and modernization of strategic nuclear forces are still continuing, although not as fast as in the mid-1980s. The actual budgetary implications of the INF Treaty are also small; in addition, elimination of weapons and verification will mean

more expenditures.⁴⁶ Therefore, it is the conventional forces that must bear the brunt of disarmament measures; hence the Soviet interest in speeding up the conventional arms discussions so that negotiations are satisfactorily concluded to allow for budgetary reductions.

A formal and strong indication that the Soviet Union has started action on reductions in defence spending in order to release more resources for investment (growth) and particularly consumption (welfare) comes from the statements made in July 1988 by General Vitaly Shabanov, the Principal Deputy Minister of Defence for Armaments. In spite of claiming that his country was modernizing its arsenal (particularly in the context of deployment of the SS-18), he was emphatic that cuts in arms spending have been made since around 1986—the first year of the current five-year plan. This is of course flatly contradicted by the joint report of the CIA/DIA (Defense Intelligence Agency) to the US Congress in April 1988, which claimed that 1987 saw an overall increase of Soviet military spending by 3 per cent.⁴⁷ Yet there can be little doubt that the new mood of economic expansion must call for military reductions, and all indications are that the Soviet Union will, if not aim for a big reduction, at least raise military expenditure more slowly than the increase of its national product.

What does the 19 per cent defence burden mean?

The enigma of how much the Soviet Union actually spends on defence continues. *Moscow News*, the maverick local journal, published an interview⁴⁸ in which it was claimed by a former US National Security Adviser that the Soviet Union could be spending up to 19 per cent of its total national output on military expenditures. According to him, this figure came from Eduard Shevardnadze in a discussion with George Shultz, the US Secretary of State. If true, then this is the first admission by a senior official of the extensive coverage of the defence sector, and the actual figure for military spending could even come up to the inflated Western intelligence estimates.

It is of course well known that the official Soviet defence budget is much lower than any reasonable estimate of the country's military spending. After the most recent methodological revision by the CIA, its estimate for military expenditure in the early to mid-1980s was about six to seven times the official figure. The official defence budget for 1988 was 20.5 billion roubles—itsself a considerable rise from the almost constant figure of 17 billion roubles cited throughout the first half of the 1980s. The budget for 1989 gives almost the same figure, 20.24 billion roubles. According to official sources this includes 'the upkeep of personnel for the Army and the Navy, material and technical supply, military development and other spending by the Ministry of Defence'.⁴⁹ Earlier statements⁵⁰ made by senior military officers indicate that the budget really covers personnel expenditures, while weapon production and procurement as well as research and development of new technology are left out.

The 19 per cent figure created some media interest.⁵¹ In particular, it even seemed to exceed the allegedly overestimated figures given by the CIA which claimed that the Soviet Union was spending around 15–17 per cent of its GDP

on the military. However, the implications of this number are not clear-cut, and it must be treated with some caution. Specifically, the actual military expenditure that needs to be calculated from this defence burden figure will vary considerably, depending on what measure of national output is used, whether rouble or dollar figures are being utilized as well as on the exchange-rates needed for converting figures from one currency to another.

It seems probable that Soviet data will pertain to the Soviet system of national accounting rather than conforming to Western methods. Within this framework it is reasonable to assume that the 19 per cent figure relates to rouble values as well as national output being measured in terms of the net material product (NMP), which is widely used in non-market economies. Table 5.6 gives various estimates for 1987, the latest year for which data are available, regarding Soviet defence spending using the postulated burden as well as those emanating from Western intelligence agencies. In terms of orders of magnitude the numbers are close to each other, although great variations exist in the absolute values.

An alternative method would be to assume that Soviet and US proportions of expenditures on the various categories of the defence budget—personnel, O&M procurement and R&D—are roughly similar. For the United States, the first category accounts (on average) for about 25 per cent of the total national defence expenditure. For the USSR, the official budget of around 20 billion

Table 5.6. Estimated Soviet defence expenditure, 1987

Figures are in b. roubles.

Source	Expenditure
(1) Official budget	20.2
(2) 19% defence burden ^a	113
(3) CIA ^b low	120
(4) CIA high	137
(5) British sources ^c	124
(6) Using US ratios of budgetary allocations ^d	89–97
(7) <i>Dollar</i> value of (6)	
(b. \$, non-commercial tourist exchange-rate ^e)	148–161
(8) <i>Dollar</i> value of (6)	
(b. \$, estimated exchange-rate ^f)	231–252

Sources:

^a 19% of NMP; 1986 NMP data from *UN Monthly Bulletin of Statistics*, Mar. 1988; updated by 3.3 per cent as the TASS-reported Soviet growth rate for 1987; *International Herald Tribune*, 25 Jan. 1988.

^b Base values for 1982 from US Congress Joint Economic Committee (JEC), *Allocation of Resources in the Soviet Union and China* (US Government Printing Office: Washington, DC, 1986); updated by 2 per cent increase per year until 1986; growth rate of military expenditure for 1987 assumed at 3 per cent, using CIA estimate; *Financial Times*, 26 Apr. 1988.

^c IISS, *Military Balance 1987–88*, gives a figure for 1986; updated by 3 per cent for 1987.

^d See section IV of this chapter.

^e Non-commercial tourist exchange-rates for Dec. 1987; from *UN Monthly Bulletin of Statistics*, Mar. 1988.

^f Dollar-rouble conversion rate for Soviet GNP estimated from implicit figures in JEC (see note ^b above) for 1982, and updated.

roubles is known to cover personnel costs alone. Using the US proportion this would give a figure for total defence spending of around 80 billion roubles. This is probably a low estimate given the volunteer nature of the forces in the USA as well as the necessity of paying them market wages. These costs are avoidable in the Soviet Union; hence, personnel costs are lower and the postulated proportion could be less than in the USA. Adjustments made to the Soviet figure would raise it by another 10–20 per cent.

Overall, these estimates suggest that *currently* the Soviet Union may spend approximately 100 billion roubles on its military. This is lower than what the United States spends in terms of any comparable exchange-rate conversion. However, the proportion of defence in national output is far higher than Western economies, and it is here that the crunch will come. Given its smaller national income it is much more problematic for the country to spend such a high proportion of aggregate output; the defence burden can then become a true economic 'burden', much more so than that of its rivals.

The implications for the defence budget of the proposed cut of 500 000 armed forces that Gorbachev claimed in the United Nations will clearly be favourable since this will be a significant reduction in numbers, maintenance costs and those related to O&M. There is now also a domestic discussion, for the first time, on the advisability of moving to an all-volunteer army and the possible ending of conscription,⁵² but it is not easy to estimate the budgetary impact of such a measure.

Curiously, in spite of the great difference in US and Soviet economic systems, another recent problem that the Soviet Union may be facing has been a characteristic feature of the US Government throughout the decade. The State Budget of the USSR, for the year 1989, forecasts a deficit in the central government (Union) budget of around 35 billion roubles; that is, 13 per cent of total expenditure. It is thought that this is the first time that the existence of such a deficit has been revealed. The Reagan deficits in the hey-day of his Administration were of course a much higher percentage of total government spending (hovering around 20–25 per cent).⁵³ However, for the Soviet Union, with a much lower level of national output, the absolute magnitude is of crucial importance. In addition, as a share of national product the deficit could be as high as 5 per cent, which is higher than comparable figures for the Reagan Administration. Even though the stated amount of military spending contributes an insignificant part of the deficit, there is little doubt that the true defence expenditure does bolster the imbalance. A reduction in weapon spending cannot but be helpful in controlling this deficit.

It is difficult to speculate as to why the government budget deficit is so high. Some analysts have suggested that the loss of tax revenue from alcohol sales—a direct consequence of the programme to control alcohol consumption—may be the principal reason for this dramatic increase.⁵⁴ A more long-term and structural reason may be the increasing drive for modernization and the use of new technologies (such as computers) which are proving to be extremely expensive. Until and unless productivity matches up to initial fixed costs, and that can only come after a threshold has been reached, the deficit could rise.

In a sense the implications of the budget deficit could be equally serious for

domestic policy. Socialist governments cannot rely on borrowing from the public at large (domestic and foreign) to finance their budgetary shortfalls. The Soviet Government will have to get this money from the Central Bank (the Gosbank); this essentially entails monetization of the debt. Hence, there will be more money available in the economy. With the supply of goods already limited, the excess demand cannot be met except through rising prices. But prices are state controlled, and there is little likelihood that they will be allowed to increase significantly. This implies 'repressed inflation' where excess demand for goods will have to be met through rationing and queues for goods. Once again, the fundamental problem of the 'shortage economy' will be exacerbated and the dissatisfaction of the population, at the slowness of getting the fruits of reform, may increase.⁵⁵

Which way now?

In terms of domestic economic restructuring, international political relations, defence spending and arms control, the Soviet Union faces a number of options. Analytically, these can be grouped into three sets of choices, although in practice they are not mutually exclusive. First, output can be increased and growth retardation reversed through an increase in investment. However, the country already invests a sizeable part of its NMP, or about 26 per cent, and further quantitative increases may simply produce more shortages and queues as resources are diverted from the consumption needs of the population. The familiar feature of repressed inflation will become more aggravated. In addition, past investment has not been highly productive; hence, in spite of massive capital expenditures (such as on tractors or steel) aggregate growth is still relatively low or falling. The Soviet Union is also incredibly inefficient and wasteful in its use of raw materials, intermediate input and energy. For example, looking at data for 1979–80, it used 1490 kg of coal and 135 kg of steel to produce \$1000 worth of aggregate national output; in comparison, the equivalent West German figures were 565 kg and 52 kg, respectively.⁵⁶ What is therefore really needed is quality rather than quantity.⁵⁷ New investment in telecommunications, information technology or computers may be much more worthwhile than investment in steel or machinery.

The second option is to allow for more free markets and private sector production to increase the supply of consumption goods, particularly in agriculture and food. However, this must allow appropriate profits for the producers and therefore carries the risk of open inflation, which the government dislikes and will be generally unpopular with the consumers. The Chinese experiment with free markets within an overall socialist system shows the dangers of opening up too soon or too fast.

The final option would be to allocate existing resources away from defence and towards the production of investment and consumption goods. Since many industrial units in the Soviet Union are dual-purpose, this type of conversion is less complex than in other countries. Converting tanks into tractors or armoured vehicles into automobiles would be a reasonably efficient way of meeting the demands of the population for a better quality of life. So

conversion could become increasingly important in the future; Gorbachev has already stressed this in his 1988 UN speech. Analytical discussions on conversion have already started, probably for the first time in recent Soviet history.⁵⁸ Reduction of manpower and releasing human resources to the civilian economy would also be useful for a labour-shortage economy. It is significant that recent discussions have also turned to the merits of a smaller volunteer army as opposed to the current conscript system. In addition, part of the massive military R&D could be utilized for civil technological progress.

The last option seems to be the most meaningful one, at least in the short or medium term. It would imply a reduction in conventional arms, concentrating on a defensive force structure and a substitution of quality for quantity. Soviet military strategy would become similar to that of NATO in general. Gorbachev could then make a virtue out of necessity by agreeing to large-scale arms control, which would have to occur in any case owing to systemic reasons. In the process, he would gain some reduction of NATO capability and threat as well as achieve a significant victory in international relations. The UN speech could be a strong indication that this is the most preferred option of the leadership.

Still, one point remains paramount. Whatever the causes and means of Soviet arms control, the implications—for world peace—of this type of structural disarmament are entirely beneficial. Therefore, the USSR should be supported, encouraged and positively helped to reach its goal. The failure of the reforms, through Western intransigence, would be tragic. It is also a sobering thought that in the short term there is nothing inevitable about the process; the country can go back to the traditional ways. It has sufficient resources and power to carry an inefficient system for a considerable period of time. Therefore, the reforms must be forced to succeed, and international co-operation is essential.

V. The Asian-Pacific region

New Soviet initiatives

The rapidly increasing economic power of the Far Eastern economies, as well as the rise of military expenditures coupled with major conflicts and security problems, have made the Asian-Pacific region important. Gorbachev's Vladivostok speech,⁵⁹ in July 1986, underscored the importance that the Soviet Union places on its role in this strategically crucial part of the world. In September 1988 Gorbachev reiterated the earlier initiatives and presented new proposals in another major speech at Krasnoyarsk.⁶⁰ He proposed: no increase in regional nuclear weapons; no increase in regional naval forces; lowering military confrontations where the coasts of the USSR, China, Japan and North and South Korea converge; withdrawal of the Soviet Union from its bases in Viet Nam (Cam Rahn Bay) if the USA shuts down the Philippine bases; provision of safety for sea channels and air communications; an international conference on the Indian Ocean as a zone of peace; and the creation of a regional negotiating machinery (possibly along the line of negotiations on

Europe) for confidence-building measures and arms control. These initiatives could have an impact on regional military spending.

The Soviet Union already has a substantial naval presence in the area. The Soviet Pacific Fleet of the Far Eastern Strategic Theatre (with headquarters at Vladivostok) is the largest of its fleets, with more than 200 combatant ships (major and minor) and over 100 submarines.⁶¹ Regional military expenditures are also significant and rising rapidly. In the mid-1980s SIPRI estimated that about 10 per cent of the world total was being spent by the countries in the Asian-Pacific region; this was the highest regional concentration of defence spending. Growth rates have also been high. Between 1980 and 1985 (the latest year for which all data are available), the total military expenditure of Japan, the Association of South East Asian Nations (ASEAN) countries, North and South Korea, and Taiwan taken together rose by 3.9 per cent per annum. Although the reported military budget of the People's Republic of China has decreased in recent years (see below) the lack of proper data makes it difficult to assess the true impact. Nevertheless, Chinese arms modernization continues, and it retains a formidable military capability in terms of its arsenal as well as being the second largest nuclear power in the region.

Soviet perceptions and attitudes towards the two major local powers, China and Japan, are somewhat different. For China, a *rapprochement* seems to be much closer with the possibility even of a summit meeting⁶² in 1989 between President Gorbachev and China's paramount leader Deng Xiaoping. The relations between Moscow and Tokyo, however, are fraught with more problems. There are three elements that define the parameters of this relationship. First, Japan's geostrategic position makes it a crucial player. Lying on the eastern seaboard of the Soviet Union, it could potentially control the vital outlets for the Soviet Navy to the Pacific through the Straits of Soya, Nemuro, Tsugaru-kaikyo and Tsushima.⁶³ Second, the Soviet Union has tried to keep political and economic factors as separate as possible. Thus it refuses to discuss the Northern Territories which Japan alleges are occupied; on the other hand, it wishes to broaden trade horizons. Third, the USSR believes that Japanese technology and investment could be essential for the development of Siberia.⁶⁴ In a sense, the economic miracles of the Pacific region have passed the USSR by, and it would like to participate in the spin-offs, particularly in terms of technology imports and the financing of its regional development. Japanese credits could be as desirable in the East as recent West German credits have been in the West.

It has been claimed that optimally the Soviet Union would like to 'Finlandize' Japan⁶⁵ and use the resultant neutrality to maximum advantage in terms of economic, trade and technological relationships without fears of military problems. Whatever the true intentions, it seems that such a step is no longer feasible, given Japan's pre-eminence in the Western economic world. The economic muscle will eventually lead to political power, and the sort of subsidiary role envisaged in the above model can no longer apply. Further, as discussed below, Japanese defence spending and capability are also increasing.

Overall, the Soviet initiatives for the Asian-Pacific region should be taken seriously. In terms of economic performance as well as security perceptions this

area will continue to increase in prominence. Its problems and characteristics—high growth, increasing international integration, flashpoints of armed conflicts, intertwined domestic and external security factors, the co-existence of opposing social systems, and superpower involvement—are not dissimilar to Europe in the 1950s and 1960s. Policy dilemmas and their solutions, for early next century, must be considered now.

China

There is little doubt that Chinese military expenditure is declining in real terms and certainly as a percentage of China's national output. The pragmatic leadership no longer believes in the 'inevitability' of major wars even though regional and localized conflicts will remain (as the skirmishes with Viet Nam show). Normalization of relations with the Soviet Union continues satisfactorily. With a few notable exceptions, China's security relationships with its neighbours are good or improving. The most important reason, however, for the reduction in military spending seems to be the demands of domestic economic and political reforms which require that more resources are released to the civilian economy together with a new type of armed force vastly different from the traditional norms of the People's Liberation Army (PLA).

Troop reductions for the PLA, arms modernization, significant organizational changes including reorganization of military regions and employing civilians in General Headquarters are all measures designed to create a more professional force structure. An interesting development in 1988, equally important for its symbolic value as well as military usefulness, was the restoration of the ranking system originally abolished by Chairman Mao Zedong.⁶⁶ The year also witnessed the formation of a new rapid deployment force, an airborne troop unit capable of speedy military responses; the *Liberation Army Daily* calls it the 'fist platoon'.⁶⁷

These changes are partly related to the structural transformation in military doctrine and strategy that followed the abandonment of the Maoist concept of 'people's war'. This traditional concept envisaged a massive armed force, supported by large reserves, and aided by the population at large. Modern weapons were less important compared with the will of the army to resist conventional attacks. Nuclear forces would be used only as a last resort and purely for retaliatory self-defence. The new theory, 'people's war under modern conditions',⁶⁸ relies much more on weapon modernization, professional armed forces, forward defence and limited aggression where necessary.

The fundamental reasons for reduced defence spending, in China as elsewhere, are related to economic and technological structural changes that are taking place in the society and economy. In the face of intense competition for resources, the government simply cannot afford large-scale increases in defence spending as was the practice in the past. The share of the defence budget in the total budget has diminished, according to official statistics, from over 15 per cent in the early 1980s to around 8 per cent in 1988. At the same time, the aggregate budget deficit has risen from less than 3 billion yuan (in 1982) to over 8 billion yuan in 1988. China's foreign debt is also in the big

league; its current level is around \$30 billion, or about 10 per cent of its GNP.

The same level of secrecy as that in the Soviet Union surrounds the true figures for Chinese military expenditure. It is not clear what the state budget for defence includes. Most analysts believe that it covers only personnel and O&M; this leaves out the potentially large amounts required for procurement, investment in weapon industries (all run by the government) as well as R&D. A basic estimate would put actual Chinese defence expenditure at around 40 billion yuan (see table 5.7). This would mean that the share of defence spending in national output is about 4 per cent.⁶⁹

Estimation problems are compounded by the fact that the PLA is allowed to keep a part of the foreign exchange earnings from overseas sales of Chinese weapons for its own procurement programmes. Reports vary about the actual proportion; it could be anything between 40 and 80 per cent, but it is certainly significant. It has been claimed that arms sales to Iran in 1987 accounted for almost \$1 billion. If a large part of this was diverted to the PLA then its procurement spending could be boosted significantly, but these amounts would probably never appear in the defence budget.

The economic nexus of China's arms production and exports is crucial in understanding the country's military expenditure process. The foreign exchange made available through weapon sales is used to finance force modernization at home; this helps, partially, to keep domestic defence spending low. Potentially valuable resources are thereby released for other needs of higher social priority. Traditionally, China has been adept at 'learning by doing'; this entails adopting technology through indigenous efforts to suit its own needs. Now China is gaining expertise in 'learning by window-shopping'. The Chinese have not bought many actual weapon systems from abroad. What they really need is technology which can be useful for domestic production. They also save costs due to savings on expensive R&D. China has learnt a lot from studying the blueprints of eager sellers (the so-called 'window-shopping') and then ingeniously adapting the knowledge to its own requirements. Wherever expensive technology has to be actually paid for, it has utilized the revenue from arms sales, thus restraining its actual military burden.

Table 5.7. Chinese military expenditure and budgets, 1985–88

Figures are in b. yuan.

	1985	1986	1987	1988
Total government expenditure	184.5	229.1	242.7	263.5
Budget deficit or surplus	+2.16	-7.08	-8.03	-8
Defence budget	19.15	20.13	20.98	21.53
Proportion of total expenditure (percentage)	10.4	8.8	8.6	8.2
1988 estimate of actual military expenditure	—	—	—	40–43
1988 dollar estimate (b. US \$)	—	—	—	10.8–11.6

Sources: *Chinese Statistics Yearbook*; budget report by Wang Bingqian to the 7th National People's Congress; author's estimates.

In addition, China has now begun a programme of partial conversion of defence to civilian industries. The armed forces have always had civilian functions (such as in construction and agriculture). What is new is industrial conversion where some defence complexes (particularly the old ones) are being utilized to manufacture civilian goods. Chinese estimates claim that 40 per cent of military industrial capacity could be used for civilian output. Another local estimate suggests that the total value of such output was 20 billion yuan between 1980 and 1986.⁷⁰ If so, the implications could be far-reaching.

Japan

Discussions of Japanese military expenditures usually centre around the so-called 1 per cent limit.⁷¹ This refers to the self-imposed ceiling set by the Cabinet in 1976 to limit defence spending to a maximum of 1 per cent of GNP. Although the upper bound has no status in law, it has generally been maintained by successive governments until recently. However, in 1986 it was decided that, although the principle remains valid, the limit can be breached in practice even though attempts would be made to keep within the norm. It was thought that the FY 1987 budget, of 3.517 trillion yen, would exceed 1 per cent of the forecasted GNP. The Japanese defence White Paper, *Defense of Japan 1987*, predicted that the military burden would be 1.004 per cent of GNP. However, actual expenditure was slightly lower (3.455 trillion yen) and GNP growth was higher than anticipated; hence the burden was of the order of 0.985 per cent.⁷² It should be noted that SIPRI provides the ratio of defence spending as a share of GDP and not GNP. The latter has been higher for Japan compared with the former. Hence the SIPRI estimates of military burden (see table 5A.3) show that the 1 per cent limit may already have been exceeded even though, strictly in terms of the Japanese definition, this is not the case.

The current defence budget for FY 1988, which commenced on 1 April 1988, allocates 3.7 trillion yen. The growth of defence spending of 5.2 per cent is higher than that of the total budgeted central government expenditure.⁷³ It is also thought that military spending as a proportion of GNP will be about 1.013 per cent; hence the inevitable question of the so-called 'limit' has surfaced once again.

In a sense, concentrating attention on this limit obfuscates rather than clarifies the central issues surrounding Japanese defence expenditure, the country's military capability as well as the implications for regional and international security relations. A much more important indicator is the absolute amount of spending. In terms of current values, and the strong yen exchange-rate with respect to the US dollar, Japan was in 1988 among the world's top six military spenders. More significantly, indications are that there will be even higher expenditures in the near future as the Government strives to fulfil its five-year defence plan.

The plan,⁷⁴ formulated in 1985, has allocated a sum of 18.5 trillion yen (in constant 1985 prices) for the five-year period FYs 1986–90. The expenditure pattern of the first three years (1986–88) are already known; for the next fiscal year the Defense Agency has requested an increase in the budget of around 6.1

per cent. Using these figures, and assuming an expected rate of inflation, it can be estimated that military expenditure in 1990 could be over 4 trillion yen (see table 5.8). At current exchange-rates this amounts to over \$32 billion. If, as anticipated by some sources, the dollar slides strongly, then Japanese defence spending could be at the level of \$40 billion in 1990. By these standards, Japan could become the world's third highest military spender, ranking below only the USA and the USSR, and outstripping the UK, France and the FRG. Even though the strength of the yen, with respect to the dollar, makes these dollar figures exceptionally large, the growth rate of real military expenditure has been much higher for Japan than for the other medium-sized powers.

In terms of military capability also, Japan seems to be making steady advances. This is particularly true for its Maritime Self Defense Forces, not surprising given its geographical position. Japan's naval forces include more than 50 major surface warships;⁷⁵ the plans to equip two destroyers (constructed by domestic industry) with the Aegis shipborne air defence system (purchased from the United States) will further increase the naval capability.⁷⁶ Recent reports have suggested that Japan might be contemplating building its first aircraft-carrier, although this is still a politically sensitive issue domestically.⁷⁷

The catapulting of Japan into the top echelon of defence spenders has raised the nascent fear of militarization that bedevils South-East Asia and the Pacific region, given the unhappy experiences of World War II. China has already openly voiced its concern, and other countries in the region could be quietly apprehensive.⁷⁸ But military expenditure should be considered separately from militarization *per se*. The rapid growth of the former is neither a necessary nor sufficient condition for the existence of the latter. It is still early to predict that militarization is on the rise in Japan.

In spite of the high growth rate of real (inflation-adjusted) military expenditure (see table 5.8), there is much other evidence that 'pacifism' and self-defence, rather than aggression, are the central motivating forces behind Japan's international security relations. It steadfastly refuses to participate in security assistance programmes and overseas military activities; witness the unwillingness to police the Gulf even though its economic life depends on oil flows. Until recently the country was not even a member of the United Nations

Table 5.8. Current and forecasted military expenditure for Japan, FYs 1986-90

Figures are in b. yen; years are fiscal years.

	1986	1987	1988 ^a	1989 ^a	1990 ^a
Military expenditure (current prices)	3338	3517	3700	3922	4142
Military expenditure (constant 1985 prices)	3318	3493	3660	3864	4065
Growth rate (percentage)		5.3	4.8	5.6	5.2
Exchange-rate (yen per US \$)	168.5	144.6	125	120	120
Military expenditure (in b. current US \$)	19.8	24	29.6	32.7	34.5

^a Data for 1988-90 are forecasts, except for current-price military expenditure for 1988.

Sources: *Defense of Japan 1987*; author's estimates.

peace-keeping forces; its first contribution of military personnel was for Afghanistan.⁷⁹

Japan has also demonstrated, through its actions, that military and economic security cannot be delinked. It compensates for its lack of foreign military involvement and help by providing large quantities of economic and humanitarian aid. It is currently the second largest aid donor in the world and by the next decade could outstrip the United States as the world's foremost donor. In June the Cabinet approved a plan whereby official development assistance could rise to \$50 billion during 1988–92; this is double the amount being spent in the current phase of 1983–88. In addition, the 1988 Toronto summit meeting saw the most innovative proposal on debt reductions and forgiveness for the poorest countries in the developing world coming from Prime Minister Takeshita.⁸⁰

Japan is an industrial giant, but its arms production is an insignificant portion of total manufacturing output; in 1985 (the latest year for which data are available) weapon output was only 0.05 per cent of total manufactures. Even large corporations, dependent on defence contracts, are generally unenthusiastic. One reason is that arms exports are negligible and the domestic market is not capable of providing sufficient profits. Also, companies like Mitsubishi Heavy Industries (MHI, the largest defence contractor) and Kawasaki Heavy Industries (KHI, the second largest contractor), which are heavily involved in weapon production, are also industrial giants in their respective civilian fields. Exposure to the arms market is generally low; MHI makes only 15 per cent of its total sales from the military; KHI has a corresponding ratio of 30 per cent, and this seems to be the highest of any Japanese company.⁸¹

In this context it should be stressed that the burden-sharing debate has also been extended to Japan, with considerable discussion in US circles as to how the Japanese can best contribute to their own security effort. According to the USA, three key functions, in terms of self-reliant military effort, need to be fulfilled: protection of the Japanese archipelago from invasion *without* US assistance; protection of the sea lanes of communication (SLOC) up to 1000 nautical miles (1850 km); and finally, the closing of the straits, during war, to hinder the Soviet fleet from moving out into the Pacific Ocean. The US House Burdensharing Panel was sceptical about the willingness or the ability of Japan to perform these functions.

As regards the economics of burden sharing, Japan spends almost 10 per cent of its defence budget on US bases; the total in 1988 is approaching \$3 billion.⁸² According to domestic sources, the expenditure per US serviceman is of the order of \$45 000; however, this number is strongly contested by US congressional sources who claim that it includes 'non-outlays' such as estimates of rental and user cost of land supplied free to the USA.⁸³ In addition, as mentioned above, the non-military aspects of security are important determinants of Japanese security perceptions; here Japan's contribution is high and significant.

In a sense Japanese security relations with the rest of the world are a curious mixture of ambivalent and sometimes contradictory attitudes. First, there is a conceptual issue of what exactly 'security' means and how military and

non-military factors should interact. The Japanese believe that their economic might may be a useful *substitute* for military power, towards global stability, provided the USA buttresses them militarily. Congressional statements are divided: they range from urging Japan to drop its self-imposed limit on the defence burden (and spending much more on the military) to targeting increased economic aid to Western allies. But it is difficult to see how both can be feasible.

Second, there could be a contradiction between domestic and foreign points of view. The politicization of foreign aid is one case in question. Official development assistance policy has been based on economic self-interest and humanitarian concerns. Helping US allies in the Middle East or giving much more aid to the Philippines does not necessarily fit squarely with that philosophy; yet that is what the United States wants.

Finally, there is the potential for controversy between US interests and those of the other nations in the region. The former would like the Japanese military capability to rise; the latter are tense about Japanese militarism and its allegedly threatening implications. How these can be reconciled is yet to be seen.

North and South Korea

The complex web of military, strategic, political, social and economic factors that constitute security are nowhere more evident than in the two Korean states. In recent history, four major powers—the United States, the Soviet Union, China and Japan—have been militarily involved on the Korean peninsula. The division of Korea is still mentally unacceptable to the people, even though geopolitical reality dictates that it must continue in the foreseeable future.

More important than the geographical division is the ideological gulf that separates the countries. North Korea, ruled by an authoritarian regime, has a strong economy but one which seems to have lost its dynamism, has high military expenditures (relative to its national product), pursues an inward-looking strategy of development and preserves a tightrope neutrality with its two biggest supporters—the Soviet Union and China. South Korea has recently emerged from its own authoritarian rule and is trying to evolve as a young democracy. Student and labour unrest, caused by demands for greater freedom and less repressive labour laws, creates difficulties for internal security. With high growth rates, an outward-looking economic strategy, a dynamic export sector and rising real incomes, the health of the economy is assured. Military expenditure and the defence burden are high and growing. Relations with the United States, its principal ally, are a curious mixture of co-operation and confrontation. Military relations are cordial but economic (trade) relations remain a bone of contention.

Much more so than any other country in the region, the two Korean states come closest to a European 'model' of security perception.⁸⁴ More specifically, it looks relatively similar to the two German states and their recent historical experience. The existence of a clearly demarcated dividing-line between the

opposite blocs; the distrust arising from division coupled with the unfulfilled dreams of unification; the presence of military forces with clearly defined functions under an integrated command; foreign troops and their basing facilities creating a bone of contention at various levels; irritation with the main allies at the entwined nature of security with economic factors, such as trade imbalance or foreign aid, causing frictions—these are all familiar features in the European context yet uncommon in this region.

South Korea's relations with the United States are multi-dimensional. 1988 again saw relatively violent student demonstrations and other signs of anti-Americanism. This was linked with strident calls for reunification with the North during the year. Overall, however, military relations at the government level are cordial since there is a clear understanding about the mutually beneficial advantages that both countries have. South Korea's defence burden is high; yet the new cost-sharing rules, agreed to in 1988, increase the Korean contribution to the combined defence projects (infrastructural programmes) from \$34 million to \$40 million from 1989. It is estimated that the Government provides about \$1.91 billion for the basing facilities while the USA spends about \$3 billion for the bases.⁸⁵ The burden sharing remains equitable.

The real controversy, which is bound to become more fierce with time, relates to trade and the allegedly 'unfair' advantages that the low-cost economies possess. Although there is little backing in economic theory or political judgement regarding the US position, it is clear that populist pressures will dictate a hardening of positions. South Korea's trade surplus with the United States is around \$10 billion; on the other hand, about 20 per cent of the aggregate trade deficit of the United States is with the Asian newly industrialized countries. The USA has threatened to remove Korea from the group of countries eligible for tariff exemptions under the Generalized System of Preferences; this will hurt exports which will be subject to controls. There is growing pressure to increase the value of the currency, the won, with respect to the dollar so that US goods can become cheaper. There is also arm-twisting about opening up domestic markets in Korea and allowing more US goods to come in without protectionism.

As South Korea becomes similar to Japan, economically strong but still requiring the military help of its superpower ally to counter the alleged threat from North Korea, bilateral relations will tend to be problematic. This can only create resentment and domestic political repercussions. The best option for the Government, within the general framework of international *détente*, would be to patch up relations with its neighbour. There are some signs that North Korea is serious about its declared intention to normalize relations. In 1987 it announced a unilateral force reduction of 100 000 men as a gesture of confidence building; this was completed by the beginning of 1988. It has also made proposals for creating a zone of peace in the demilitarized zone dividing the country and sundry other measures for mutual disarmament. The catch, from the South's point of view, is the demand for the removal of US bases which is not acceptable to either ally.

Although North Korea has made significant strides in industrialization, its overall economic performance is weaker. Until the mid-1970s the North

probably had a slightly higher per capita income; but it grew very slowly afterwards while the South achieved its economic 'miracle'. Today, North Korea has an average income which is possibly half that of its southern neighbour; with a population which is also half as large, the total GDP is probably only one-quarter of that of South Korea. With a much lower national income, and military expenditures at similar levels, the defence burden is much higher. Therefore, it cannot afford to spend as much as it does, given the weak economic base and the adverse effects of the reallocation of resources. Estimates of capabilities and force structures tend to show that North Korea is superior to the South, although the latter is catching up. According to a local analyst, the former started its arms buildup in 1964 while the latter followed 12 years later; hence there has been an asymmetric arms race.⁸⁶

Both countries are significant arms producers by Third World standards. For South Korea this was necessary after the soul searching consequent to the US withdrawal from Viet Nam and the desire for more self-sufficiency from its superpower ally. In addition, it could build on its rapidly expanding industrial base. For North Korea, domestic production of weapons is a part of an overall economic philosophy which stresses self-reliant development. But given the limited nature of the domestic markets and the difficulties of small-scale production, both have turned to export markets; the North has been much more active, given its greater need for foreign exchange and its isolation from the world community. In spite of domestic production, however, major force modernizations are dependent on foreign arms, and both the USSR and the USA have been large-scale suppliers. The South, in addition, enjoys a nuclear deterrent protection which the other country does not have.

SIPRI reports the North Korean budget estimate of military spending. According to some sources this is probably a low estimate. Actual North Korean military spending could be about double the reported figure. Then the share of defence in national output would be around 20 per cent, an unacceptably high figure from the point of view of economic development. It is in the interest of the North to follow through arms control measures by dialogue. Both countries realize that all the major powers would probably favour a status quo with the 'two Koreas' as a permanent feature. Nevertheless, incipient reunification will also be present as a national aspiration. In this context it is heartening that President Roh has claimed that the South will renounce its policy of isolating the North from international economic forums and trade channels; this would be helpful in not only reducing tension but also fostering socio-economic growth without which no true security will emerge in the divided peninsula.

VI. The Third World

Conflict resolution

The eight-year-old Iraq-Iran War formally ended in 1988. Regardless of how it is viewed, this war has been expensive and the costs are excessive even for two of the richest Third World nations. No analysis of human, social and economic

costs can be accurate given the prolonged nature, secrecy, difficulties of verification of information and economic disruption of the armed conflict. Estimates suggest one and one-half million dead and an equivalent number as refugees from the war zone. There are no figures for the number of war veterans or those crippled by this war. The opportunity costs of the war, that is, the amount of investment, consumption and economic growth that would have been possible in its absence, could be exceedingly high. The Speaker of the Majlis, Hashemi Rafsanjani, indicated this clearly in 1985: 'If we had spent the budget allocation of four and a half years of the imposed war, that is 4000 to 5000 billion rials (\$43.4–\$54.3 billion) on industry, today we would be one of the most powerful countries in the world'.⁸⁷

According to SIPRI estimates, the belligerents, taken together, may have spent \$170–200 billion for military activities, excluding arms imports. These are financial costs associated with the domestic military input to the war effort, but they leave out war damages as well as human costs. The information sheet prepared by SIPRI in August 1988, 'The Iraq–Iran War 1980–1988: Military Costs and Arms Transfers',⁸⁸ provides more detailed data on the breakdown of the above numbers.

The extent of war damage is as yet simply impossible to calculate. Some estimates state figures such as \$500 billion for the amount that the two countries need to rebuild their infrastructure and productive systems. Losses in productive facilities in the oil sector were probably less than feared since the combatants resisted crippling each other's principal source of revenues for the war. However, the absolute numbers are high. The Iranian Government has claimed damages worth \$160 billion, up until 1985,⁸⁹ in the oil industry alone. Therefore, the total war period losses in the oil sector alone could be around \$250 billion. Information from Iraq is much more scarce but there is no reason to suppose that the situation there was very different.

The governments have also had to compensate the families of the dead. For Iran this is a sacred obligation since the deceased are *Shaheeds* (martyrs) in a holy war; but for Iraq also, domestic dissatisfaction would have been unbearable if compensation was not high. Again Iranian data are more forthcoming; the families received 2 million rials (about \$30 000) each which, considering the large numbers of war dead, could rise to a very large sum.

An indication of the costs for Iraq is the extent of its international indebtedness: it is now one of the largest debtors, having started the war as one of the richest nations in the Third World. In 1977, much before the second oil price rise of 1979 and the improvement in its financial position at the beginning of the war, official estimates show that Iraq had foreign reserves of around \$6.7 billion. At the beginning of this decade, the country's foreign reserves were thought to be \$20 billion.⁹⁰ Today it is a major debtor; some estimates of its foreign debt give a figure of \$75 billion.⁹¹

To put the cost figures in perspective they can be compared with the oil revenues that Iran and Iraq consider as their economic life-blood. Estimates show that the total historical earnings from oil for both the countries taken together, from the first oil exports in 1919 for Iran and 1931 for Iraq up until the end of the war, would be worth around \$400 billion.⁹² If the total cost of the war

including military expenditures, war damage, other payments and arms imports are all added up, then there is no doubt that it far exceeds all the oil revenues that the combatants ever earned.

It is difficult to predict defence spending trends in Iran and Iraq for the future given the volatility of the countries concerned. But the high expenses already incurred for the war suggest that domestic military expenditure will probably fall in real terms, even though arms imports may rise as the erstwhile combatants try to replenish their inventories. One disturbing off-shoot of the war has been the increase in domestic arms production, particularly by Iran. Officials have claimed that Iran produces 70–80 per cent of all its ammunition needs; it is self-sufficient in bullets and mortar shells; produces anti-tank missiles and is on its way to manufacturing sophisticated missile technology in the form of surface-to-air missiles (SAMs) and Scud surface-to-surface missiles (SSMs).⁹³ This would enhance the capabilities of the combatants to fight limited but long drawn-out wars of attrition without worrying about embargoes.

One of the vital elements of the regional peace process is the presence of the United Nations peace-keeping forces (the UNIIMOG, UN Iran–Iraq Military Observers Group). In addition to land-based troops the Group may have, for the first time, a naval peace-keeping presence in the Gulf.⁹⁴ Without these ground forces (408 military personnel supplied by 26 countries) it would be impossible to monitor and maintain peace. Yet for the financially impoverished United Nations it has not been easy to provide funding for such operations.⁹⁵ The actual budgeted spending, particularly in relation to the astronomical costs of the war itself, is small. Between 9 August 1988 and 8 February 1989 (when the current mandate is expected to be renewed for another 6–12 months) the total spending for the peace-keeping operation in this area will be \$54 million.⁹⁶ If this sum is compared with the military expenditure figure given above for the combatants, the cost of peace as a proportion of the cost of the war comes to about 0.03 per cent—a truly insignificant amount. If all war costs are considered, then this proportion will become even more trivial. All member countries must realize that with such minute financial contributions they may be able to avoid the massive costs of a new conflict.

The beginning of the Soviet troop withdrawal from Afghanistan marks the end of a phase in that wretched country's recent history but may not bring true peace very much nearer. Soviet forces started moving out in May 1988 but by August the withdrawal was temporarily halted; since then it has resumed again.⁹⁷ The deadline is 15 February 1989. The costs of the war, to the Soviet Union, have been high although few financial figures are available. President Gorbachev himself indicated the potential cost when he said, while discussing the Soviet Government budget deficit, that 'we are sustaining heavy losses as a result of the situation in Afghanistan'.⁹⁸ Official casualty figures give 13 310 soldiers dead, 35 478 wounded and 311 missing as of 15 May 1988.⁹⁹ Both the Najibullah regime and the various Mujahideen groups are committed to keep the conflict going aided and abetted by the superpowers' arms supplies.

Afghanistan, one of the most impoverished countries in the world, is now in ruin. Over one million people are reported to have died. There are about five million refugees (about one-third of the total population at the start of the

hostilities) in Pakistan and Iran, and few had returned by the end of 1988. The cost of bringing the refugees back and their rehabilitation could cost around \$500 million. At least \$1 billion will be required for reconstructing the war-damaged country but actual figures could be much higher.¹⁰⁰ Per capita income for 1986 is estimated to be around \$166.¹⁰¹ This places it among the eight poorest countries in the world. The socio-economic situation is obviously much worse than in the case of Iran and Iraq since the Government has neither the means nor the ability to provide help to its people.

Primary open sources have failed to provide any reasonably reliable data on Afghan military expenditure. SIPRI does not publish budgetary data since it is difficult to ascertain the extent of defence-related spending. However, Soviet foreign aid must have been a major determinant of military expenditures and weapon procurement; hence the actual government budgetary allocations could have been commensurately low relative to the intensity of the war.

The debt crisis

The international ramifications of the debt crisis are now well known. Since the early 1980s, when Mexico failed to meet its debt-servicing obligation, the problem has passed through two phases; a third phase is now beginning to unfold. Between 1982 and the mid-1980s there was the possibility that a major country debtor would default or refuse to pay interest or capital. The default by a sovereign nation, the so-called sovereign risk factor, could cause a serious domino effect whereby the international banking system would be badly affected and could even collapse. New lending, rescheduling and government intervention from the lending countries through the provision of public loans as a substitute for private sector loans effectively averted the problem. The second phase saw a consolidation of the banking sector; new schemes, including partial write-offs of old loans, selling off debts at discounted prices, swapping equity for debt, building up reserves against defaults, threats against non-payments, and so on, made the lending institutions much stronger. This phase also saw a remarkable turn-around in the developing countries' exports and an improvement in their trading positions which allowed them to meet their debt obligations. The carrot-and-stick policy pursued by major developed countries and the International Monetary Fund (IMF) also helped; this included promises of new loans and threats of blocking credits for normal trade. Even countries such as Brazil, which declared a moratorium on its debt payment in 1987, have tamely returned to the fold with promises of good behaviour.

In spite of the hazardous nature of predictions in this field, it is possible to claim that the debt crisis for the international financial system is probably over.¹⁰² But the incredible damage done to Third World indebted countries, particularly in Africa and Latin America, in attempting to meet the burden of debt payment is now very serious. The third phase will be characterized by major social, political and economic difficulties for these nations. For them the issue is not one of the stock of debt per se. Rather it is the constraints imposed on their societies as they meet the obligations arising out of the flow of *debt*

service; how to earn enough foreign exchange to pay the *interests* that have accrued. The net transfer of resources is now going from the Third World to the richer nations. Between 1982 and 1987, Latin America paid back \$147 billion more than it actually received. This is the extent of the debt trap. As an eminent economist recently said: 'For most countries, the problem is how to pay interest, not whether debt is rising or falling. That means, you want a solution that attacks the interest problem, not the debt problem'.¹⁰³

The total volume of external debt that a country has is not strictly relevant in considering whether it has a 'problem' or not. All countries, at certain stages of development, borrow from abroad to pay for investment and imports. It is worthwhile to remember that the first historical example of the debt crisis was the default by the American states in the mid-19th century of their overseas loans. Difficulties arise when exports or income are not sufficient to meet the obligations incurred by the residents and governments of the country concerned. In 1985, South Korea and India had total external debts of \$48 billion and \$35.5 billion, respectively; Nigeria and Peru had debts of \$18.4 billion and \$13.7 billion, respectively.¹⁰⁴ Yet the latter two countries are among those considered as 'heavily indebted' while the former remain unscathed. It really boils down to the capability of the country to meet its debt-servicing obligations, the most important of which is interest payments.

Table 5.9 shows, for different regional and functional categories, the amount of outstanding debt and annual debt-service payments; both the totals and shares in exports are given. Figures for 1982 and 1988 are provided for comparative purposes. The 15 'most heavily indebted countries' are those with the worst difficulties in terms of structural adjustments and ability to pay. These were the middle-income countries which were targeted for special attention by the US Treasury Secretary in 1985 in the Baker Plan. These are the following: Argentina, Bolivia, Brazil, Chile, Colombia, Côte d'Ivoire, Ecuador, Mexico, Morocco, Nigeria, Peru, the Philippines, Uruguay, Venezuela and Yugoslavia.¹⁰⁵ Overall, the worsening situation is exemplified by the trend over this period.

How does the so-called 'interest problem' affect these countries, and what effect does it have on their security? The principal point to note is that most of the foreign debt is now owed by the public sector or the government. Therefore it is the government which has to pay for the debt service and face up to the interest problem. In spite of brave words to the contrary about refusing to pay, almost all Third World governments have been brought to their heels by the international financial system, which includes the IMF, the World Bank and the banking community, with support from the governments of industrialized countries. Obligations are being met even though the domestic costs are insupportable; in extremely sensitive political cases, such as recently for Mexico, the US Government has also helped out but only its closest friends. The effects of the governments taking responsibility for the foreign debt are crucial in the analysis.

If the government has to pay the additional burden arising out of foreign debt, then it must either cut down on its expenditure, increase its income, or run a budget deficit which needs to be financed; combinations are also possible

Table 5.9. Third World debt, 1982 and 1988

Figures are in b. US\$; bracketed figures are shares in exports.

Country groups	1982	1988
Total external debt		
All LDCs ^a	841.4 (119.1)	1243.5 (145.7)
Africa	123.2 (155.2)	196.6 (243.7)
Western hemisphere	330.2 (271.4)	413.8 (309.5)
15 most heavily indebted countries ^b	380.1 (267.8)	484.4 (308.3)
Sub-Saharan Africa	54.8 (216.5)	99.5 (324.9)
Debt service		
All LDCs ^a	134.8	164.7
Africa	16.8 (21.2)	21.1 (26.2)
Western hemisphere	62.8 (51.6)	57.2 (42.8)
15 most heavily indebted countries ^b	43.8 (30.9)	41 (26.1)
Sub-Saharan Africa	2.6 (10.4)	3.6 (11.8)

^a LDC: less developed country.^b See the facing page for the list of countries.Sources: International Monetary Fund, *World Economic Outlook*, Oct. 1988.

but the extreme cases can be understood better. The various ways in which these options are utilized explain clearly the individual problems of many Third World countries.

In a sense the theoretically optimum way to pay interest and debt service is through cutting government expenditure elsewhere. This is the favoured position of the watchdogs, the IMF and the World Bank. In reality this option creates insuperable difficulties whose reverberations are felt in numerous and unlikely places. One quick way of cutting down on budgetary spending is to reduce military expenditure, but this creates grave dissatisfaction among the armed forces, particularly in the lower ranks. The result may even be a military coup. The army revolts in Argentina¹⁰⁶ show that the new democracies are particularly vulnerable here. President Alfonsín's Government has managed to hold its own, but the future does not look too bright for democracy there.

Alternatively, cuts would have to be made and resources gleaned from civilian budgets: on housing, education, health, infrastructure and investment. The adverse consequences for society are clear enough. Populations of most of the poorer countries, particularly in Africa, are solely dependent on the government to provide these public goods; in the absence of such provision their prospects for a better quality of life would simply disappear. The choice is clearly political: whether to buy guns for the army or food for the famine-stricken people; whether to pay for interest on debt or medicine for the

sick and shelter for the homeless. The decision is based on the ideology of the regime and the pressure imposed by foreign powers, but the economic constraints become crucial since resources are so limited. Hence, some segments of the population have to suffer badly, and this creates socio-economic conflict which leads to changes in the regime and further militarization. The final outcome is instability and possibly military conflicts.

The combination of high debt service and military expenditure is potentially devastating for the economy because of its budgetary consequences. Pakistan's new democratic government, under Prime Minister Benazir Bhutto, may quickly come up against the constraints imposed by this legacy of past military rule. In the 1987-88 budget,¹⁰⁷ central government revenue from taxation and non-tax sources amounted to 105 billion rupees (the rest of the total revenues came from borrowing and foreign aid). On the other hand, defence spending and debt service cost the exchequer 88 billion rupees. Thus the cost of debt and the military amounted to an incredible 84 per cent of earned government revenue. The total development budget—for education, health, roads, infrastructure, public investment and so forth—has to be financed by domestic borrowing and foreign grants. Ironically, many of these debt-related problems were inherited from previous authoritarian regimes; but earlier profligacy by the military has to be paid later on by the nation and its democratic institutions. Pakistan, the Philippines and the Western hemisphere's new democracies all have these difficulties.

Particularly in Latin America, the mid-1980s have seen a wave of democratization as military governments in country after country have given way to civilian rule. Argentina, Bolivia, Brazil, Colombia and now possibly Chile (after the plebiscite defeat of Pinochet) are being governed by civilian governments. But the analysis, conducted above, shows that the future may not be as hopeful as expected.

The second option, attempts to increase more revenues, is also problematic. Where the government controls or owns a major exporting sector such as minerals, its economic fortunes depend on the world market price of that commodity. Chile is the successful example where the increase in international metal prices have meant that the government has earned huge revenues from copper exports. Part of this foreign exchange has been passed directly to the military for their weapon procurement programme. On the other hand countries such as Venezuela, Mexico and Nigeria have seen oil prices collapse and hence are faced with catastrophic problems in paying their debts. The other alternative, that of increasing taxes, is difficult to implement, often inequitable or opposed by vested interests. In any case the tax base is low in Third World countries and little help is available here.

African governments have in recent years liberalized their economies, allowed more foreign trade and relaxed controls, and have followed orthodox economic measures to acquire more foreign exchange revenues.¹⁰⁸ One method has been to encourage cash crops rather than food growing since the former can be exported more easily and fetch better prices on world markets. But when commodity prices crashed in the early and mid-1980s this policy became counter-productive. Much more important is the fact that, when there were

food shortages, the previous subsistence economy worked reasonably well; but if the farmers are growing coffee and not wheat when there is a shortage of wheat and the price of coffee has fallen, then the inevitable consequence is food shortage and famines. Once again, the scramble to earn foreign exchange to pay off debt interest may have an indirect bearing on famines in Africa.

Finally, looking at the third option, the deficits are financed by money creation, and this creates the problems of hyper-inflation. In 1988 Latin America saw a wave of surging inflation in one country after another.¹⁰⁹ Argentina, Brazil and Peru currently have inflation rates of over 1000 per cent per year. As before, this situation engenders dissatisfaction and facilitates military take-overs. More important, it casts aspersions on the organizational ability of civilian governments to look after the country; the military stands to look more 'efficient'. Legitimacy becomes eroded and democratic measures suffer.

Hyper-inflation seems to have affected major countries of Latin America in 1988. It is thought that Argentina, Brazil, Ecuador and Peru are facing the highest levels of inflation ever. Success stories such as that of Bolivia, which reduced its inflation rate from over 20 000 per cent per annum to about 15 per cent, are rare.¹¹⁰ It has been increasingly difficult to estimate current military expenditures for 1988 since budgetary funding becomes meaningless in the face of such astronomical price rises. Except for Brazil, where force modernization has increased military spending,¹¹¹ although the budget requests of the military have been pruned substantially, the regional total shows a real (inflation-adjusted) decline from 1987. The trend is a hopeful sign.¹¹² This is as much an effect of the government assuming responsibility for the debt, discussed above, as that of political will of the democratic establishment. Another ray of hope is the growing democratization of Latin America, with even long-standing military figures leaving government power. However, as discussed above, the system is still fragile and one cannot confidently forecast the future of democracy and the military expenditure process in the troubled continent or in the Third World in general.¹¹³

VII. Conclusion

Both military expenditure, for the major powers, and militarization, in the Third World, are on the decline. Structural reasons related to technological and economic factors are as important as those related to political dynamics. Disarmament, deficits, dollars, development and debt all interrelate with politics, personalities, passion and policy to produce a complex set of causes and effects. Whether these features of non-increasing defence spending, arms control and possible disarmament will be long-term or not is difficult to predict. Nevertheless, the constraints imposed by technology and economics are strong enough to make ever increasing military expenditure a very difficult proposition indeed. Conflicts, in their many forms, remain; possibly among allies both in the West and in the East, and certainly in the Third World. However, there is some hope that both political and structural factors have coalesced at the same moment to continue the impetus towards controlling the military expenditure process.

Notes and references

The assistance of Somnath Sen in the preparation of the tables in this chapter is gratefully acknowledged.

¹ The first version was called the Balanced Budget and Emergency Deficit Control Act. After being declared unconstitutional, the new version was called the Balanced Budget and Emergency Deficit Reduction Reaffirmation Act. The main difference is that, in the former, expenditure cuts would come into operation on the basis of the economic forecasts by the Congressional Budget Office (CBO); the latter stipulates that the relevant forecasts are those by the Office of Management and Budget (OMB), a part of the Administration. It should be noted that the OMB forecasts have generally been more optimistic about future trends and have allowed the government more room to manoeuvre in its expenditure programmes. See *The Economist*, 24–30 Sep. 1988, which also provides a perceptive survey of the US and the world economy.

² For budgetary details, see *International Herald Tribune*, 20–21 Feb. 1988. The Stealth bomber was first put on show in Nov. 1988. Its unit price is expected to be over one-half billion dollars, the most expensive aircraft ever made, but it was also announced that full-scale production may be postponed for another three years or more. See *The Guardian*, 20 Dec. 1988.

³ *Congressional Quarterly*, 6 Aug. 1988, p. 2143. See also *International Herald Tribune*, 12 Aug. 1988.

⁴ *Congressional Quarterly*, 30 July 1988, p. 2091. The quotation is from Representative Jerry Lewis, Chairman of the House Republican Policy Committee.

⁵ *Defense News*, vol. 3, no. 25 (20 June 1988), p. 1. An audit by the DOD revealed that between July 1984 and Sep. 1987 industrial suppliers had overcharged the Pentagon by \$789 million; *Financial Times*, 10 Aug. 1988. The scale of corruption has also led to more self-regulatory controls in the fear that the Government may intervene more actively than it has hitherto done. On the self-regulation of Pentagon industrial contractors, see *Defense News*, vol. 3, no. 30 (1988), p. 4. The President's Commission on Defense Management, known as the Packard Commission after its Chairman, David Packard, has suggested the setting up of a Defense Industry Initiative on Business Ethics and Conduct which will be the core of self-regulatory practices to discourage corruption.

⁶ *Congressional Quarterly*, 28 May 1988, p. 1439.

⁷ *International Herald Tribune*, 13 Dec. 1988.

⁸ Kennedy, P., *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000* (Random House: New York, 1987).

⁹ For a theoretical and policy analysis of the impact of the overvaluation of the dollar, see Dornbusch, R., *Dollars, Debts and Deficits* (MIT Press: Cambridge, Mass., 1986). Professor Dornbusch's ideas follow mainstream open-economy macro-economics, and this is a brief summary of the concepts. A more radical version of the implications of the twin deficits, though following from the 19th century English economist David Ricardo, is that by Professor Robert Barro. He argues that the two deficits are not related; hence cutting the budget will not necessarily improve the trade balance. For a general summary of his work, see Barro, R., 'The Ricardian Approach to Budget Deficits', NBER working paper, 2685; a non-technical review appears in *The Economist*, 10 Dec. 1988.

¹⁰ A wide-ranging review of the social and economic impact of the whole Reagan Administration can be found in Rothschild, E., 'The real Reagan economy', *New York Review*, 31 June 1988; and 'The Reagan economic legacy', *New York Review*, 21 July 1988. In particular, the contrast between booming employment creation and rising social deprivation is emphasized.

¹¹ The estimates are by John H. Makin, of the American Enterprise Institute; see note 2. It seems surprising that, when entitlement expenditures are high, it is also a reflection of poverty and inequality in US society. This is because the Government is constitutionally obliged to provide minimum entitlement relief; when this is high, the implication is that there are more poor people who have to be provided a very minimum standard of living (through income supplements) and health facilities. Sivard, R. L., *World Military and Social Expenditure 1987–88* (World Priorities: Washington, DC, 1987) provides strong evidence on the adverse social impact of the Reagan Administration policies: in 1987 demand for emergency shelter and food rose by 20 per cent; the minimum wage has dropped in real terms since 1981 so that currently a full-time job at the minimum wage gives an annual income which is \$2000 less than the poverty line for a family of three; welfare benefits in 1987, for mothers and children in poverty, were 11 per cent less in real value compared with the level 10 years ago. There is also the related question as to whether it was these entitlement expenditures (and other non-military spending) which caused the budget deficit to rise rather than the defence budget expansion and the cut in taxes. The former view has been

echoed by the White House as well as in the Bush campaign, but this is not substantiated by the facts. As a percentage of GNP, revenues currently amount to 19.2 per cent; if the Reagan-era *increases* in interest payment (owing to the expanding national debt) and defence spending are removed, then total expenditure would amount to almost the same percentage (19.6 per cent) of GNP. The *additional* spending, over and above the *trend*, on these two items, defence and interest, is almost exactly equal to the aggregate deficit. It is now forecast that the amount of interest currently payable by the Treasury is about to exceed the total budget deficit of around \$150 billion a year; *International Herald Tribune*, 11 Oct. 1988.

¹² The Defense Secretary in the Reagan Administration, Frank Carlucci, said in 1988: 'Not since the Manhattan Project have we seen a programme cloaked in such secrecy and with such enormous potential to guarantee the security of our nation'; *Jane's Defence Weekly*, 19 Nov. 1988, p. 1266.

¹³ *National Defense Budget Estimates for FY 1988/1989*, Office of the Assistant Secretary of Defense (Comptroller), Washington, DC, 1988.

¹⁴ See the discussion on the defence priorities by the Bush team in *Aviation Week & Space Technology*, 19 Dec. 1988, p. 20.

¹⁵ For the general principles and basic policies of the new Bush Administration, see *International Herald Tribune*, 10 Nov. 1988. For an overall evaluation of the problems of the US and the world economy, see the editorial 'The US and the world economy: challenges,' *Financial Times*, 17 Oct. 1988. One of the interesting twists to the story of the future defence policy is the nomination of Senator John Tower as the new Defense Secretary; *The Guardian*, 17 Dec. 1988. As Chairman of the Senate Armed Services Committee, he was partly responsible for passing the early large-scale Reagan defence budgets; now he may have to preside over equivalent cuts. It should also be appreciated that it will not be simple to reduce the amount of spending, whoever is in power.

¹⁶ The CBO has estimated that weapon programmes already planned and approved for the next five years would need a 4 per cent annual increase in military spending above inflation. The CBO estimates also suggest that to maintain current weapon acquisition programmes, military spending needs to go up by a further \$35 billion to \$50 billion annually, over and above the amount necessary to keep the inflation-adjusted level of the defence budget constant for the next five years; see *International Herald Tribune*, 22 Oct. 1988. Another estimate suggests that simply to keep defence budgets at constant real levels needs total cuts of \$300 billion (in the next five years) from currently projected outlays based on planned force structures; see Moodie, M., 'Bush's national security challenge', *Jane's Defence Weekly*, 19 Nov. 1988, p. 1273.

¹⁷ President Reagan's last formal budget, for FY 1990, was presented to Congress on 9 Jan. 1989; see *Congressional Quarterly*, 14 Jan. 1989, p. 67. Total budget authority on national defence rises (in current prices) from \$298.8 billion in FY 1989 to \$315.2 billion in FY 1990. This is an increase of 2 per cent, after allowing for projected inflation. The corresponding monetary increase in outlays is much smaller, from \$298.3 billion to \$303 billion; thus there is a fall in real terms for budgeted outlay. An analytical discussion on the FY 1990 budget of the USA can be found in *Financial Times*, 10 Jan. 1988.

¹⁸ During the campaign, Bush is reported to have said, 'Read my lips, no new taxes'; *The Guardian*, 7 Sep. 1988.

¹⁹ *The Economist* (note 1).

²⁰ McCartney, R. J., 'East, West agree on arms talks', *Guardian Weekly*, vol. 140, no. 4 (week ending 22 Jan. 1988). See also chapter 11 in this *Yearbook*.

²¹ Sandler, T., 'NATO burden-sharing: rules or reality', eds C. Schmidt and F. Blackaby, IEA and SIPRI, *Peace, Defence and Economic Analysis* (Macmillan: London, 1987).

²² Brzezinski, Z., reported in J. Barry, J. and R. Watson, 'Can Europe stand on its own feet?', *Newsweek*, 7 Dec. 1987, p. 32.

²³ For a recent exposition see Hunter, R. E., 'Will the United States remain a European power?', *Survival*, vol. 30, no. 3 (May/June 1988), pp. 201-31; a much more general historical perspective on related questions of imperial power can be found in Kennedy (note 8).

²⁴ Safire, W., 'The European pillar', *New York Times*, 7 Apr. 1988.

²⁵ Symptomatic of congressional concern at US cost escalations for European security needs is the bill proposed by Rep. Jack Davis which sought to penalize countries which do not compensate the USA when the dollar falls and it becomes more expensive to pay for overseas expenditures. Senate discussions on the FY 1989 defence budget also mentioned burden sharing; see *International Herald Tribune*, 12 Aug. 1988. The Senate wanted new restrictions on overseas spending; but more important, it mandated a special envoy to negotiate the issue with the Europeans.

²⁶ *Report of the Defense Burdensharing Panel of the Committee on Armed Services, US House of Representatives* (US Government Printing Office: Washington, DC, Aug. 1988).

²⁷ Maroni, A., 'Costs and benefits to the United States', in ed. J. Sharp, SIPRI, *Europe After American Withdrawal: Myth and Reality* (Oxford University Press: Oxford, forthcoming).

²⁸ The Euro-group was founded in 1968 to propagate and ensure that the European contribution to NATO is appropriate. This statement was published on its 20th anniversary. Quoted from NATO's *Sixteen Nations*, June 1988, p. 41.

²⁹ *Enhancing Alliance Collective Security; Shared Roles, Risks and Responsibility in the Alliance*, Report by NATO's Defence Planning Committee, Dec. 1988.

³⁰ Knorr, K., 'Burden sharing in NATO: aspects of US policy', *Orbis*, autumn 1985, p. 530.

³¹ See note 27.

³² All estimates have been made for FY 1988 forecasts as of Apr. 1988. The basic data are from the US Defense Budget (note 13).

³³ *The Force Structure of the Federal Republic of Germany: Analysis and Options*, Force Structure Commission of the Government of the FRG, Bonn, 1972/1973.

³⁴ The statement was made by Ambassador R. L. Ridgway, Assistant Secretary of State for European and Canadian Affairs, speaking before the House Armed Services Committee Defence Burdensharing Panel on 18 May 1988; *Foreign Operations, Export Financing, and Related Programs Appropriations for 1989*, Hearings, Committee on Appropriations House of Representatives, 100th Congress (US Government Printing Office: Washington, DC, 1988).

³⁵ Calculated from data in NATO Press Release, *Financial and Economic Data Relating to NATO Defence*, Dec. 1988. This is more than the amount stipulated in the West German defence budget since the definition for military expenditure is different from that used by NATO; for an analysis of the difference see FRG, *White Paper 1985, The Situation and the Development of the Federal Armed Forces*, Federal Minister of Defence, FRG.

³⁶ See NATO Press Release (note 35).

³⁷ See *Statement on the Defence Estimates 1988*, vol. 1 and 2, *British Defence White Paper*, Cmd 344-1 (Her Majesty's Stationery Office: London, 1988).

³⁸ See *Financial Times*, 18 May 1988, p. 9; and note 37.

³⁹ The 1988 Defence Estimates show that the planned provisions for the next two fiscal years, 1989-90 and 1990-91, are £19 950 million and £20 560 million. Therefore the postulated annual increases are of the order of 3.8 and 3.1 per cent. This is expected to be lower than the rate of inflation. Thus, even level funding may be difficult to maintain, and the final position might be a real reduction in the defence budget.

⁴⁰ The mid-year OECD Economic Outlook, reported in the *Financial Times*, 10 June 1988, shows that the UK will grow by 3.5 per cent in 1988 (after a growth rate of 4.5 per cent in 1987). The current growth rate is higher than for the OECD as a whole.

⁴¹ The main problem currently is the trade deficit, which is worsening rapidly as the consumption boom sucks in more and more imports. At the time of writing (Dec. 1988), the latest Oct. figure for the trade deficit (£2.43 billion) was the worst monthly figure in recorded history; see *International Herald Tribune*, 26-27 Nov. 1988.

⁴² *Statement by Mikhail S. Gorbachev, President of the Presidium of the Supreme Soviet of the USSR, at Plenary Meeting of the United Nations General Assembly*, 7 Dec. 1988. See also chapter 11 of this *Yearbook*.

⁴³ Dawydow, O., *Frankfurter Allgemeine Zeitung*, 6 Jan. 1989.

⁴⁴ Statement to members of the Diplomatic Academy, *Vestnik Ministerstva Inostrannykh Del SSSR*, no. 2 (1987) p. 31. This was quoted by Lynch, A., 'The restructuring of Soviet foreign policy', *Bulletin of the Atomic Scientists*, Mar. 1988.

⁴⁵ See the report on the speech in *Süddeutsche Zeitung*, 20 Jan. 1989; and the initial response by US officials in Wireless File, US Information Service, 19 Jan. 1989.

⁴⁶ For the force structure assessments see International Institute for Strategic Studies, *The Military Balance, 1988-1989* (IISS: London, 1988). Discussions on the economic implications of the arms reduction treaties are rare. One report claims that there will be a net saving of around 300 million roubles from intermediate-range missile reductions (see *International Herald Tribune*, 9 Sep. 1988). This is only 1.5 per cent of the official budget and therefore a negligible proportion of the actual total. However, the social implications of the re-allocation of such expenditures could be high. The 300 million-rouble saving is to be spent in the 'social sphere' specifically for housing construction; it is estimated that about 30 000-40 000 flats will be built with the money. For details as well as other examples of Soviet conversion, see Remisov, A., 'Disarmament treaties and conversion of military production in USSR', *Internazionale IDOC*, vol. 19, no. 5 (Sep.-Oct. 1988), p. 5.

⁴⁷ General Shabanov's comments are discussed in *International Herald Tribune*, 27 July 1988; and 'Soviet army chief reveals budget cuts', *The Guardian*, 28 July, p. 8. See also *Financial Times*, 25 and 26 Apr. 1988, for the CIA/DIA figure of 3 per cent military spending rise as well as a more

general discussion of Soviet economic stagnation in 1987 and the problems with the Gorbachev reforms.

⁴⁸ Interview, published in the section 'MN' Discussion Club, between Zbigniew Brzezinski and the New York correspondent of the journal *Moscow News Weekly*, no. 19 (1988), pp. 6-7.

⁴⁹ The Law of the Union of Soviet Socialist Republics on the State Budget of the USSR for 1989.

⁵⁰ See Tullberg, R. and Hagmeyer-Gaverus, G., 'SIPRI military expenditure data', in SIPRI, *SIPRI Yearbook 1988: World Armaments and Disarmament* (Oxford University Press: Oxford, 1988), chapter 6.

⁵¹ Peel, Q., 'Soviet press publishes military spending figures for the first time', *Financial Times*, 5 May 1988. A more general critique of data, this time of CIA data for the USSR, can be found in *International Herald Tribune*, 21-22 May 1988.

⁵² *The Guardian*, 8 Dec. 1988.

⁵³ Calculated from *Historical Tables, Budget of the United States Government Fiscal Year 1989* (US Government Printing Office: Washington, DC, 1987).

⁵⁴ A CIA report has claimed that the CIA estimate of the budget deficit for 1987 was equivalent to 7 per cent of Soviet gross national product; see Pear, R., 'US experts dubious on Soviet deficits', *International Herald Tribune*, 31 Oct. 1988.

⁵⁵ The Soviet Union of course has no fears, unlike a capitalist economy such as that of the USA, of the linkages between the budget and trade deficits; but the trade problem is of equal, though independent, importance. The USSR wishes to increase the imports of Western technology, as well as some consumption products and food, but may find it difficult to pay with enough hard currency. In the past it has eschewed international borrowing but recently this has been changing rapidly. Traditionally, oil, gas and raw materials have been major exports for dollars. In addition, arms exports were used vigorously, at one time, to earn foreign currency; See Deger, S., 'The economics of Soviet arms trade', in ed. R. Cassen, Royal Institute of International Affairs, *Soviet Relations with the Third World* (Sage: London, 1985). With the decline of the ability to pay of Third World customers this lucrative avenue is now closed.

⁵⁶ The specific figures on comparative input costs are taken from 'Inputs misused', *The Economist*, 6 July 1985, p. 12.

⁵⁷ For a general analysis of Soviet investment and growth retardation see Desai, P., *The Soviet Economy: Problems and Prospects* (Basil Blackwell: Oxford, 1987). It is worthwhile to note that the Soviet Union is an economic giant and a superpower, provided one considers only its position as an industrial producer. It is the world's number one producer of pig iron, steel, iron ore, oil (including gas condensate) and gas; and it ranks second in the output of industrial manufacturers, electricity, engineering products and cotton fibre. Soviet agricultural production is also extremely impressive in spite of repeated claims of backwardness. The country's per head output of wheat, potatoes, sugar, milk and cattle is higher than that of the United States; calculated from CIA, *Handbook of Economic Statistics, 1986* (Directorate of Intelligence: Washington, DC, 1986). Yet, its inefficiency in such production and distribution creates the numerous problems that the economy has encountered.

⁵⁸ Possibly the first open and formal discussion on conversion from military to civil industries is the paper by Izyumov, A., 'The other side of disarmament', *International Life* (Moscow), Apr. 1988. Professor Seymour Melman of Columbia University, an international expert on conversion studies, has said that this 'is the first article to appear in a Soviet journal that discusses Soviet issues of converting from military to civilian economy'. An English translation can be found in *Riconvertire Per Un Altro Sviluppo* (Archivio Disarmo: Rome, Nov. 1988).

⁵⁹ 'Text of the Vladivostok Speech', *News and Views of the USSR*, Soviet Embassy, Washington, DC, 1986. For a critical commentary, see Kapista, M., 'Paths to peace and security in the Asia and Pacific Region', *International Affairs* (Moscow), no. 8 (Aug. 1987), pp. 27-37.

⁶⁰ *The Times*, 17 Sep. 1988. See also, for recent diplomatic efforts, Gourlay, R., in *Financial Times*, 31 May 1988.

⁶¹ *Jane's Fighting Ships 1988-89* (Jane's: Coulsdon, 1988); see also Fieldhouse, R. and Taoka, S., SIPRI, *Superpowers at Sea: An Assessment of the Naval Arms Race* (Oxford University Press: Oxford, 1989).

⁶² *International Herald Tribune*, 3-4 Dec. 1988.

⁶³ Chi Young Pak, *The Korean Straits* (Martinus Nijhoff Publishers: Dordrecht, 1988) reviews the wide-ranging naval problems in East Asia.

⁶⁴ *USSR Yearbook '88* (Novosti: Moscow, 1988) gives an account of the comprehensive economic development plans for the Siberian region.

⁶⁵ See Tokinoya, A., *The Japan-US Alliance: A Japanese Perspective*, Adelphi Papers 212 (IISS: London, 1986).

⁶⁶ *The Guardian*, 2 Aug. 1988, p. 8; see also *Asian Security 1988-89* (Brassey's: London, 1988), p. 67.

⁶⁷ *The Guardian*, 2 Aug. 1988.

⁶⁸ For a description of Chinese military philosophy as well as details of their arms conversion plans see Dassu, M., 'The Problem of Reconversion of the Military Industry: The Case of China' (del Centro studi di politica internazionale (CeSPI): Rome, 1988), mimeo.

⁶⁹ China's GNP in 1987 was 1092 billion yuan (\$293.4 billion); see *Asian Security 1988-89* (note 66).

⁷⁰ See the following: Ping, W., *Disarmament and Development: China's Practice* (Foreign Language Press: Beijing, 1987); and Lee, W., 'The birth of a salesman: China as an arms supplier', *Journal of North East Asian Studies*, no. 4 (winter 1987-88), p. 41. Both are referred to and discussed in Dassu (note 68).

⁷¹ See Tullberg, R. and Hagmeyer-Gaverus, G., 'World military expenditure', in SIPRI, *SIPRI Yearbook 1987: World Armaments and Disarmament* (Oxford University Press: Oxford, 1987), chapter 6.

⁷² *Japan Monitor*, June 1988, p. 7; details are from *Daily Yomiuri*, 17 June 1988.

⁷³ *Asian Security 1988-89* (note 66); see also *Financial Times*, 16-17 July 1988 (this also gives the planned increase for the next financial year of 6.1 per cent).

⁷⁴ *Defense of Japan 1987*, The White Paper of the Japan Defense Agency.

⁷⁵ *Jane's Fighting Ships 1988-89* (note 61).

⁷⁶ See chapter 6 in this *Yearbook*.

⁷⁷ It has been reported that in Mar. 1988 the former head of the Japan Defense Agency, Tsutomu Kawara, told the Diet (Parliament) that Japan may wish to possess aircraft-carriers for national defence; see *Jane's Defence Weekly*, 10 Dec. 1988.

⁷⁸ *Defence Monitor*, 3 Feb. 1988, p. 6040.

⁷⁹ For an analysis, see *Japan Monitor*, Nov. 1988, p. 14; report from *Daily Yomiuri*, 13 Nov. 1988.

⁸⁰ *Financial Times*, 30 Sep. 1988, p. 18.

⁸¹ See *Far Eastern Economic Review*, 13 Oct. 1988, for a discussion on defence industrialization in Japan. The article also analyses the reasons for Japan not exporting any arms (although it has the industrial power to do so); hence, profitability remains low.

⁸² See note 74.

⁸³ See note 26.

⁸⁴ See Kissinger, H., 'East Asia, the Pacific and the West: strategic trends and implication', in *East Asia, the West and International Security: Prospects for Peace*, Adelphi Papers, 216 (IISS: London, 1987).

⁸⁵ *Asian Security 1988-89* (note 66).

⁸⁶ Chongwhi, K., 'The security of East Asia', in *East Asia, the West and International Security: Prospects for Peace*, Adelphi Papers, 218 (IISS: London, 1987).

⁸⁷ Chubin, S. and Tripp, C., *Iran and Iraq At War* (Tauris: London, 1988), chapter 7.

⁸⁸ The information sheet is available from SIPRI on written request.

⁸⁹ Estimates taken from note 87. A more detailed, but dated, analysis of war costs for the two combatants can be found in McLachlen, K. and Joffe, G., *The Gulf War: A Survey of Political Issues and Economic Consequences* (Economic Intelligence Unit (EIU): London, 1984).

⁹⁰ *International Herald Tribune*, 4 Aug. 1988; the estimates for 1977 are from IMF, *International Financial Statistics*, various issues.

⁹¹ Recent debt figures are from *The Military Balance 1988-1989* (note 46).

⁹² Updated from SIPRI information sheet, 'The Iraq-Iran War 1980-1988: Military Costs and Arms Transfers', p. 3 (see also note 88).

⁹³ See note 87.

⁹⁴ See *Jane's Defence Weekly*, 20 Aug. 1988.

⁹⁵ The UN cash crisis in general is discussed in *Jane's Defence Weekly*, 13 Aug. 1988; see also *The Times*, 17 Aug. 1988; and note 94.

⁹⁶ I am indebted to Commandant Dermot Earley, Assistant Military Adviser to the United Nations, for information on the UNIMOG.

⁹⁷ See the *Financial Times*, 5 Nov. 1988 and 12 Nov. 1988; *The Economist*, 7 Jan. 1989, p. 18.

⁹⁸ 'Building Up the Intellectual Potential of Perestroika', speech by Gorbachev, M. at a Meeting with Scientific and Cultural Workers at the CPSU Central Committee on 6 Jan. 1989; published in *Daily Review* (Novosti Press Agency), vol. 35, no. 1 (10 Jan 1989).

⁹⁹ *International Herald Tribune*, 26 May 1988.

¹⁰⁰ For some of the fundamental causes of the refugee problem see Deger, S., 'Conflict and Economic Development: The Refugee As an End Product', press conference and lecture for the

Norwegian Refugee Council, Oslo, 1988. For the financial costs of repatriation and reconstruction, see *Financial Times*, 28 June 1988.

¹⁰¹ The per head income figure for Afghanistan is calculated from basic data in *The Europa Year Book* (Europa Publications: London, 1988).

¹⁰² See Orme, W. A., 'For Latin lenders, The crisis is over', *International Herald Tribune*, 27 Sep. 1988. An analysis of why the crisis for the lenders may be disappearing while the fatigue for the debtors is only just beginning can be found in *Financial Times*, 31 Aug. 1988. The implications for international security of the debt crisis are lucidly discussed in by Stützle, W., 'Introduction: a year of peace?', in *SIPRI Yearbook 1987* (note 71).

¹⁰³ Professor R. Dornbusch of MIT was quoted in Gewirtz, C., 'Talk of relief brings a palpable change in creditor attitudes', *International Herald Tribune*, 27 Sep. 1988. Details on the burden of interest are to be found in *The Guardian*, 4 May 1988. The major cost arises due to the payment of the real rate of interest; this is the difference between the money interest rate and the rate of inflation. Quite often during the 1970s the US real interest rate (which sets the market trend) was negative; the maximum it ever rose was about 2 per cent per annum. During the 1980s real interest rates have been consistently between 8 and 10 per cent. Therefore, the cost of interest payment in this decade has been over five times the value of what it was during the past decade. Clearly, a fivefold increase in debt-service burdens is abnormal. Data on interest payments can be found in Congdon, T., *The Debt Threat* (Basil Blackwell: Oxford, 1988).

¹⁰⁴ World Bank, *World Development Report 1987* (Oxford University Press: New York, 1987).

¹⁰⁵ For a specific discussion on the economic problems of Latin America in general, see Economic Commission for Latin America and the Caribbean, *Economic Panorama of Latin America 1988* (ECLAC: Santiago, Sep. 1988). This report also has country studies on Argentina, Brazil, Colombia, Chile, Ecuador, Mexico, Peru, Uruguay and Venezuela.

¹⁰⁶ For details of the Argentine military revolt see *International Herald Tribune*, 3-4 Dec. 1988. One of the major economic demands is a substantial increase in pay to compensate for inflationary erosion. The government has been trying to bring down the share of military expenditure in GDP from its 1984 high of 6 per cent (during the Falklands/Malvinas War) to about 2.5 per cent. In addition, some reports suggest that defence spending in 1988 has fallen by 20 per cent owing to the failure of the ruling Radical Party government to pass its 1988 budget; see *Financial Times*, 18 Oct. 1988. A more detailed analysis of Argentine economic performance can be found in *Financial Times*, 10 Aug. and 12 Sep. 1988.

¹⁰⁷ Budget data for Pakistan are taken from *Far Eastern Economic Review*, 14 July 1988. It has also been reported that defence and debt servicing take 70 per cent of total budgeted expenditure; *Financial Times*, 9 June and 11 Nov. 1988. It is also claimed that owing to excessive spending on the army and debt service, the government's revenue is barely sufficient to cover current expenditures; *The Economist*, 26 Nov. 1988, reports that all capital spending, say on infrastructure, roads, schools and hospital buildings, etc., is covered by borrowing.

¹⁰⁸ International Monetary Fund, *World Economic Outlook* (IMF: Washington, DC, Oct. 1988); World Bank, *World Development Report 1988* (Oxford University Press: New York, 1988).

¹⁰⁹ See note 105.

¹¹⁰ *Latin American Weekly Report* WR-86-96, 7 Feb. 1986, p. 3, claimed that in Sep. 1985, when President Paz announced a tough austerity programme, the Bolivian inflation rate was 23 400 per cent per annum. In 1988 the inflation rate fell to an estimated 15 per cent; see *The Economist*, 7 Jan. 1989, p. 16.

¹¹¹ *Milavnews* NL-324/10/88 gives some data on Brazilian defence budgets, but not much information is generally available.

¹¹² Military expenditure, overall, has an adverse impact on socio-economic developments in Third World countries in spite of some 'spin-offs'. For the effects of defence spending on growth and development, see Deger, S., *Military Expenditure in the Third World: The Economic Effects* (Routledge & Kegan Paul: London, 1986); also see Deger, S. and Sen, S., 'Military Expenditure, Growth and Development', paper prepared for the Development Studies Association Annual conference, Birmingham, UK, Sep. 1988.

¹¹³ Military spending trends in developing countries, as well as arms imports, have generally followed their economic fortunes. Periods of economic downturns have coincided with lower outlays on defence, and vice versa. Current financial adversity therefore provides a sort of brake on rapid defence growth, but the behaviour of individual countries is difficult to predict, particularly if democracy fails and the military takes over.

Appendix 5A. Tables of world military expenditure, 1979–88

GERD HAGMEYER-GAVERUS, SAADET DEGER, SOMNATH SEN and RITA TULLBERG
assisted by FREDRIK WETTERQVIST and CARL-GUSTAF LAGERGREN

Notes, definitions, sources and conventions for the military expenditure tables can be found on pages 192–94.

Table 5A.1. World military expenditure, in current price figures

Figures are in local currency, current prices.

		1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
NATO											
<i>North America</i>											
Canada	m. dollars	4 825	5 499	6 289	7 655	8 562	9 519	10 187	10 811	11 529	12 178
USA	m. dollars	122 279	143 981	169 888	196 390	218 084	238 136	263 900	282 868	287 625	289 090
<i>Europe</i>											
Belgium	m. francs	106 472	115 754	125 689	132 127	136 615	139 113	144 183	152 079	155 422	155 074
Denmark	m. kroner	8 045	9 117	10 301	11 669	12 574	13 045	13 343	13 333	14 647	15 741
France	m. francs	96 439	111 672	129 708	148 021	165 029	176 638	186 715	197 080	209 326	214 126
FR Germany	m. D. marks	45 415	48 518	52 193	54 234	56 496	57 274	58 649	60 130	61 354	62 178
Greece	m. drachmas	89 791	96 975	142 865	176 270	193 340	271 922	321 981	338 465	393 052	492 025
Italy	b. lire	6 468	8 203	9 868	12 294	14 400	16 433	18 584	20 071	23 788	24 950
Luxembourg	m. francs	1 242	1 534	1 715	1 893	2 104	2 234	2 265	2 390	2 730	2 992
Netherlands	m. guilders	10 106	10 476	11 296	11 921	12 149	12 762	12 901	13 110	13 254	13 346
Norway	m. kroner	7 362	8 242	9 468	10 956	12 395	12 688	15 446	16 033	18 695	19 023
Portugal	m. escudos	34 343	43 440	51 917	63 817	76 765	92 009	111 375	139 972	159 288	181 916
Spain ^a	m. pesetas	279 690	350 423	400 940	465 695	540 311	594 932	674 883	715 306	852 767	853 165
Turkey	b. lira	93.2	186	313	448	557	803	1 235	1 868	2 477	3 789
UK	m. pounds	8 687	10 923	12 004	14 203	15 605	17 104	18 156	18 581	19 125	19 629

WTO

Bulgaria	m. leva	[700]	[820]	[870]	[901]	[932]	[969]	[1 010]	..	..	..
Czechoslovakia	m. korunas	21 380	22 900	23 099	24 560	25 261	26 276	27 393	28 300	(29 260)	..
German DR	m. marks	9 110	9 875	10 705	11 315	11 970	12 830	13 041	14 045	15 141	(15 654)
Hungary	m. forints	16 200	17 700	19 060	20 050	21 900	22 700	37 700	53 150	53 340	(56 400)
Poland	m. zlotys	70 780	74 285	84 450	175 800	191 000	250 900	315 200	381 200	424 490	[542 000]
Romania	m. lei	11 835	10 394	10 490	11 340	11 662	11 888	12 113	12 208	(11 597)	[11 552]
USSR	m. roubles	..	..	..	..	..	..	..	..	..	..

Other Europe

Albania	m. leks	885	899	(917)	(912)	888	(986)	(1 700)	978	1 055	1 080
Austria	m. schillings	11 693	12 423	12 864	14 140	14 845	15 843	17 875	18 768	18 295	17 646
Finland	m. markkaa	3 044	3 612	4 128	5 187	5 659	6 086	6 565	7 257	7 655	8 467
Ireland	m. pounds	142	176	203	241	250	263	283	306	298	303
Sweden	m. kronor	14 451	15 932	17 467	18 500	19 550	21 164	22 762	24 211	25 662	27 124
Switzerland	m. francs	2 982	3 152	3 349	3 727	3 862	4 009	4 576	4 282	4 203	4 436
Yugoslavia	b. new dinars	55.1	76.3	101	118	155	247	465	979	(1 320)	[3 730]

Middle East

Bahrain	m. dinars	53.9	59.2	80.7	106	62.3	55.6	56.6	60.4	[61.5]	[70.7]
Cyprus	m. pounds	12.6	10.9	17.5	17.9	19.1	19.9	18.5	13.7	..	..
Egypt ^b	m. pounds	411	..	1 238	1 435	1 801	2 173	2 108	(2 493)	[2 742]	..
Iran ^c	m. rials	[386 725]	[363 800]	[345 900]	[341 325]	[340 125]	[362 625]	[454 500]	[469 375]	..	..
Iraq ^c	m. dinars	[788]	[990]	[1 350]	[2 400]	[3 200]	[4 300]	[4 000]	[3 600]	[4 350]	..
Israel ^b	m. new shekels	10.5	23.6	53.2	113	309	1 626	4 055	4 936	[4 720]	..
Jordan	m. dinars	133	136	160	179	196	197	(219)	243	253	(256)
Kuwait	m. dinars	244	257	291	370	416	434	(469)	(430)	(380)	[408]
Lebanon	m. pounds	738	980	(654)	(1 215)	(3 554)	(2 030)	(2 448)	(3 740)	..	..
Oman	m. riyals	269	407	522	581	670	728	745	601	[580]	[533]
Saudi Arabia ^d	m. riyals	(52 388)	(64 076)	(75 723)	(87 695)	(84 311)	(77 817)	(71 992)	(62 418)	(60 726)	[55 750]
Syria	m. pounds	6 226	8 884	9 653	10 703	11 309	12 601	13 000	13 600	(15 500)	[18 000]
United Arab Emirates	m. dirhams	4 394	6 330	7 672	7 268	7 042	7 093	(7 500)	(6 900)	(5 800)	..

		1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Yemen Arab Republic	m. rials	2 616	(1 978)	2 677	3 701	3 146	2 733	2 747	2 852	[3 720]	..
Yemen, People's Democratic Rep. of ^d	m. dinars	36.1	42.6	56.0	[57.5]	[65.8]	[67.0]	[65.3]	[68.8]	..	..
South Asia											
Bangladesh	m. taka	2 409	2 985	3 210	[4 190]	[5 080]	[5 325]	[5 790]	7 495	9 080	[10 000]
India	m. rupees	36 648	38 238	45 371	53 193	61 945	70 834	83 651	105 291	[124 965]	(129 878)
Nepal	m. rupees	217	242	273	337	430	493	[601]	(866)	[1 153]	[1 304]
Pakistan	m. rupees	(12 088)	(14 598)	(17 731)	(22 637)	(26 915)	(30 689)	(35 110)	(38 861)	(44 200)	(49 146)
Sri Lanka	m. rupees	804	971	1 051	1 500	1 800	2 600	4 280	[10 000]	[12 937]	(9 918)
Far East											
Brunei	m. dollars	373	410	416	(480)	(530)	[534]	..	[700]	..	..
Burma	m. kyats	1 324	(1 491)	(1 712)	(1 643)	[1 630]	[1 760]	(1 973)	(1 858)	(1 875)	..
Hong Kong	m. dollars	628	1 353	1 521	1 478	1 537	1 523	(1 639)	(1 530)	1 645	1 676
Indonesia	b. new rupiahs	[1 300]	[1 708]	[2 153]	[2 613]	[2 858]	[3 106]	[2 856]	[3 089]	..	..
Japan	b. yen	2 010	2 215	2 388	2 532	2 712	2 911	3 118	3 296	3 473	3 654
Korea, North	m. won	2 563	2 750	3 009	3 242	3 530	3 819	3 935	3 976	3 971	3 886
Korea, South	b. won	1 597	2 252	2 831	3 163	3 406	3 573	3 957	4 372	4 915	5 753
Malaysia	m. ringgits	2 547	3 389	4 693	4 975	(4 820)	(4 370)	(4 320)	(4 215)	(4 790)	(5 250)
Mongolia	m. tugriks	480	590	630	716	726	764	764	790	837	900
Philippines	m. pesos	[5 240]	[5 829]	[6 746]	[7 778]	[8 530]	[8 288]	[10 894]	[7 600]	[8 500]	[9 700]
Singapore	m. dollars	(1 035)	1 259	1 507	1 659	1 640	2 204	2 516	(2 403)	(2 439)	(2 659)
Taiwan	b. dollars	80.5	96.5	117	136	139	138	152	161	190	238
Thailand	m. baht	30 250	34 625	37 375	41 250	45 875	49 500	52 275	51 825	53 125	58 000
Oceania											
Australia	m. dollars	2 808	3 247	3 767	4 371	4 992	5 610	6 298	6 932	7 305	7 535
Fiji	m. dollars	3.5	4.4	3.6	4.2	4.7	4.5	4.5	4.8	..	..
New Zealand ^e	m. dollars	334	426	549	628	656	724	825	1 017	1 211	1 357
Africa											
Algeria	m. dinars	2 742	3 417	3 481	3 893	4 477	4 631	4 793	5 459	5 805	[6 070]

Angola	m. kwanzas	15 150	15 060	15 060	15 060	23 295	31 943	34 306	34 572	..	..
Benin	m. francs	3 680	(4 700)	(5 400)	(7 821)	(9 500)	9 280	10 190	10 610	(9 367)	(11 420)
Botswana	m. pulas	22.3	26.9	28.5	25.2	28.2	34.9	41.7	..	..	..
Burkina Faso	m. francs	6 814	7 471	9 216	10 800	11 170	11 780	11 810	13 860	15 340	..
Burundi	m. francs	(1 800)	(2 500)	(2 700)	(3 300)	(3 200)	(3 900)	(4 200)	(4 780)	..	..
Cameroon	m. francs	18 795	19 540	[21 415]	41 015	63 105	73 658	[81 920]	[86 905]	[83 150]	[77 889]
Central African Rep.	m. francs	3 061	2 816	4 029	5 000	6 500	..	..	..	..	..
Chad	m. francs	5 890	..	..	..	(15 000)	(17 496)	(17 000)	(16 850)	(10 307)	..
Congo	m. francs	9 450	10 050	[11 250]	[16 500]	[18 600]	(21 596)	(25 000)	..	..	..
Côte d'Ivoire	m. francs	21 854	26 643	25 000	28 400	29 658	30 706	31 320	33 547	35 336	[36 250]
Ethiopia	m. birr	722	744	760	802	845	897	(923)	..	..	..
Gabon	m. francs	(12 036)	(18 600)	(25 600)	29 100	33 000	35 100	42 900	47 100	..	[40 000]
Ghana	m. cedis	190	175	488	587	(894)	1 403	2 517	4 018	(5 632)	..
Kenya	m. shillings	2 176	2 016	2 182	2 662	2 778	2 523	(2 395)	[3 342]	[3 909]	[3 945]
Liberia	m. dollars	13.1	27.1	51.6	46.9	25.3	25.2	24.4	(23.0)	[25.8]	[27.4]
Libya	m. dinars	[1 112]	[1 058]	[1 310]	[1 330]	[1 107]	[1 096]	..	819	..	..
Madagascar	m. francs	17 420	(19 315)	23 500	[27 200]	[29 600]	31 730	(33 520)	(39 830)	(39 200)	..
Malawi	m. kwachas	35.3	43.2	36.0	29.0	26.1	26.6	28.6	37.1	[42.2]	..
Mali	m. francs	7 700	8 100	8 600	9 700	10 200	11 100	13 400	(12 900)	(18 313)	..
Mauritania	m. ouguiyas	3 238	3 700	..	..	2 639	..	..	..	..	..
Mauritius	m. rupees	15.7	42.6	47.7	30.8	34.4	36.5	36.1	36.3	38.5	49.3
Morocco	m. dirhams	3 495	4 400	5 047	5 814	4 675	4 960	6 453	6 837	7 190	[7 630]
Mozambique	m. escudos	3 733	4 419	5 741	6 900	8 300	10 300	10 300	11 214	(29 600)	[50 400]
Niger	m. francs	3 430	3 867	4 286	4 232	4 389	4 775	5 075	(5 325)	(5 175)	..
Nigeria	m. nairas	1 142	1 352	1 319	1 113	1 179	(928)	976	957	810	(1 270)
Rwanda	m. francs	1 702	2 027	2 500	2 622	2 693	2 500	2 760	3 050	2 979	(2 800)
Senegal	m. francs	20 150	19 870	21 565	23 505	25 110	27 046	28 235	28 490	(28 784)	(29 630)
Sierra Leone	m. leones	10.0	14.1	17.5	17.9	18.6	23.3	[29.4]	[64.5]	[101]	..
Somalia	m. shillings	552	601	824	826	1 300	1 786	1 751	(2 300)	(3 800)	[3 500]
South Africa	m. rands	2 018	2 419	2 615	2 967	3 314	3 922	4 414	5 412	6 717	7 835
Sudan	m. pounds	90.6	132	131	139	212	361	468	562	(723)	(968)
Swaziland	m. emalangeni	9.5	10.9	12.0	16.2	16.0	16.1	15.7	15.9	16.8	..
Tanzania	m. shillings	2 771	1 688	2 122	2 433	2 651	3 201	4 277	7 073	(11 025)	(16 250)
Togo	m. francs	4 786	5 155	6 202	6 138	6 328	7 007	8 632	(9 200)	(12 000)	..

		1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Tunisia	m. dinars	65.4	78.6	113	284	364	296	357	413	434	(460)
Uganda	m. shillings	1 548	2 958	5 413	8 228	14 420	32 665	74 400	98 650	..	..
Zaire	m. zaires	330	430	316	873	723	1 928	2 013	[2 700]	(5 000)	[6 500]
Zambia	m. kwachas	128	106	[154]	[148]	[161]	[148]	[167]	[480]	[637]	..
Zimbabwe	m. dollars	171	243	284	296	353	398	436	(554)	(661)	(720)
Central America											
Costa Rica	m. colones	291	316	367	711	1 071	(1 322)	(1 470)	(1 730)	..	..
Cuba	m. pesos	1 009	973	1 011	1 109	1 133	1 386	1 335	1 307	1 300	1 350
Dominican Republic	m. pesos	109	99.4	[126]	[128]	129	164	191	202	..	..
El Salvador	m. colones	(175)	254	322	395	442	534	(630)	(964)	(885)	..
Guatemala	m. quetzales	118	143	161	[208]	(231)	(270)	[400]	..	..	..
Haiti	m. gourdes	93.8	99.9	105	104	102	110	(131)	(138)	..	..
Honduras	m. lempiras	99.1	120	(125)	(160)	240	335	(445)	..	..	..
Jamaica	m. dollars	38.3	62.0	81.8	98.8	97.8	(104)	(124)	..	..	..
Mexico	b. pesos	17.8	24.7	37.9	47.4	(90.3)	(181)	(297)	(470)	(894)	[1 340]
Nicaragua	m. cordobas	(456)	(961)	(1 300)	(1 760)	[3 420]	[4 930]	[26 800]	[192 000]	..	..
Panama	m. balboas	41.0	42.2	46.5	55.0	60.0	(88.0)	(92.0)	(105)	(105)	(105)
Trinidad and Tobago	m. dollars	209	296	371	563	(545)	(490)	[465]	[465]	..	..
South America											
Argentina	m. australes	0.9	1.8	3.9	8.9	(31.2)	236	1 387	2 727	5 863	[28 224]
Bolivia	t. bolivianos	3.2	4.8	8.0	(19.0)	(58.0)	[721]	[94 677]	[299 374]	[358 020]	[447 842]
Brazil	m. cruzados	(44.0)	(88.0)	(171)	(452)	(996)	(3 058)	(10 734)	[32 072]	[62 508]	[445 995]
Chile	m. pesos	53 838	72 525	94 810	117 831	124 901	182 203	194 877	[258 675]	[277 417]	[385 145]
Colombia	m. pesos	20 530	29 023	35 830	44 661	69 531	91 753	105 092	135 712	176 989	[265 484]
Ecuador	m. sucres	4 638	5 213	5 848	6 870	8 833	12 086	19 743	[23 553]	[36 946]	..
Guyana	m. dollars	67.2	98.0	96.0	108	(142)	(156)	(192)	[276]	..	..
Paraguay	m. guaranies	5 793	7 644	10 581	11 566	11 676	12 826	15 937	20 097	26 885	31 799
Peru	m. intis	121	[265]	[515]	[1 480]	[2 530]	[3 875]	[11 900]	[23 900]	[37 000]	[103 842]
Uruguay	m. new pesos	1 361	2 693	4 770	5 168	5 877	7 708	(12 831)	[22 828]	[35 712]	[55 367]
Venezuela	m. bolivares	4 991	6 899	8 952	9 905	(8 488)	(9 800)	[9 394]	[10 458]	[15 225]	[18 015]

Table 5A.2. World military expenditure, in constant price figures

Figures are in US \$m., at 1986 prices and exchange-rates.

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
NATO										
<i>North America</i>										
Canada	5 701	5 893	5 996	6 584	6 961	7 419	7 634	7 780	7 950	8 066
USA	184 737	191 639	204 820	223 224	240 091	251 355	269 158	282 868	277 613	267 765
<i>Europe</i>										
Belgium	3 616	3 687	3 721	3 597	3 454	3 307	3 269	3 404	3 426	3 378
Denmark	1 695	1 709	1 729	1 779	1 793	1 750	1 709	1 648	1 740	1 790
France	25 559	26 104	26 737	27 287	27 753	27 656	27 641	28 455	29 247	29 050
FR Germany	26 600	26 968	27 291	26 939	27 165	26 888	26 942	27 691	28 184	28 167
Greece	2 521	2 181	2 581	2 632	2 401	2 851	2 830	2 418	2 413	2 632
Italy	10 744	11 241	11 316	12 103	12 372	12 737	13 196	13 463	15 233	15 244
Luxembourg	41.8	48.6	50.3	50.8	51.9	52.2	50.8	53.5	61.2	66.0
Netherlands	5 399	5 255	5 311	5 292	5 245	5 335	5 274	5 351	5 436	5 420
Norway	1 821	1 841	1 860	1 933	2 017	1 943	2 238	2 168	2 325	2 223
Portugal	851	922	919	920	884	822	832	936	974	1 002
Spain ^a	4 470	4 844	4 841	4 914	5 081	5 027	5 241	5 108	5 784	5 475
Turkey	1 998	1 893	2 337	2 555	2 390	2 323	2 464	2 769	2 645	2 226
UK	22 001	23 459	23 039	25 105	26 368	27 516	27 537	27 258	26 934	26 103

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
WTO^a										
Bulgaria	[680]	[700]	[739]	[763]	[778]	[800]	[828]	..	..	..
Czechoslovakia	3 019	3 142	3 144	3 179	3 242	3 342	3 449	3 472	(3 479)	..
German DR	3 258	3 518	3 806	4 023	4 256	4 561	4 641	4 998	5 388	(5 571)
Hungary	499	500	515	507	516	494	767	1 026	947	[862]
Poland	2 426	2 327	2 183	2 263	2 013	2 300	2 510	2 579	2 294	(1 952)
Romania	1 689	1 461	1 443	1 334	1 304	1 315	1 345	1 356	(1 289)	[1 269]
USSR	..	..	..	..	..	..	..	..	..	..
Other Europe										
Albania ⁱ	126	128	(131)	(130)	127	(141)	(243)	140	151	154
Austria	1 051	1 050	1 018	1 060	1 079	1 089	1 190	1 229	1 182	1 117
Finland	1 039	1 105	1 128	1 293	1 302	1 308	1 333	1 431	1 451	1 542
Ireland	416	438	420	425	398	386	394	411	388	386
Sweden	3 699	3 585	3 506	3 421	3 318	3 326	3 330	3 399	3 458	3 448
Switzerland	2 144	2 178	2 173	2 289	2 302	2 322	2 563	2 380	2 303	2 380
Yugoslavia	2 480	2 623	2 485	2 212	2 062	2 126	2 328	2 582	(1 577)	[1 326]
Middle East										
Bahrain	177	188	230	276	158	141	147	161	[166]	[191]
Cyprus	38.6	29.5	42.7	40.9	41.6	40.8	36.3	26.4	..	..
Egypt ^h	1 696	..	4 056	4 843	5 602	6 101	6 620	(6 080)	[4 904]	..
Iran ^c	[15 933]	[12 425]	[9 512]	[7 909]	[6 582]	[6 236]	[7 485]	[5 960]	..	..
Iraq ^c	[8 316]	[8 620]	[9 812]	[15 377]	[20 030]	[22 128]	[16 467]	[11 579]	..	..
Israel ^b	6 206	5 986	5 841	5 646	6 284	6 932	4 636	4 582	[4 130]	..
Jordan	549	505	552	575	599	580	(626)	694	724	(726)
Kuwait	1 123	1 106	1 164	1 376	1 475	1 523	(1 622)	(1 473)	(1 294)	[1 373]
Lebanon	95.2	102	(58.8)	(96.0)	(262)	(107)	(92.8)	(97.5)	..	..
Omani ⁱ	779	1 178	1 511	1 682	1 940	2 108	2 157	1 740	[1 679]	[1 542]
Saudi Arabia ^d	(13 809)	(16 282)	(18 735)	(21 825)	(21 107)	(19 714)	(18 859)	(16 855)	(16 556)	[15 006]
Syria	4 722	5 665	5 199	5 045	5 022	5 122	4 508	3 465	(2 924)	[2 517]
United Arab Emirates	1 490	2 104	2 452	2 100	2 035	2 015	(2 077)	(1 880)	(1 554)	..

Yemen Arab Republic	649	(466)	600	807	650	503	399	296	[316]	..
Yemen, People's Democratic Rep. of ^d	175	187	237	[222]	[229]	[212]	[199]	[199]	..	..
South Asia										
Bangladesh	175	191	177	[205]	[227]	[215]	[211]	246	273	[281]
India	5 491	5 139	5 397	5 865	6 109	6 446	7 212	8 349	[9 109]	(8 830)
Nepal	21.6	21.1	21.4	23.6	26.8	30.0	[33.7]	(40.8)	[49.0]	[50.9]
Pakistan	(1 189)	(1 282)	(1 392)	(1 678)	(1 876)	(2 016)	(2 184)	(2 334)	(2 537)	(2 539)
Sri Lanka	68.9	66.0	60.6	78.0	82.0	102	165	[357]	[429]	(288)
Far East										
Brunei	230	240	223	(242)	(263)	[258]	..	[322]	..	..
Burma	248	(278)	(318)	(290)	[272]	[280]	(294)	(253)	(207)	..
Hong Kong	149	276	272	239	226	207	(216)	(196)	200	204
Indonesia	[2 021]	[2 239]	[2 515]	[2 788]	[2 728]	[2 685]	[2 357]	[2 408]	..	..
Japan	14 851	15 152	15 578	16 072	16 886	17 738	18 613	19 558	20 588	21 554
Korea, North ⁱ	1 149	1 233	1 349	1 454	1 583	1 713	1 765	1 783	1 781	1 743
Korea, South	3 381	3 705	3 841	4 000	4 165	4 272	4 617	4 960	5 415	5 896
Malaysia	1 331	1 659	2 095	2 098	(1 960)	(1 710)	(1 686)	(1 633)	(1 835)	(1 958)
Mongolia ⁱ	157	193	206	234	237	249	249	258	273	294
Philippines	[777]	[731]	[748]	[783]	[780]	[504]	[538]	[373]	[402]	[421]
Singapore	(597)	669	740	784	766	1 003	1 140	(1 104)	(1 114)	(1 195)
Taiwan	3 293	3 316	3 457	3 887	3 921	3 894	4 303	4 525	5 316	6 593
Thailand	1 783	1 704	1 632	1 711	1 835	1 963	2 024	1 971	1 971	2 077
Oceania										
Australia	3 361	3 529	3 732	3 897	4 043	4 368	4 594	4 650	4 511	4 333
Fiji	5.0	5.5	4.1	4.4	4.7	4.3	4.0	4.2	..	..
New Zealand ^e	404	445	498	490	477	496	490	533	565	600
Africa										
Algeria	1 111	1 264	1 123	1 177	1 256	1 222	1 146	1 161	1 149	[1 090]

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Angola ⁱ	506	503	503	503	779	1 068	1 147	1 155	..	..
Benin	20.2	(24.0)	(24.8)	(31.8)	(35.5)	31.8	32.1	30.6	(24.8)	(27.8)
Botswana	25.0	26.6	24.2	19.2	19.5	22.2	24.6	..	..	..
Burkina Faso	31.5	30.7	35.2	36.9	35.2	35.4	33.2	40.0	45.6	..
Burundi	(26.7)	(33.9)	(32.7)	(37.8)	(33.8)	(36.1)	(37.5)	(41.9)	..	..
Cameroon	101	96.0	[95.1]	161	212	222	[244]	[251]	[220]	[189]
Central African Rep.	19.1	15.0	19.0	20.9	24.0	..	..	..	..	..
Chad ⁱ	20.9	..	..	..	(47.6)	(46.2)	(42.7)	(48.7)	(30.6)	..
Congo	51.0	50.6	[48.4]	[62.9]	[65.8]	(67.8)	(74.0)	..	..	..
Côte d'Ivoire	101	108	93.0	98.4	97.0	96.3	96.4	96.9	96.9	[92.8]
Ethiopia	474	467	450	454	476	466	(402)	..	..	..
Gabon	(66.0)	(90.8)	(115)	112	115	116	132	136	..	[117]
Ghana	36.2	22.2	28.6	28.1	(19.2)	21.6	35.1	45.0	(45.1)	..
Kenya	297	242	234	237	222	183	(153)	[206]	[229]	[215]
Liberia	18.3	33.1	58.6	50.2	26.3	25.9	25.2	(23.0)	[24.5]	[23.8]
Libya ^f	[8 934]	[7 514]	[8 382]	[7 749]	[5 231]	[4 712]	..	2 766	..	..
Madagascar	86.9	(81.5)	76.0	[66.8]	[60.9]	59.4	56.8	58.9	50.4	..
Malawi	47.6	48.9	36.5	26.7	21.2	18.0	17.5	19.9	[18.1]	..
Mali	45.5	39.2	37.1	40.8	38.8	38.4	42.6	(37.3)	(48.2)	..
Mauritania	85.5	88.3	..	..	46.5	..	..	..	..	..
Mauritius	2.6	5.0	4.9	2.8	3.0	2.9	2.7	2.7	2.8	3.4
Morocco	731	841	857	893	676	638	771	751	769	[793]
Mozambique ⁱ	91.4	108	141	169	203	252	252	275	(725)	..
Niger	15.2	15.5	14.0	12.4	13.2	13.2	14.2	(15.4)	(16.0)	..
Nigeria	2 321	2 498	2 017	1 580	1 359	(766)	763	711	546	(801)
Rwanda	28.2	31.3	36.3	33.8	32.6	28.7	31.1	34.8	32.7	[29.7]
Senegal	118	107	110	102	97.4	93.9	86.7	82.3	(86.8)	(88.6)
Sierra Leone	18.5	23.5	23.7	19.1	11.8	8.8	[6.3]	[7.7]	[4.3]	..
Somalia	106	72.5	68.8	55.8	64.6	46.4	33.0	(31.9)	(41.1)	[21.1]
South Africa	2 312	2 436	2 287	2 261	2 249	2 384	2 308	2 386	2 550	2 620
Sudan	223	259	208	175	204	259	231	225	(242)	(224)
Swaziland	11.2	11.3	10.1	13.0	10.3	9.6	7.6	7.1	6.7	..
Tanzania	546	255	256	227	195	174	173	216	(259)	(294)
Togo	22.3	21.4	21.5	19.1	18.0	20.7	26.0	(26.6)	(34.7)	..

Tunisia	151	165	218	483	568	426	476	520	510	(512)
Uganda	38.1	72.8	133	64.9	91.7	146	143	70.5	..	..
Zaire	70.8	65.0	35.4	71.7	33.5	58.7	49.5	[45.3]	(44.0)	[30.1]
Zambia	75.1	55.7	[70.9]	[60.6]	[55.1]	[42.2]	[34.7]	[65.7]	[61.0]	..
Zimbabwe	248	336	346	326	316	296	299	(333)	(353)	(326)

Central America

Costa Rica	30.5	28.1	23.8	24.3	27.6	(30.4)	(29.4)	(30.9)	..	..
Cuba	1 761	1 681	1 559	1 624	1 591	1 871	1 747	1 648	1 639	1 702
Dominican Republic	102	79.6	[93.8]	[88.3]	85.1	85.2	72.1	69.5	..	..
El Salvador	(107)	133	147	161	159	172	(166)	(193)	(142)	..
Guatemala	137	150	151	[195]	(207)	(234)	[292]	..	..	..
Haiti	35.3	31.9	30.2	27.8	24.9	25.0	(27.1)	(27.6)	..	..
Honduras	85.3	87.5	(83.3)	(97.9)	136	181	(232)	..	..	..
Jamaica	23.9	31.2	34.5	38.8	32.4	(28.3)	(27.1)	..	..	..
Mexico	733	805	965	761	(718)	(871)	(904)	(768)	(630)	[624]
Nicaragua	(635)	(990)	(1 080)	(1 170)	[1 736]	[1 854]	[3 148]	[2 887]	..	..
Panama	54.7	49.5	50.8	57.6	61.6	(88.9)	(92.0)	(105)	(104)	..
Trinidad and Tobago	131	159	174	237	(199)	(158)	[139]	[129]	..	..

South America

Argentina	4 892	4 892	5 196	4 471	(3 529)	3 673	2 796	2 892	2 688	[2 398]
Bolivia	169	170	220	(225)	(186)	[167]	[185]	[156]	[163]	[177]
Brazil ^a	(1 381)	(1 510)	(1 425)	(1 906)	(1 737)	(1 795)	(1 928)	[2 349]	[1 389]	[1 981]
Chile	1 181	1 178	1 286	1 454	1 211	1 474	1 206	[1 340]	[1 199]	[1 447]
Colombia	436	487	471	472	613	697	643	699	739	[853]
Ecuador	177	176	170	172	149	155	198	[192]	[232]	..
Guyana	47.3	60.5	47.6	44.5	(51.6)	(45.3)	(48.5)	[64.6]	..	..
Paraguay	57.3	61.7	75.0	76.7	68.3	62.4	61.9	59.3	65.1	65.5
Peru	826	[1 140]	[1 266]	[2 210]	[1 787]	[1 302]	[1 518]	[1 714]	[1 427]	[1 426]
Uruguay	164	199	263	239	182	154	(149)	[150]	[144]	[145]
Venezuela	1 415	1 610	1 798	1 815	(1 464)	(1 506)	[1 296]	[1 294]	[1 470]	[1 399]

Other Europe

Austria	1.3	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.2	1.1
Finland	1.8	1.9	1.9	2.1	2.1	2.0	1.9	2.0	1.9	1.9
Ireland	1.8	1.9	1.8	1.8	1.7	1.6	1.6	1.7	1.5	1.5
Sweden	2.9	2.9	2.9	2.8	2.6	2.6	2.5	2.5	2.5	2.5
Switzerland	1.9	1.9	1.8	1.9	1.9	1.9	2.0	1.8	1.6	1.7
Yugoslavia ^d	4.7	4.9	4.6	4.0	3.8	3.7	3.9	3.9	(2.4)	[2.0]

Middle East

Bahrain	5.3	4.4	5.2	6.3	3.6	3.2	3.5	4.4	[4.6]	..
Cyprus	2.0	1.4	2.0	1.7	1.7	1.5	1.3	0.8	..	..
Egypt ^b	2.9	..	6.5	6.3	6.7	6.9	5.8	(6.1)	[6.2]	..
Iran ^c	[6.3]	[5.4]	[4.3]	[3.4]	[2.6]	[2.5]	[3.0]	..	..	..
Iraq ^c	(6.9)	[6.3]	[12.3]	[19.0]	[24.4]	[29.1]	[27.5]	..	..	..
Israel ^b	26.1	25.0	23.5	21.9	23.8	26.8	17.7	12.4	(9.0)	..
Jordan	17.7	13.8	13.7	13.5	13.8	(13.1)	13.6	14.8	(15.0)	..
Kuwait	3.3	3.5	4.4	6.0	6.6	7.1	(8.6)	(8.4)	[7.3]	..
Oman	20.9	19.8	20.6	21.1	23.3	22.9	20.8	25.7	[24.2]	..
Saudi Arabia ^d	(21.1)	(16.6)	(14.5)	(16.7)	(20.3)	(20.9)	(21.8)	(21.8)	[22.7]	..
Syria	16.0	17.3	14.7	15.6	15.4	16.7	15.6	13.8	(9.3)	..
United Arab Emirates	5.5	5.8	6.3	6.5	6.8	7.0	(7.5)	(8.8)	(6.8)	..
Yemen Arab Republic	20.9	14.3	17.3	21.7	17.0	12.7	10.3	9.5	..	..
Yemen, People's Democratic Rep. of ^d	17.5	17.8	19.7	[18.7]	[19.1]	[17.7]	[16.7]	..	..	..

South Asia

Bangladesh	1.3	1.4	1.3	[1.5]	[1.6]	[1.4]	[1.3]	1.5	..	..
India	3.5	3.0	3.0	3.1	3.1	3.2	3.3	3.7	..	..
Nepal	1.0	1.0	0.9	1.1	1.2	1.2	[1.3]	(1.6)	..	..
Pakistan	(5.6)	(5.7)	(5.9)	(6.6)	(6.9)	(6.8)	(6.8)	(6.7)	..	..
Sri Lanka	1.5	1.5	1.2	1.5	1.5	1.7	2.6	[5.6]	[6.6]	..

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Far East										
Brunei	6.1	3.9	4.5	(5.3)	(6.5)	[6.5]	..	..	..	..
Burma	3.8	(3.9)	(4.1)	(3.6)	[3.3]	[3.3]	(3.6)	(3.2)	..	..
Hong Kong	0.6	1.0	0.9	0.8	0.7	0.6	(0.6)	0.5	..	..
Indonesia	[4.1]	[3.8]	[3.7]	[4.2]	[3.9]	[3.6]	[3.0]	[3.2]	..	..
Japan	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0
Korea, North ^k	10.4	10.7	11.5	11.8	12.3	..	..	..	..	..
Korea, South	5.1	5.9	6.0	6.0	5.6	5.2	5.2	5.0	4.9	..
Malaysia	5.5	6.4	8.1	7.9	(6.9)	(5.5)	(5.6)	(5.9)	(5.9)	..
Philippines	[2.4]	[2.2]	[2.2]	[2.3]	[2.2]	[1.5]	[1.8]	[1.2]	[1.2]	..
Singapore	(5.0)	5.0	5.1	5.1	4.5	5.5	6.5	(6.3)	(5.8)	..
Taiwan	6.8	6.6	6.7	7.3	6.8	6.1	6.4	5.9	6.3	..
Thailand	5.4	5.1	4.8	4.9	5.0	5.0	5.0	4.7	4.4	..
Oceania										
Australia	2.4	2.6	2.6	2.7	2.8	2.8	2.8	2.8	2.6	2.4
Fiji	0.4	0.4	0.3	0.4	0.4	0.4	0.3	0.3	..	..
New Zealand ^e	1.8	1.9	2.1	2.1	2.0	1.9	1.9	2.0	2.0	2.1
Africa										
Algeria	2.1	2.1	1.8	1.9	1.9	1.8	1.7	1.7	(1.7)	(1.5)
Angola	14.0	12.8	13.8	11.9	16.5	22.0	28.4	28.4	..	..
Benin	1.9	(1.9)	[1.8]	(1.9)	(2.2)	2.0	2.0	[1.9]	..	..
Botswana	3.6	3.7	3.7	2.7	2.4	[2.4]	[2.2]	..	..	..
Burkina Faso	2.7	2.7	2.8	3.0	2.9	3.0	2.6	(2.9)	[3.0]	..
Burundi	(2.6)	(2.9)	(3.0)	(3.5)	(3.1)	(3.2)	(3.0)	(3.4)	..	..
Cameroon	1.5	1.2	[1.1]	1.7	2.2	2.1	[2.2]	..	..	..
Central African Rep.	2.0	1.7	2.1	2.3	2.8	..	..	..	..	..
Chad	..	..	..	..	[7.0]	[7.8]	[5.7]	[6.0]	[3.8]	..
Congo	3.7	2.8	[2.1]	[2.3]	[2.3]	(2.3)	[2.6]	..	..	..
Côte d'Ivoire	1.1	1.2	1.1	1.1	1.1	1.1	1.0	1.0	(1.2)	..

Ethiopia	8.8	8.5	8.4	8.4	8.4	9.0	(8.9)	..	..	..
Gabon	(1.9)	(2.1)	(2.4)	2.4	2.5	2.4	2.8	(3.9)	..	[3.9]
Ghana	0.5	0.3	0.6	0.4	(0.4)	0.5	0.5	[0.6]	..	..
Kenya	4.4	3.6	3.4	3.7	3.4	2.7	(2.2)	[2.7]	[2.8]	[2.6]
Liberia	1.5	2.8	4.8	4.3	2.3	2.4	2.3	(2.2)	..	..
Libya ^a	[14.2]	[10.0]	[14.0]	[15.0]	[13.0]	[14.5]	..	12.7	..	..
Madagascar	2.9	(2.8)	3.0	[2.7]	[2.4]	2.3	2.2	2.2	1.8	..
Malawi	4.2	4.4	3.3	2.4	1.9	1.6	1.5	1.8	[1.6]	..
Mali	..	2.3	2.3	2.4	2.4	2.4	2.7	(2.3)	..	..
Mauritania	10.5	9.7	..	..	5.7	..	..	..	..	..
Mauritius	0.2	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2	[0.2]
Morocco	5.6	6.3	6.6	6.5	4.9	4.7	5.4	5.1	(5.0)	[5.0]
Mozambique	..	5.6	7.0	8.0	10.7	12.1	11.7	(10.4)	..	..
Niger	0.7	0.7	0.7	0.6	0.7	0.7	0.7	[0.8]	[0.8]	..
Nigeria	2.5	2.5	2.3	1.8	1.9	1.4	1.3	1.2	0.8	..
Rwanda	1.8	1.9	2.0	2.0	1.9	1.6	1.6	1.9	..	..
Senegal	3.3	3.1	2.8	2.7	2.6	2.5	2.3	2.2	..	..
Sierra Leone	0.7	1.0	1.0	0.8	0.7	0.7	[0.6]	[1.1]	..	..
Somalia	6.8	4.9	4.3	3.4	3.8	2.7	1.8	(1.8)	..	..
South Africa	4.3	3.9	3.7	3.7	3.7	3.7	3.7	3.9	4.1	[4.1]
Sudan	2.0	2.3	1.7	1.5	2.1	(3.2)	(3.6)	..	..	..
Swaziland	2.3	2.1	2.2	2.9	2.6	2.3	1.8	1.7	..	..
Tanzania	7.1	3.7	4.0	3.8	3.5	3.2	3.3	4.1	(4.7)	(6.1)
Togo	2.2	2.2	2.4	2.3	2.2	2.4	2.8	(2.8)	(3.5)	..
Tunisia	2.2	2.2	2.7	5.9	6.6	4.7	5.2	5.9	5.4	(5.2)
Uganda	1.3	2.1	2.5	2.1	2.6	3.3	3.4	..	..	..
Zaire	3.0	2.5	1.3	2.8	1.2	1.9	1.4	[1.3]	..	..
Zambia	4.8	3.5	[4.4]	[4.1]	[3.9]	[3.0]	[2.4]	[3.7]	[3.5]	..
Zimbabwe	6.0	7.1	6.4	5.7	5.7	6.2	5.7	(6.2)	(6.5)	[5.8]

Central America

Costa Rica	0.8	0.8	0.6	0.7	0.8	(0.8)	(0.7)	(0.7)	..	..
Cuba ^m	10.5	9.9	8.8	9.1	8.8	10.1	9.6	..	..	..
Dominican Republic	2.0	1.5	[1.7]	[1.6]	1.5	1.6	1.4	1.3	..	..
El Salvador	(1.8)	2.8	3.7	4.4	4.4	4.6	(4.4)	(4.9)	(3.8)	..
Guatemala	1.7	1.8	1.9	[2.4]	(2.6)	(2.9)	[3.6]	..	..	..

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Haiti	1.4	1.4	1.4	1.3	1.2	1.1	(1.2)	(1.4)	..	..
Honduras	2.2	2.4	(2.3)	(2.8)	4.0	5.2	(6.4)	..	..	..
Jamaica	0.9	1.3	1.6	1.7	1.4	1.1	1.1	..	..	..
Mexico	0.6	0.6	0.6	0.5	(0.5)	(0.6)	(0.7)	(0.6)	..	..
Nicaragua	(3.1)	(4.4)	(5.3)	(6.2)	[10.4]	[10.9]	[23.2]	[44.1]	..	..
Panama	1.5	1.2	1.2	1.3	1.4	(1.9)	(1.9)	(2.1)	..	..
Trinidad and Tobago	1.9	2.0	2.3	2.9	(3.0)	(2.6)	[2.6]	[2.5]	..	..
South America										
Argentina	6.3	6.4	7.1	6.0	(4.6)	4.5	3.5	3.7	3.4	[3.0]
Bolivia	3.6	4.0	5.3	(4.5)	(3.9)	[3.4]	[3.4]	[2.8]	[2.9]	[3.1]
Brazil ^a	(0.7)	(0.7)	(0.7)	(0.9)	(0.8)	(0.8)	(0.8)	[0.8]	[0.5]	[0.8]
Chile	7.0	6.7	7.4	9.5	8.0	9.6	7.6	[7.9]	[6.8]	[7.8]
Colombia	1.7	1.8	1.8	1.8	2.3	2.4	2.1	2.0	2.0	[2.2]
Ecuador	2.0	1.8	1.7	1.7	1.6	1.5	1.8	[1.7]	[2.0]	..
Guyana	5.1	6.5	6.0	7.5	(9.7)	(9.2)	(9.8)	[12.4]	..	..
Paraguay	1.3	1.4	1.5	1.6	1.4	1.2	1.1	1.1	1.1	..
Peru	3.9	[5.3]	[6.0]	[10.4]	[9.6]	[6.5]	[7.5]	[8.6]	..	..
Uruguay	2.4	2.9	3.9	4.0	3.2	2.6	(2.4)	[2.3]	[2.1]	[2.1]
Venezuela	2.4	2.7	3.1	3.4	(2.9)	(2.4)	[2.0]	[2.1]	[2.1]	..

Conventions

- .. Information not available or not applicable
 () Uncertain data
 [] Data with a high degree of uncertainty
 - Negligible or nil
 t. Thousand
 m. Million
 b. Billion

Notes, definitions and sources for the tables of world military expenditure

- a* Spanish data have been revised using official NATO sources.
- b* Figures include defence expenditures minus military grants from the US overseas grants and loans programme, which are substantial for Egyptian and Israeli military expenditure and should per definition be excluded.
- c* Data reported from open sources for Iran and Iraq may underestimate their real military expenditures, which especially for the period of the war have not been fully disclosed by the countries.
- d* Figures include defence and security expenditure.
- e* New Zealand data for 1987–88 contain an adjustment for pensions.
- f* Libya reports only operational costs. An estimate for arms import costs has been added.
- g* Brazilian data have been revised using a combination of national sources and the *Government Finance Statistics Yearbook 1987* (International Monetary Fund: Washington, DC, 1987).
- h* The SIPRI practice of using official consumer price indices, which tend to understate actual price changes in WTO countries, especially for recent years, results in overstated volume expenditure increases for the WTO countries.
- i* At current prices and 1986 exchange-rates.
- j* At current prices and an exchange-rate of 29.99 kwanzas per US dollar.
- k* Per cent of gross national product (GNP).
- l* Per cent of gross material product (GMP).
- m* Per cent of net material product (NMP).

Table 5A.1: Military expenditure figures are given in local currency at current prices. Figures for recent years are budget estimates.

Table 5A.2: This series is based on the data given in the local currency series, deflated to 1986 price levels and converted into dollars at 1986 period-average exchange-rates. Local consumer price indices (CPI) are taken as far as possible from *International Financial Statistics* (IFS) (International Monetary Fund: Washington, DC). For the most recent year, the CPI is an estimate based on the first 6–10 months of the year. Period-average exchange-rates are taken as far as possible from the IFS.

Table 5A.3: The share of gross domestic product (GDP) is calculated in local currency. GDP data are taken as far as possible from the IFS.

Definitions and sources

For more detailed information, readers are referred to previous editions of the *SIPRI Yearbook*.

The NATO definition of military expenditure is used as a guideline throughout. Where possible, the following items are *included*: all current and capital expenditure on the armed forces and on the running of defence departments and other government agencies engaged in defence projects; the cost of paramilitary forces and police when judged to be trained and equipped for military operations; military R&D, tests and evaluation costs; and costs of retirement pensions of service personnel, including pensions of civilian employees. Military aid is included in the budget of the donor country.

Excluded: civil defence, interest on war debts and some types of veterans' payments.

Problems encountered when applying this definition include: the absence of disaggregated expenditure series; the non-disclosure of certain expenditure categories, especially procurement and R&D; uncertainty as to the amount of military aid included in recipients' budgets; and the degree to which police forces, border and coastguards and the like play a military role.

The data cover 129 countries for the calendar years 1979–88. *Calendar year* figures are calculated from fiscal year data where necessary, on the assumption that expenditure takes place evenly throughout the year. All series are *revised* annually.

General remarks on the data and data presentation

Changes of the series in successive *SIPRI Yearbooks* may be due to the revision of any component of the data base, i.e., military expenditure, consumer price indices, exchange-rates and GDP/GNP/NMP data.

Primary sources are official publications.

Secondary sources are press information, specialist literature and other background information.

Uncertain data (with round brackets in the tables) are figures from secondary sources or figures from primary sources, adjusted for known inconsistencies with the time-series in use. Data with a high degree of uncertainty (with square brackets in the tables) are data with components of primary and secondary sources and SIPRI estimates based on other country background material.

Main sources of military expenditure data

NATO

Official NATO data published in *Financial and Economic Data Relating to NATO Defence*, annual press release (NATO: Brussels).

Other WTO

1979: Alton, T. P., Lazaricik, G., Bass, E. M. and Znayenko, W., 'East European defense expenditures, 1965-1978', in *East European Assessment*, Part 2, a compendium of papers submitted to the Joint Economic Committee, US Congress (US Government Printing Office: Washington, DC, 1981); Alton, T. P., Lazaricik, G., Bass, E. M. and Znayenko, W., *Military Expenditure in Eastern Europe, Post World War II to 1979* (L.W. International Financial Research, Inc: New York, 1980). After 1979: domestic sources.

Others

Domestic budgets, defence appropriations and final accounts. Official publications such as *Government Finance Statistics Yearbook* (International Monetary Fund: Washington, DC); *Statistical Yearbook* (United Nations: New York); *Statistical Yearbook for Asia and the Pacific* (United Nations: Bangkok); *Statistik des Auslandes* (Federal Statistical Office: Wiesbaden); *Europa Yearbook* (Europa Publications: London). Journals and newspapers are consulted for the most recent figures.

6. The trade in major conventional weapons

IAN ANTHONY

I. Introduction

The value of the global trade in conventional weapons for 1988 is \$33 969 million, expressed in 1985 US dollars, suggesting that the increase recorded for 1987 was an exception and not indicative of an upward trend. The increase recorded for 1987 was accounted for by a step-up in deliveries of major weapons to India and Iraq.¹ These statistics are important because of what they show about the trend in deliveries of major conventional weapons and the patterns of the global international arms trade. They are not figures which measure what was actually paid for the arms delivered.²

The fact that the total global value of arms deliveries remains within the range of \$32–35 billion conceals a gradual shift in the respective shares of the industrial and Third World countries within that total. In 1984, the Third World accounted for 67.6 per cent of the global total, falling to 66 per cent by 1986 and to 61.4 per cent in 1988.

The declining importance of the Third World within the global arms market is partly accounted for by the rapid decline of deliveries to key Third World importers—most clear is the reduced importance of imports of major weapons to Egypt, Israel and Libya. This is not a complete explanation since there have been increased deliveries of major weapon systems to other Third World countries—notably India and North Korea—at the same time. In fact there is a regional shift in the global arms market away from the Middle East (other than Persian Gulf littoral countries) towards Asia. Whereas the Middle East as a whole accounted for 48 per cent of all Third World imports in 1984, by 1988 this had become 39 per cent. South-East Asia, by contrast, accounted for 12 per cent of Third World imports in 1984, rising to 22 per cent in 1988.

Changes in the respective shares of the industrial and Third World countries in global imports also reflect the rising importance of some European countries as importers of major weapon systems. Greece, Spain and Turkey have all begun receiving equipment as parts of modernization programmes financed by military aid from NATO allies.

In 1988 the event with the single greatest impact on the arms trade was the 20 August cease-fire in the Iraq–Iran War. This is discussed in a special section. Other arms deliveries made and new arms deals struck during 1988 indicate that overall the arms market remains dominated by a relatively small number of stable and long-term relationships, as shown in table 6.1.

In 1988 the issue of arms transfer control has been pursued in bilateral talks between various countries and in the multilateral forums of the United Nations, the Council of Europe and the European Community (EC). These issues are discussed in section VI.

In spite of the important changes in the superpower relationship, none of the

Table 6.1. Patterns of arms exports to the Third World by the leading suppliers, 1979–88

Percentage shares are based on SIPRI trend indicator values, as expressed in US \$m., at constant (1985) prices.

Supplier	Major recipients 1979–83	Combined share ^a	Major recipients 1984–88	Combined share ^a
USSR	Libya, Viet Nam, India, Iraq, Syria	69	Angola, India, Iraq, Libya, Syria	75
USA	Egypt, Israel, Saudi Arabia, S. Korea, Taiwan	71	Egypt, Israel, Pakistan, Saudi Arabia, S. Korea	63
France	Egypt, Iraq, Libya, Morocco	49	India, Iraq, Saudi Arabia	50
China	Egypt, Iran, Pakistan	71	Egypt, Iran, Iraq, Pakistan, Saudi Arabia	88
UK	Brazil, Egypt, India	49	India, Indonesia, Nigeria, Oman, Saudi Arabia	58
FR Germany	Argentina, Nigeria	65	Argentina	30

^a Share in supplier's total exports to the Third World.

Source: SIPRI data base.

key actors in the arms trade has modified arms transfer policies in 1988. The year has seen some exceptional arms deals, but these have been noteworthy because they break or modify traditional relationships—the delivery by China of CSS-2 East Wind IRBMs (intermediate-range ballistic missiles)³ to Saudi Arabia falls into this category. Other deals are important because of their scale—the agreement by the UK to supply Saudi Arabia with a large package of equipment and services falls into this category, as does the Soviet delivery to North Korea of equipment, including MiG-29 and Su-25 aircraft and SA-5 surface-to-air missiles (SAMs).⁴ A third important group includes deals that significantly change the local military balance, best illustrated in 1988 by the delivery by the Soviet Union of large quantities of equipment to Angola and to Cuban forces fighting with the Angolan Government.

II. The Iraq–Iran War

Iraq and Iran have fought the most destructive war ever waged between Third World countries, including the bombardment of cities with ballistic missiles, resulting in 2000–4000 deaths. The progress of the war has been discussed in successive *SIPRI Yearbooks*, and aspects of it are dealt with again this year in chapters 9 and 13. The war has had a major impact on the global arms trade in the 1980s. Deliveries of major weapons to countries around the Persian Gulf have accounted for 30 per cent of all arms sold to the Third World in the period 1984–88, rising to 46 per cent for the Middle East as a region.

The cease-fire is likely to change the nature of the demand for military equipment in Iraq and Iran since, if it remains successful, there will be no requirement for ordnance and spare parts on the scale reached during the war. However, large quantities of major weapons will continue to flow to Iraq and

Iran, neither of which has declared any intent to slow down force development. Other states in the Persian Gulf have committed themselves to arms packages that will keep deliveries coming through the 1990s.⁵ Iraq maintained diplomatic links with major arms producers during the Iraq–Iran War and improved its relations with the United States. In 1982 it was removed from the US list of countries sponsoring terrorism, and full diplomatic relations between the two countries were restored in 1984. After the cease-fire, Iran also improved relations with major arms suppliers, but there is no real evidence that this may lead to a renewal of Iran's arms relationships with Western countries.

The Iraqi war effort was principally underwritten by France and the Soviet Union, which provided 28 per cent and 47 per cent, respectively, of Iraq's major weapon systems. China accounted for over 50 per cent of Iranian imports of major weapon systems. It is possible that China will sustain its relationship with Iran, given possible political difficulties for Western countries in selling arms to Tehran.⁶ The war has had a major impact on the pattern of arms procurement throughout the Persian Gulf region by introducing new suppliers, notably Brazil, China, North Korea and Egypt, where the major powers (in particular France, the UK and the USA) had previously dominated. For these new suppliers and other smaller-scale exporters, the cease-fire may lead to a contraction in their arms exports, although this is not certain for China as noted above.⁷

The Brazilian arms industry is particularly vulnerable to any loss of orders by Iraq. The low domestic demand for major weapon systems and successive domestic economic crises have combined to make exports essential to the maintenance of the Brazilian defence industrial base.⁸ This applies in particular to the companies Avibras, makers of multiple rocket launch systems, and Engesa, makers of armoured vehicles. Continued production of the Engesa EE-T1 Osorio tank, for example, appears to hinge largely on whether it is sold to Saudi Arabia.⁹ Brazilian exports to the Middle East have not gone exclusively to Iraq and Iran. In 1988, reports of a major arms package deal with Libya also seem to have been confirmed.¹⁰

The Iraq–Iran War has accelerated the growth of regional arms industries under development before 1980.¹¹ Limited progress towards greater defence production capabilities during the war were reported in Iraq.¹² In Iran, the problem of access to military equipment stimulated a greater initiative with respect to the development of indigenous research and development (R&D) and the production of more advanced weapons. However, the primary effort was devoted to developing a greater capacity for the production of less sophisticated systems, ordnance and spare parts. While progress should probably not be exaggerated, it is clear that a significant investment in defence production has been made.¹³

The war has resuscitated wider Arab initiatives, as the need for greater defence industrial co-operation has been the catalyst for improved relations between otherwise antagonistic Arab countries.¹⁴ Egypt and Jordan emerged as important supporters of Iraq. Egypt supplied arms to Iraq worth an estimated \$982 million (in 1985 US dollars). Jordan has received considerable

quantities of second-hand arms from Iraq in the wake of the Iraq-Iran cease-fire.¹⁵ Libya and Syria in combination transferred arms worth an estimated \$300 million (in 1985 US dollars) to Iran.

III. The major suppliers

The Soviet Union and the United States continued to dominate the trade in major conventional weapons in 1988, accounting for roughly 38 and 28 per cent, respectively, of the global total (table 6.2). In terms of both policy and performance 1988 seems to have been an unexceptional year.

Table 6.2. The leading exporters of major weapons, 1984-88

The countries are ranked according to 1984-88 aggregate exports. Figures are in US \$m., at constant (1985) prices.

	1984	1985	1986	1987	1988	1984-88
<i>To the Third World</i>						
1. USSR	7 423	8 634	9 136	11 672	9 001	45 866
2. USA	4 905	4 009	4 845	6 229	3 490	23 479
3. France	3 345	3 664	3 420	2 635	1 671	14 736
4. China	1 207	1 011	1 313	2 187	2 011	7 730
5. UK	1 136	849	1 396	1 717	1 464	6 562
6. FR Germany	1 830	395	649	252	482	3 609
7. Italy	811	575	397	317	334	2 434
8. Brazil	271	172	124	466	338	1 372
9. Israel	263	160	242	394	178	1 237
10. Spain	475	139	163	139	205	1 121
11. Netherlands	57	38	132	263	570	1 059
12. Egypt	237	122	164	195	229	947
13. Czechoslovakia	306	124	124	198	146	897
14. Sweden	47	35	141	298	240	762
15. North Korea	36	95	48	98	109	386
Others	740	652	557	566	409	2 921
Total	23 089	20 674	22 851	27 627	20 877	115 118
<i>To the industrial world</i>						
1. USA	5 321	4 497	5 128	5 997	5 877	26 819
2. USSR	2 695	4 311	3 769	3 381	3 767	17 923
3. France	507	382	702	438	1 209	3 239
4. FR Germany	705	550	456	464	973	3 149
5. UK	772	797	409	135	122	2 235
6. Czechoslovakia	398	373	373	373	259	1 775
7. Canada	84	99	433	350	41	1 007
8. Sweden	57	117	177	173	286	809
9. Poland	92	92	92	92	92	462
10. Netherlands	41	51	109	2	186	388
11. Switzerland	13	54	46	15	80	208
12. Italy	58	16	6	61	63	204
13. Saudi Arabia	—	—	39	125	—	164
14. Austria	42	42	—	34	34	151
15. Israel	—	59	—	66	8	134
Others	238	170	57	184	95	744
Total	11 023	11 610	11 796	11 890	13 092	59 411

Table 6.2. *cont.*

	1984	1985	1986	1987	1988	1984-88
<i>To all countries</i>						
1. USSR	10 118	12 945	12 905	15 053	12 768	63 789
2. USA	10 226	8 506	9 973	12 225	9 367	50 298
3. France	3 853	4 046	4 122	3 073	2 881	17 975
4. UK	1 908	1 646	1 805	1 852	1 586	8 797
5. China	1 254	1 082	1 313	2 187	2 011	7 847
6. FR Germany	2 535	945	1 106	717	1 455	6 758
7. Czechoslovakia	704	497	497	570	405	2 673
8. Italy	869	590	404	379	397	2 638
9. Sweden	104	152	318	471	526	1 571
10. Brazil	301	188	140	482	356	1 468
11. Netherlands	98	88	240	265	756	1 447
12. Israel	263	220	242	460	186	1 370
13. Canada	107	132	472	387	67	1 165
14. Spain	475	139	172	139	211	1 136
15. Egypt	237	122	164	195	229	947
Others	1 060	986	773	1 063	768	4 650
Total	34 112	32 284	34 647	39 518	33 969	174 529

Source: SIPRI data base.

The Soviet Union

Concrete assessments of developments in Soviet arms exports are complicated by the fact that many transfers become public knowledge only once deliveries begin. There is seldom any comprehensive information about the size and contents of arms agreements, and it is often difficult to identify even the year in which agreements were made.

A belief that the Soviet Union will in the future seek to expand its arms transfers has been a feature of recent analysis.¹⁶ In April 1988, testimony to a US House of Representatives Foreign Affairs Subcommittee suggested that Soviet arms exports will rise as civilian economic reforms take effect within the Soviet Union.¹⁷ Another uncertainty is the significance of conflict resolution in the Middle East, Southern Africa and South Asia as a factor of growing importance in the bilateral relationship between the superpowers. In his first address to the Plenary Meeting of the UN General Assembly on 7 December 1988, President Mikhail Gorbachev stated that the Soviet Union 'was in favour of demilitarizing international relations' and 'drew the attention of the international community to yet another pressing problem—the problem of transition from the economy of armaments to an economy of disarmament'.¹⁸ The only specific reference to arms transfers in the statement came in the section discussing conflicts in the Third World, specifically that in Afghanistan. Gorbachev proposed 'stopping any supplies of arms to all belligerents' after 1 January 1989 as one of a series of supplementary measures to support the Geneva Accords signed in April 1988.

There is insufficient information to determine whether or not the Soviet Union would like to increase the scale of its arms exports. However, there are

reasons to question whether the Soviet Union could expand or contract the volume of its arms exports at will.

The bulk of Soviet exports to the Third World are delivered to a very small group of clients. The Soviet Union has had a total of only 20 Third World clients for its major weapons since 1970. However, a far smaller group than this dominates Soviet export policy. Angola, India, Iraq, Libya and Syria accounted for over 75 per cent of exports during the period 1984–88. These are not new relationships, the most recent being the Soviet–Angolan relationship which dates back to the mid-1970s. Moreover, these are countries with which Moscow has a range of ties outside the sphere of arms and military equipment. For example, India, Iraq and Syria have Treaties of Friendship with the Soviet Union.¹⁹ The volume of future Soviet arms exports is tied to the procurement policies of this small group of countries.

In the cases of Angola, India and Syria, there are reasons to believe that the scope for future arms exports by the Soviet Union is limited, at least in comparison with the scale of deliveries to these countries so far in the 1980s.

In Angola questions surround the extent to which equipment is intended for Cuban troops and which consequently may be withdrawn as Cuban troops leave Angola as part of the UN-sponsored agreement signed by Angola, Cuba and South Africa in Geneva on 15 November 1988.²⁰ This applies in particular to MiG-23 aircraft flown by Cuban pilots and later generations of SAMs dependent on personnel from the GDR for their effective operation.²¹ In the absence of these personnel, there are limits to the volume and technological level of equipment that Angolan forces could operate. In India there is no lack of infrastructure, trained manpower or repair and maintenance facilities in the country but programmes have reached a natural plateau. Following a six- or seven-year period of large-scale deliveries a period of absorption is probable, although several large deliveries remain in the pipeline.²²

The Indo-Soviet arms relationship will move increasingly in the direction of licensed production of current-generation Soviet equipment in India rather than direct transfers of major weapons.²³

In Syria, questions pertain more to shifts in the political relationship between Moscow and Damascus. A growing number of authors point to the growth of Soviet–Syrian differences in a number of areas.²⁴ A certain exasperation is to be found in some statements by Soviet officials, including the Soviet ambassador in Damascus, who noted that ‘the Syrians are willing to take everything from the Soviet Union except advice’.²⁵ 1988 saw a certain reticence enter the Soviet–Syrian arms transfer relationship. Syria was refused delivery of the SS-23 Spider missile, and there have been no further reported deliveries of an estimated order for 150 MiG-29 aircraft after the initial delivery of 12–20 aircraft in 1987–88.²⁶ Protracted negotiations concerning Su-24 fighter-bombers had not led to Soviet agreement to transfer the aircraft by December 1988, with US State Department officials suggesting that Soviet concerns over Syria’s payment record were the obstacle.²⁷ Syrian Defence Minister Mustafa Tlass has noted that, during the visit of President Assad to Moscow in April 1987, the Syrian delegation ‘had to fight for every bullet and cannon and bomb, and we received only our minimum needs’.²⁸ However, the Syrian case is

ambiguous. There have been persistent reports that Syria will receive three Kilo Class submarines from the Soviet Union and occasional erroneous suggestions that they have already been delivered to Syria. Other reports suggest that the vessels have been built in the Soviet Union but not yet delivered.²⁹ Some authors suggest that any slowing of Soviet deliveries is simply a natural hiatus in which Syrian forces can integrate the large amounts of equipment delivered since 1982.³⁰

Arms transfers in 1988 underline the Soviet tendency to supply equipment together with training in how to use it and the supplementary equipment needed to support it, rather than to sell equipment of a specific designation—such as a given make of tank or aircraft—on an *ad hoc* basis. The USSR has tended to meet the needs of its clients over a broad range of military equipment, including armoured vehicles, missiles, aircraft and to a lesser extent naval vessels, especially diesel electric submarines. In Angola and North Korea this has led to the supply of comprehensive air defence packages including fighter aircraft, mobile anti-aircraft guns and anti-aircraft missiles, fixed batteries of SAMs for the defence of key installations (some of which are still under construction) together with the radars and communications equipment necessary for command and control.³¹ In North Korea the delivery schedule has been slower, reflecting the different security environment of the Korean peninsula compared with the war under way in South-West Africa. The composition of the package has been very similar in its structure and philosophy—a mix of fighter aircraft, fixed batteries of SAMs and mobile SAMs together with the requisite radars and communications equipment. However, there have been differences in the specific composition of the deals. For example, whereas in North Korea the package supplied included the first export of the Tin Shield early-warning/target-acquisition radar, the Angolan package included MiG-21 aircraft which are no longer in production in the Soviet Union.³² These differences reflected the high level of technical competence and organizational experience in North Korea as compared with Angola. In both cases, however, it is clear that a central component of planning the shape and size of the packages must have been close liaison with local decision makers.

The United States

A small number of recipients dominate US export patterns to the Third World. Between 1984–88 Egypt, Israel, Pakistan, Saudi Arabia and South Korea account for 63 per cent of US exports to the Third World. There is no evidence that the current review of US foreign commitments will lead to a reassessment of the importance of military technology transfers. However, with the exception of Saudi Arabia, these countries share an intention to develop their own capacity for industrial defence production which will probably reduce the extent to which they buy arms as finished items. Egypt and Taiwan have both accelerated their efforts to pursue this path in the 1980s, although neither has taken a major decision relating to this process in 1988. The clearest illustrations of this trend have instead been seen in relations with Israel.

The largest single US-Israeli agreement in 1988 was the transfer of 75 F-16C fighters to compensate for the cancellation under US pressure of the Israeli Lavi aircraft.³³ However, deals unfolding in 1988 emphasized the central role of the USA in Israeli defence industrial production. In June the USA agreed to meet 80 per cent of the costs of the development of a short-range anti-ballistic missile system under development in Israel. Known as Chetz, or the Arrow, the estimated cost of the programme is \$700-1000 million.³⁴ In September the US Defence Department confirmed that the Arrow programme would lead to testing at an Israeli test range within three years.³⁵ It should be noted that the US-Israeli relationship is not typical of relations with the Third World generally, and the closer co-operation in the area of military R&D does not constitute any sort of widespread model.

In 1988 questions of arms transfer control dominated the discussion of the arms trade in the United States. A variety of international forums were used to press the case for controlling the spread of certain specific weapon systems. Two areas have been stressed in particular, the proliferation of ballistic missiles and of chemical weapons, which receive detailed treatment in chapters 7 and 4, respectively, of this *Yearbook*. In the joint statement following the meeting in Moscow between President Reagan and General Secretary Gorbachev, the leaders agreed to bilateral discussions at the level of experts on the problem of proliferation of ballistic missile technology.³⁶ At the 1988 United Nations Special Session on Disarmament, Secretary of State Shultz made the first of these issues, the proliferation of ballistic missiles, the centre-piece of his presentation to the plenary session. In bilateral discussions with counterparts in the People's Republic of China in July and September respectively, both Shultz and Defense Secretary Carlucci raised the question of sales of missiles in the Middle East.³⁷ In a televised news conference in Geneva, US Ambassador Kampelman noted that it was '[u]nfortunate that at a time while we were abolishing missiles others were manufacturing, selling and deploying'.³⁸ The United States pursued bilateral discussions on the issue with the Soviet Union in talks between US Assistant Secretary of State H. Allen Homes and Soviet Ambassador Viktor Karpov at meetings in Washington at the end of September.³⁹

Chinese exports of CSS-2 missiles to Saudi Arabia were a subject for criticism rather than pressure, as the USA was apparently unaware of the agreement before deliveries began. However, the prospect of Chinese sales of M-9 missiles to Syria and the joint development by Egypt and Argentina of a missile called the Condor-2 in Argentina were the subject of specific actions. In the latter case, the representatives of Canada, the Federal Republic of Germany, France, Italy, Japan, the UK and the USA met in Rome on 8-9 September under the auspices of the April 1987 Missile Technology Control Regime.⁴⁰ At the meeting the seven states agreed to try to persuade Argentina to stop the Condor programme, currently still in the development stage.⁴¹

Prospective sales of Chinese missiles to Syria were also the subject of specific US attention. Syria and China have discussed the sale of the M-9 surface-to-surface missile. Under development by China, this missile is expected to enter production in 1989. The issue of the transfer was raised specifically both by

Secretary of State Shultz in his visit to Beijing—at which time the Chinese emphasized that the missile was not even in production—and in the US Senate.⁴²

Irritating trans-Atlantic relations were persistent reports that one consequence of the creation of a single European market in 1992 would be the erection of tariff barriers against US military equipment.⁴³ Defence goods from outside the member states are specifically excluded from any general EC duties in the Treaty of Rome and the Single European Act of 1987. However, in September 1988 a draft regulation circulated among members of the EC Commission in which major items and finished products would remain exempt from any duty. The report made no mention of radars or defence electronics, which make up a large proportion of US exports to Europe in the defence sector.⁴⁴

US–British relations were affected by Canada's intention to acquire 10–12 nuclear-powered attack submarines. In 1988 funds for the project-definition stage of the programme were allocated, although it is not likely that any specific proposal will be submitted for Cabinet discussion until 1990.⁴⁵ The vessels will be built in Canada, but Canadian 'teams' of companies will link with overseas contractors from Britain or France. The British offer is contingent on decisions by the United States under a 1958 US–British agreement by which nuclear technology could not be transferred to third parties without consent⁴⁶ and a 1959 US–Canadian agreement whereby Congress can veto the transfer of US nuclear technology to Canada.⁴⁷

There were two US complaints concerning British arms trade policy. The first related to British objections to any US arms sales to Argentina, embargoed since the Falklands/Malvinas War of 1982. By 1988, Argentina was finding it difficult to maintain equipment of US origin because of a lack of spare parts and was apparently looking to other suppliers. There were rumours of negotiations between Argentina and South Africa as well as of growing Chinese interest in making sales to Buenos Aires.⁴⁸ Although reluctant to sanction any supplies to Argentina without British agreement, in October 1988 the USA made available limited credit facilities for the purchase of spare parts for helicopters and armoured personnel carriers (APCs).⁴⁹ Washington also apparently expressed dissatisfaction with British arms sales to Chile in advance of the September plebiscite on the future political development of that country.⁵⁰

Whether and how far Congress ought to be able to regulate US export policies has been a feature of the domestic debate over arms transfers in the USA throughout the 1980s. Chapter 8 of this *Yearbook* contains a description of the legal framework for US exports, which contributes to struggles between the executive and legislative branches over the issue of arms sales. 1988 was not as contentious as 1986 and 1987, when Bahrain, Jordan, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates all criticized US responses to equipment requests.⁵¹ In 1988 a proposal by the Administration to sell 40 F/A-18 Hornet fighter aircraft with armaments including AGM-65 Maverick and AGM-84A Harpoon air-to-surface missiles was agreed by Congress, but not without modification. In July an initial package submitted for congressional approval included the anti-armour version of the Maverick as requested by

Kuwait. The Senate raised objections on the grounds that it might be used against Israel. The Kuwaiti response was to say that without the Maverick missiles the entire deal would be cancelled and it would look elsewhere for suppliers. In August a modified package was agreed by the US Senate and accepted by Kuwait in which the Maverick would be supplied but in its anti-ship version. Moreover, Kuwait would return one of its 30 A-4 Skyhawks to the USA for each F/A-18 delivered.⁵²

France, the FRG and the UK

France, the Federal Republic of Germany and the United Kingdom are discussed together in this section in an effort to highlight similarities and differences in their participation in the arms trade. The similarities are much more striking, in each case stemming from the perceived common need to sustain the capacity to manufacture major weapons across the spectrum of land, sea and air systems. With limited domestic demand, the unit costs of these systems continued to grow, putting all three countries under increasing budgetary pressure. All three have sought to encourage the development of a European defence industry in which companies from several countries are engaged in joint ventures to produce weapon systems which they could not produce alone. The aim is to spread R&D costs and to open a wider European market, thereby lengthening production runs and lowering unit costs. While all three countries have accepted that they are unable to sustain autonomous defence production, they have also identified some specific areas where they will continue to bear the costs of developing current-generation systems alone.

These countries show the same concentration on key recipients that was shown for the superpowers. In the case of France, over 50 per cent of exports are accounted for by India, Iraq and Saudi Arabia. For the United Kingdom, nearly 60 per cent of deliveries are accounted for by India, Indonesia, Nigeria, Oman and Saudi Arabia. Egypt, an important client, is absent because of the tendency to import components, technology and expertise rather than finished systems.⁵³ For FR Germany, the concentration is most pronounced, with Argentina accounting for over 30 per cent of its exports to the Third World.

This approach is illustrated by Anglo-German co-operation in the Tornado and the European Fighter Aircraft (EFA) programmes and the French decision to develop the Mirage-200 and Rafale as national aircraft. In 1988 the UK deferred a decision on whether to continue producing the Challenger tank, to seek a co-operative agreement with other countries or to buy a foreign system. The future of Rafale and Challenger are in doubt, but it is clear that neither France nor the UK can develop successors to them from national resources. This is central to arms export policy because these and similar programmes represent the future of European defence production.

Aware of the concentration of sales to a few countries with the progressive reductions in the price of oil and consequently in the purchasing power of the largest importers, the major arms producers of Western Europe have been concerned to look to new markets, especially in South and South-East Asia, which were peripheral in the 1970s.

In the 1980s West European companies have sought to establish closer arms relationships with Asian countries as part of a wider reassessment of the place of that continent within the international economy.⁵⁴ These arms relationships have included co-operative projects, particularly in the area of aerospace, reflecting the insistence by Asian countries that arms programmes include a degree of local production. This reinforces the fact that developing countries will no longer buy arms at commercial rates, but will insist on using defence expenditure to support local industry.⁵⁵

In 1988 British Aerospace (BAe), Avions Marcel Dassault of France, Messerschmitt-Bölkow Blohm (MBB) of FR Germany and the Italian company SIAI-Marchetti of the Agusta industrial group all expanded existing links with South-East Asian countries. Dassault offered to reopen production of the Super Etendard fighter-bomber by moving a complete production line from Bordeaux to Indonesia.⁵⁶ BAe signed a Memorandum of Understanding (MoU) establishing a joint venture company with the Sheng-Li Group of Singapore (owners of Singapore Aircraft Industries and the Singapore Technology Corporation) and made concerted efforts to do the same with Malaysian, Indonesian and South Korean companies.⁵⁷ MBB was looking to sell licences to make components for a military version of the Airbus in Indonesia (where the BO-105 helicopter is already produced under licence), Malaysia and Thailand.⁵⁸ The Agusta group sold the S-211 trainer to the Philippines in a deal which included limited licensed assembly.⁵⁹ US companies have long adopted the same approach in the two most important East Asian economies, Japan and South Korea. The Japanese FSX programme is discussed in greater detail below.

The linkages with Asian countries have also included more traditional transfers of weapon systems, the biggest in the region in 1988 being the sale to Malaysia by the UK of a package of equipment including Tornado multi-role aircraft and a refurbished submarine together with SAMs and artillery.⁶⁰

The sale of the Tornado aircraft to Jordan in 1988 has illustrated how closely European countries are integrating export policies as a consequence of collaborative production. For the purpose of sales outside NATO, the UK takes the lead in negotiations and in managing the transfer as it unfolds. FR Germany is treated as a sub-contractor in order to avoid any clash between British and West German export laws. In 1983 the UK suggested that FR Germany waive the ability to restrain sales altogether, to which Chancellor Kohl agreed.⁶¹ Nevertheless, there is close consultation with FR Germany and Italy over what constitutes acceptable financial terms and over production and delivery schedules.⁶² In FR Germany the proposal that a state-owned bank, the Kreditanstalt für Wiederaufbau (KfW), would lead a consortium of German banks offering credit facilities to Jordan as part of the financial arrangements involved in the sale of the Tornado to that country led to objections from opposition parties in the Bundestag. In the event, the KfW withdrew from the consortium arranging the credit.⁶³

The long-term policy of West European countries—judging that for the most part Third World economies are developing slowly if at all—has been based on increased efforts to sell arms within the NATO alliance framework. Arms

transfers within NATO are likely to increase as a proportion of the total global trade, as deliveries to Third World countries continue to decline. A more important change in the nature of the European armaments industry will stem from the gradual decline in the capacity of European states to produce the broad spectrum of weapon systems themselves. It is already possible to identify programmes whose progress will define the future development of European aerospace industries.

The EFA has perhaps come to symbolize the prospects for collaborative defence production in Europe. The programme includes FR Germany, Italy, Spain and the UK, with the division of funding being unequal among these partners. FR Germany and the UK each has a 33 per cent share, Italy 21 per cent and Spain 13 per cent. On 16 May 1988, the Defence Ministers of FR Germany, Italy and the UK signed a third MoU on the EFA, formally committing funds to the production of eight prototypes in the Experimental Aircraft Programme (EAP). While the UK has contributed the greatest share to this phase of development, ultimately the West German contribution to EFA will probably be the largest. While estimates of the programme cost cannot be considered definitive, the total costs of R&D have been put at \$9.2 billion, with the total programme costs at \$37 billion for 800 aircraft.⁶⁴ This would make the R&D component about 25 per cent of the total programme costs and the flyaway unit cost \$46.25 million. The purchase of long-lead items was initiated in January, and competitions for important sub-systems such as radars and engines commenced after May.⁶⁵ The Spanish Defence Minister did not attend the May signing, but sent a letter of support which implied that Spain would sign shortly thereafter. When this did not occur, there was speculation that Spain might leave the programme in favour of participation in the French Rafale programme.⁶⁶ Discussions between France and Spain included a French offer that Spain would not only receive full transfer of technology but would also have the right to export the Rafale to African countries.⁶⁷

In October the Spanish Defence Minister made it clear that Spain intended to remain in the EFA programme but did not rule out participation in the Rafale programme as well.⁶⁸ At the beginning of November, contracts were signed for the development of the airframe and engines. The Eurofighter Consortium, consisting of BAe, MBB, Aeritalia of Italy and Construcciones Aeronauticas (CASA) of Spain, contracted to produce the airframe. The Eurojet Consortium, consisting of Rolls Royce, MTU of FR Germany, Fiat of Italy and Sener of Spain, contracted to build the engine.⁶⁹ By October it was not the EFA whose future seemed in doubt so much as the Rafale, with both Spain and FR Germany trying to persuade France to join the EFA programme.⁷⁰ French Defence Minister Chevenement noted in an interview: 'Let us not rule out developing co-operation between the Rafale and the EFA . . . exchanges, associations are possible in the area of engines, radars, landing gears, armament systems, electronic equipment which now accounts for a large part of aircraft costs'.⁷¹ 1988 has seen much discussion in France of the costs of the Rafale, principally as a result of a report compiled by Deputy Michel Bernard and completed in February 1988, which revealed that the programme was running well over budget and that it had been imposed on the French Air Force

and Navy, both of which had expressed a preference for the direct purchase of US F/A-18 Hornet aircraft.⁷² The report suggested that the unit cost of US aircraft was likely to be 50 per cent lower than that of the Rafale. Dassault, the manufacturer of the Rafale, estimated the programme costs to be \$25.2 billion, of which R&D would account for \$8.89 billion, over 35 per cent of the total. These calculations were based on production of 330 aircraft for the Air Force and Navy, which would make the unit cost \$76 million.

China

Attention on the role of China as an arms exporter grew after 1982, when SIPRI noted a doubling of Chinese exports and the US Arms Control and Disarmament Agency logged a threefold increase in Chinese export figures. Chinese efforts to maximize exports are contrasted with export policies up to the late 1970s, which were based chiefly on aid programmes pursued for political and ideological gains.⁷³ It is clear that in the 1980s aid no longer plays such a central role in Chinese arms export policy. However, deals unfolding in 1988 suggest that it remains important.

Following the pattern of other major arms exporters, Chinese exports are concentrated on a small number of important clients. Egypt, Iran, Iraq, Pakistan and Saudi Arabia account for almost 90 per cent of Chinese deliveries of major weapons over the five-year period 1984–88. The cease-fire in the Iraq–Iran War will reduce the demand in Iraq for Chinese weapons and ammunition, although Iran may remain important.⁷⁴ In Egypt, where the armed forces have been unable to get access to Soviet equipment or expertise since 1974, China has been an important substitute. Since late 1986 Chinese experts have been in Egypt supervising the setting up of production lines for Soviet-model spare parts, chiefly for armoured vehicles. China has provided Romeo Class submarines and copies of the Soviet MiG-21 fighter, the latter being assembled in Egypt.⁷⁵

If the demand for Chinese arms in Egypt, Iraq and Iran declines, sales will revert to a more traditional pattern, dominated by traditional clients such as North Korea and Pakistan. A series of agreements signed since 1986 have made Thailand an increasingly important customer for Chinese weapons. Sino-Thai relations began to improve after the Vietnamese occupation of Cambodia in 1978, but did not take on an arms transfer dimension until 1985.⁷⁶ In 1987 the Royal Thai Army confirmed for the first time that it had ordered Chinese versions of the Soviet T-54 tanks, 130-mm artillery and APCs and that the Royal Thai Air Force had ordered Chinese anti-aircraft guns. In 1988 Thailand ordered 4 frigates, minesweepers, Type 69 tanks, 1600 APCs, SAMs and SAM guidance systems (probably the HN-5C short-range mobile SAM), and quantities of 130-mm ammunition.⁷⁷

The political utility of arms sales was stressed by Chinese officials in 1988 in response to US criticism of China's exports. They pointed out in particular that other major powers regard their own arms sales as legitimate foreign policy tools that can contribute to regional stability, particularly in the Middle East, and Foreign Minister Wu Zueqian put the sale of the CSS-2 East Wind to Saudi

Arabia in this context. Noting that the sale was conducive to stability in the Middle East, Wu added that hopefully it would lead to the earliest establishment of diplomatic relations between the two countries.⁷⁸

If arms sales can be seen as a means of bolstering China's status as an important power, there is also a clear link to domestic defence economics. In the 1980s, the share of national resources allocated to defence has declined consistently as a share of national resources except in the sphere of R&D.⁷⁹ This emphasis reflects a belief that genuine military self-sufficiency can only come from domestic economic and technological strength, which cannot be acquired in the short (or even the medium) term. China has searched for technology-sharing agreements with Australia, Israel, the United States and West European countries. Manifestations of these partnerships in 1988 included US plans to install avionics on both the Chinese F-8 fighter and on a new Chinese trainer aircraft, the L-8; Italian collaboration on the avionics for a new version of the A-5 Fantan fighter; and a Sino-Franco-Australian partnership to develop a new helicopter.⁸⁰

In the absence of any domestic orders for equipment, exports can play a role in maintaining the production capacity and the defence industrial base in China, pending the modernization of the People's Liberation Army (PLA) which will inevitably come at some point in the future. However, given the potential scale of this modernization there is no evidence that China can export sufficient equipment to keep factories in production. PLA ground forces alone include an estimated 11 450 main battle tanks, 2000 light tanks, 1800 APCs, nearly 27 000 artillery pieces of various kinds, 9500 multiple rocket systems and 15 000 anti-aircraft guns. Much of this inventory is up to 30 years old.⁸¹

IV. The economics of arms transfers in 1988

Commercial rationales clearly play a part in shaping the way defence manufacturers regard arms exports, and collectively this group of companies is regarded by governments as a key element of national defence. It is not argued here that governments are indifferent to the prospect of financial returns from arms sales. However, viewed from finance ministries, arms exports do not necessarily contribute to the overall wealth of the exporting country. What they in effect do is act as an indirect subsidy from exporting governments to their own defence industries.

In 1988 British sales to Malaysia and Saudi Arabia offered some insight into the complex economic arrangements accompanying arms transfers. After several years of negotiation, the deal with Malaysia seemed likely to be cancelled in early 1988 because Malaysia refused to proceed unless the deal was accompanied by reciprocal trade advantages in the UK. The British-Malaysian deal has been valued at between £1 billion and £1.5 billion (\$1.5-2.5 billion), with deliveries over the next 15 years. However, the financial arrangements include undisclosed amounts of indirect credit from the UK.⁸²

The Saudi deal was also a product of multi-year discussions and, although an agreement was signed on 3 July 1988 in Bermuda, many contractual details were not defined, including provisions for a 'positive and constructive

Economic Offset Programme'.⁸³ Some of the elements of the offset programme which have emerged are as follows. An MoU has been signed covering joint ventures by Saudi and British companies, with the transfer of high technology to Saudi Arabia as a priority. With this in mind, the joint ventures will also include licensing agreements and technical training.⁸⁴

In both of these cases, the financial arrangements include the provision of oil and other commodities to British companies as partial payment. These goods will then have to be re-sold by the companies concerned. For some this will be less problematic than for others since they are part of an industrial group which includes oil or commodity divisions experienced in marketing such products. In 1988 a fall in the price of oil at the time the Saudi deal was announced was specifically put in the context of fears among oil traders that Saudi Arabia would increase output to pay for arms imports, although the Saudi Government denied this.⁸⁵ Payment in oil or commodities blurs the real value of arms deals by linking them to a fluctuating market price for commodities. In the UK a department within the Trade Ministry, the Export Credits Guarantee Department, insures British manufacturers against defaults in payments by overseas customers, up to a ceiling set on a country-by-country basis. In 1988 the level of funding available for this purpose was increased by £1 billion (\$1.6 billion), although the specific countries against whose payment this money was contingent were not specified.⁸⁶

Arms relationships with India, North Korea and Syria also bring into question the extent to which arms exports represent a major source of hard currency to the Soviet Union.⁸⁷ In the case of India, arms transfers are paid through an arrangement by which Moscow has a rupee clearing account in New Delhi. As the rupee is not a convertible currency, this forces the Soviet Union to buy goods in India.⁸⁸ In the case of Middle Eastern countries, it is assumed that arms transfer accounts are settled in hard currency clearing accounts, but it is not clear whether these accounts are in fact ever settled. In the case of Syria, by the time of Assad's visit to Moscow, Damascus had built up a debt of over \$12 billion. During his visit the Soviet Union wrote off \$4 billion and agreed that the remainder be spread over 40 years with payments beginning in 1991.⁸⁹ In North Korea the extent to which hard currency is available for payments to the Soviet Union is also called into question by the fact that in 1987-88 Pyongyang was held in default of foreign debts totalling \$4.1 billion, half of which is apparently owed to socialist countries.⁹⁰

In the case of China, sales to Thailand take place on a concessional basis, perhaps as little as 10 per cent of their value, with payments waived for 10 years.⁹¹ Moreover, the Chinese defence sector has to compete for resources with other sectors of the economy. One analyst has noted that, in 1987, 'demand vastly outstripped available supplies of energy, raw materials, and high quality producer and consumer goods'.⁹² Production costs must reflect this, although it is widely accepted that the unit price charged by China to a recipient is less than that of other suppliers. For example, the cost of a Type 59 tank has been said to be \$250 000.⁹³ A Type 69 tank (a version of a Soviet T-59 with an Israeli-supplied 105-mm gun) is believed to cost \$750 000.⁹⁴ The cost of a Chinese F-7 aircraft (a version of the Soviet MiG-21) was quoted to be around

\$3.5 million in 1987.⁹⁵ It is worth noting that there is seldom if ever any explanation of how this valuation was arrived at. However, assuming that the figures are correct and that all customers pay in hard currency, China would have to deliver a large number of major weapons to make arms exports an important component of the economy. There is no evidence that deliveries on this scale take place.

V. The major recipients

A small group of countries—Egypt, India, Iraq, Israel, Saudi Arabia and Syria—has been responsible for over 65 per cent of all arms imports by the Third World as measured by SIPRI over the past five years (table 6.3). This group accounts for a significant percentage of the total trade in major conventional weapons.

India

Thus far in the 1980s, India has become the country which imports the greatest number of major conventional weapons in the world. The Indian Army, Navy, Air Force and Coast Guard have all been the recipients of significant amounts of new equipment either imported directly or produced under licence in India. Many of the arms programmes currently unfolding in India are the outcome of deals finalized in the turbulent five-year period 1978–82, when officials discerned a disturbing pattern emerging in regional politics by which serious domestic instability was followed by intervention. The 1978 coup in Afghanistan and the revolution in Iran were followed by the Soviet invasion of

Table 6.3. The leading importers of major weapons, 1984–88

The countries are ranked according to 1984–88 aggregate imports. Figures are in US \$m., at constant (1985) prices.

	1984	1985	1986	1987	1988	1984–88
<i>Third World</i>						
1. Iraq	3 940	2 958	2 179	4 632	2 339	16 048
2. India	1 016	1 876	2 946	5 048	3 378	14 263
3. Saudi Arabia	862	1 447	2 697	2 217	2 066	9 289
4. Egypt	2 322	1 295	1 682	2 335	354	7 987
5. Syria	1 604	1 690	1 508	1 172	1 133	7 107
6. North Korea	654	1 123	1 038	787	2 169	5 772
7. Angola	697	694	974	1 135	890	4 391
8. Pakistan	654	675	616	564	856	3 365
9. Iran	268	739	883	802	656	3 348
10. Libya	425	969	1 359	294	65	3 112
11. Taiwan	378	664	866	642	556	3 105
12. Israel	290	192	446	1 629	327	2 884
13. South Korea	259	388	323	635	736	2 341
14. Afghanistan	210	82	359	435	1 097	2 184
15. Argentina	1 062	388	315	180	160	2 106
Others	8 448	5 494	4 660	5 120	4 095	27 816
Total	23 089	20 674	22 851	27 627	20 877	115 118

Table 6.3. *cont.*

	1984	1985	1986	1987	1988	1984-88
<i>Industrial world</i>						
1. Japan	1 529	1 632	1 743	1 615	1 671	8 190
2. Czechoslovakia	818	1 588	1 347	1 228	824	5 804
3. Turkey	563	604	621	1 097	1 090	3 975
4. Spain	36	129	940	1 454	1 362	3 921
5. Poland	424	427	877	952	876	3 556
6. Canada	641	778	747	678	506	3 351
7. GDR	979	609	420	268	808	3 084
8. Netherlands	917	787	676	322	214	2 916
9. Australia	445	352	699	478	628	2 602
10. USSR	481	497	473	497	369	2 317
11. UK	810	420	418	360	247	2 255
12. Hungary	3	759	507	592	—	1 861
13. Greece	264	192	156	98	1 150	1 860
14. Yugoslavia	125	89	89	220	1 209	1 732
15. FR Germany	445	191	431	334	324	1 725
Others	2 543	2 556	1 652	1 697	1 814	10 262
Total	11 023	11 610	11 796	11 890	13 092	59 411
<i>All countries</i>						
1. Iraq	3 940	2 958	2 179	4 632	2 339	16 048
2. India	1 016	1 876	2 946	5 048	3 378	14 263
3. Saudi Arabia	862	1 447	2 697	2 217	2 066	9 289
4. Japan	1 529	1 632	1 743	1 615	1 671	8 190
5. Egypt	2 322	1 295	1 682	2 335	354	7 987
6. Syria	1 604	1 690	1 508	1 172	1 133	7 107
7. Czechoslovakia	818	1 588	1 347	1 228	824	5 804
8. North Korea	654	1 123	1 038	787	2 169	5 772
9. Angola	697	694	974	1 135	890	4 391
10. Turkey	563	604	621	1 097	1 090	3 975
11. Spain	36	129	940	1 454	1 362	3 921
12. Poland	424	427	877	952	876	3 556
13. Pakistan	654	675	616	564	856	3 365
14. Canada	641	778	747	678	506	3 351
15. Iran	268	739	883	802	656	3 348
Others	18 084	14 629	13 849	13 802	13 799	74 162
World total	34 112	32 284	34 647	39 518	33 969	174 529

Source: SIPRI data base.

Afghanistan and the outbreak of the Iraq-Iran War, respectively, as well as the creation of the US Central Command. However, since India does not face a conventional threat from its neighbours, procurement has increasingly responded to medium- and long-term extra-regional challenges and plans for industrial, technological and scientific development.

Indian modernization programmes follow a pattern in which the need for a replacement system is identified early and the preference for a domestically developed system leads to the initiation of an Indian programme. Programme development is usually slower and more expensive than expected, leaving a choice between maintaining ageing equipment at growing cost or importing foreign systems. Licensed production represents a compromise that promises faster delivery of a proven system and a degree of technology transfer.

However, the decision to import systems creates problems for the indigenous development programme. The requirement which it was intended to meet is no longer a pressing priority since the new systems are being bought, and as a result it becomes more difficult to argue for funding for the given indigenous programme in the face of the competing claims for resources. This pattern shows up in Indian tank modernization, in surface ship design, in the programme to develop an advanced light helicopter (ALH) and in the development of a new-generation light combat aircraft (LCA).

In 1988 the project definition stage of an Indian LCA, one of a very few areas of Indo-US military co-operation, was completed. In addition to General Electric, which supplied eight F404 engines for the initial prototypes of the LCA, a Letter of Acceptance was signed in September 1988 to facilitate co-operation between the Indian Defence Research and Development Organisation and the US Air Force aeronautical laboratories on certain projects relevant to the LCA. The aircraft will also incorporate French avionics (from Dassault) and Swedish radar (from Ericsson).⁹⁶ However, the submarine programme offers the best illustration of the pattern of Indian procurement.

In January 1988, the Indian Navy took possession of a Soviet-designed nuclear-powered attack submarine of the Charlie-1 Class. The purpose here is to explain how this arms deal fits into the wider context of Indian submarine procurement policy. Discussions of the current generation of submarines for the Indian Navy began in the early 1970s and produced three conclusions: that India should aim to build submarines in the country, that in the immediate future this would not be possible and that consequently there would have to be an overseas purchase to meet the needs of the Indian Navy in the interim.⁹⁷ The discussion included the possibility that India would at some point want to build a nuclear-propelled submarine. In December 1983, answering questions in the Indian Parliament, Defence Minister Ramaswamy Venkataraman said: 'I have already said that we keep our options open in this matter; if necessary we will go in for it. But then a nuclear powered submarine is different from the nuclear submarine with nuclear warheads. I have already said that we are not going to use atomic energy for anything but peaceful purposes. Therefore, we will use it for the power . . . It will be only propulsion.'⁹⁸

The shipbuilding expertise, shore-based facilities and manpower needed to build and operate nuclear submarines were lacking in India and could not be acquired quickly, especially since the USSR was apparently reluctant to transfer either nuclear-powered submarines themselves or the technology required for their construction in India.⁹⁹ From the mid-1970s, a number of West European submarine designs had been under consideration.¹⁰⁰ India stipulated a design which could teach production and operating skills relevant to nuclear-powered submarines, and the design offered by the West German company Howaldtswerke-Deutsche Werft (HDW) met these criteria. In 1981 HDW won the order based on a stretched version of the Type-209 called the Type-1500.¹⁰¹ The initial order covered the sale of two submarines to be built in Kiel and included an option to produce up to four subsequently in India.¹⁰²

In early 1984 there were reports of discussions with the Soviet Union on the

supply of more advanced, possibly nuclear-powered, vessels and the training of Indian crews in the Soviet Union.¹⁰³ By late 1984, the Soviet Union was apparently prepared to offer India submarines of more modern design in considerable numbers. Vice Admiral R. H. Tahiliani, then Vice Chief of Naval Staff, took a leading role in talks in Moscow in September 1984 after which official sources stated that the defence relationship had taken on 'a new dimension'. This has been interpreted to have meant that the Soviet Union agreed to allow India access to nuclear-powered submarines.¹⁰⁴ A formal agreement to lease a nuclear-powered submarine from the Soviet Union appears to have been signed in 1985.

In 1988 India decided not to exercise the option to build the final two submarines. Initially the Indian press put this in the context of a parallel controversy in FR Germany surrounding the allegation that the company HDW had illegally supplied South Africa with plans to build a submarine.¹⁰⁵ It has emerged that this had nothing to do with the Indian decision and India will instead discuss the construction of vessels of even larger conventional designs to acquire more of the skills which will contribute to an indigenous nuclear-powered submarine programme.¹⁰⁶

Saudi Arabia

Saudi attitudes to procurement are very different from Indian policy. Saudi Arabia is dependent on imports of major systems and has a very small defence industrial base. In 1988, the tendency to import major weapon systems was illustrated in the most dramatic manner with the delivery of Chinese IRBMs and the extension of the Al Yamamah contract with the UK involving the sale of a package of equipment—principally the collaboratively produced Anglo-German-Italian Tornado multi-role combat aircraft—and military construction. Deals unfolding in 1988 also illustrate the diversification of supplier in every area of equipment that has been under way in the 1980s in Saudi Arabia. In the five-year period 1979–83 the USA accounted for over 80 per cent of the major weapons delivered to Saudi Arabia; in 1984–88 this percentage had fallen to below 40 per cent. Conversely, the percentage of imports of major conventional weapons from West European countries increased from 15 per cent to nearly 60 per cent over the same period. In 1988, in addition to the major deal with the United Kingdom, Saudi Arabia placed orders worth 2.5 billion francs (\$422 million) with France for fast patrol boats and missile-armed helicopters.¹⁰⁷

To some extent this policy has been forced on Saudi Arabia by congressional objections to sales that the Reagan Administration would have preferred to go ahead with, but the reorientation in Saudi policy pre-dates problems with Congress. In June 1983, a deal for the sale of 800 tanks was refused by the FR German Government.¹⁰⁸

Saudi Arabia is further diversifying its suppliers. The delivery of up to 50 CSS-2 East Wind missiles from China to be deployed over the next two years at the Al-Kharj air base, 50 km south of Riyadh, was revealed in March 1988 (the order was agreed in 1985).¹⁰⁹ Moreover, the Royal Saudi Army is selecting a

new tank; the two systems still under evaluation are the US M-1 Abrams and the EE-1 Osorio from Brazil.

These new transfer relationships notwithstanding, deals signed in the 1980s have committed Saudi Arabia to close military ties to Western Europe for the next 15 years. In July a follow-on order to the 1985 Al Yamamah deal with the UK, dubbed Al Yamamah II, was revealed. This deal will mean that the Tornado will ultimately be the single most important component of the Royal Saudi Air Force, at least numerically.¹¹⁰ The total requirement is for a minimum of 120 aircraft, and in 1987 the USA, as a consequence of congressional intervention, decided to replace Saudi F-15s on a one-for-one basis as there were losses through attrition, maintaining the overall number at 61.

Co-operation between Saudi Arabia and the UK in the field of aircraft procurement and operations stretches back to the 1960s. In May 1973 the UK in effect undertook to create and support the Royal Saudi Air Force, including technical support of all aircraft, armament maintenance and military construction.¹¹¹ This agreement was renewed in 1977 and again in 1985; the 1988 contract needs to be seen as part of this 15-year relationship.

Aircraft procurement can be put in the context of long-term programmes established for the Royal Saudi Air Force, and in the context of efforts to establish through the Gulf Co-operation Council (GCC) and bilateral arrangements with Arab countries a regional collective security framework.¹¹²

In 1985, the decisions by Saudi Arabia and Oman to buy the Tornado aircraft suggested some efforts to spread the burdens of repair and maintenance in equipment programmes. In 1988 the decision by Jordan to buy the Tornado was influenced by Saudi financial guarantees for the programme and possibly by similar burden-sharing arrangements in the areas of support and maintenance. It is difficult to estimate the degree of co-ordination in procurement policies of GCC countries thus far, but in the long term the capacity of the organization may be considerable. In the December 1987 summit meeting, the GCC accepted proposals submitted by its Military Committee including the formulation of joint operational plans, operational liaison and a unified defence manufacturing authority.¹¹³

Adjustments have been made in Saudi procurement policy in direct response to the Iraq-Iran War, perhaps most noticeably in naval policy. In 1988 the UK and France both signed agreements for the transfer of vessels to Saudi Arabia. The UK sold six Sandown Class minehunters although, since this class has only just entered production, rapid delivery is unlikely. France sold 20 small, fast patrol boats as part of a larger arms package including helicopters. The use of mine warfare and raiding attacks by small, fast patrol craft were features of Iranian operations in 1986 and 1987. The decision to buy minehunters has led to the postponement of long-term Saudi plans to buy a submarine fleet, orders for which have been anticipated for several years now.

Japan

Between 1984 and 1988, Japan consistently imported major weapons worth in excess of \$1.4 billion per annum, as calculated by SIPRI. According to the Office of the Under Secretary of Defense for Research and Engineering, the total value of Japanese imports is just over \$2 billion annually.¹¹⁴ As measured by value, Japan is clearly a major importer of conventional armaments. Over 95 per cent of Japanese arms imports come from the United States. The case of Japan offers a clear illustration of the impact of changing Alliance relations on arms programmes.

Japan's weapon purchases are the product of a planning process called the Mid-Term Defense Programme Estimates initiated in 1979.¹¹⁵ This is essentially a rolling five-year plan for defence procurement which is reviewed annually and revised every three years. The planning process is in turn a product of a more thorough review of defence policy conducted in the wake of the US withdrawal from Viet Nam and discussions initiated in 1977–79 concerning the long-term future of US forces in South Korea. It was in the context of a possible reduction in the level of US forces in Asia that US and Japanese defence planners perceived a need for larger and more capable Japanese Self Defense Forces. However, programmes initiated under these circumstances have unfolded in a period when issues of trade imbalance and technology transfer have moved to the centre of the US–Japanese relationship.

In 1988 two Japanese programmes came to symbolize two different aspects of the problem of technology transfer. US concerns about leakage of sensitive technology to the Soviet Union became a feature of the discussion on whether or not to sell Japan the Aegis computer-controlled shipborne air defence system. Issues of patent ownership, intellectual property rights, and the extent to which technology transfer assists economic rivals were raised in discussions about the programme to build a new generation of US-designed fighter aircraft in Japan.

On 24 June 1988 Japan and the USA signed a contract for the sale of the Aegis, capable of intercepting 10 or more targets (including anti-ship missiles) simultaneously.¹¹⁶ The prospective sale of the Aegis, to be installed in a new 7000-ton air defence escort, had been discussed since 1984, but congressional opposition culminated in the approval on 3 March of a motion by the Seapower Subcommittee of the House of Representatives to prohibit the sale.¹¹⁷ The concerns expressed by the Subcommittee related to safeguarding US technology from potential enemies in the wake of the illegal export of four computerized milling machines to the Soviet Union by the Toshiba Corporation of Japan.¹¹⁸ The Aegis air defence system discussed with Japan is less elaborate than the version incorporated in US vessels. The difference lies in the radar and data processing elements rather than the weapon systems themselves.¹¹⁹ The Subcommittee's decision did not prevent the offer of a contract to Japan with regard to the sale, but in June a group of Congressmen attached an amendment to the Fiscal Year 1988–89 Defence Appropriations Bill that would require all buyers of the Aegis to buy US-built ships in which to install them.¹²⁰ In response, Secretary of State Shultz and Defense Secretary Carlucci co-

authored a newspaper article in which they advocated the sale, and in August it was confirmed.¹²¹

Different issues of technology transfer related to the FS-X programme, intended to replace F-1 fighters to be withdrawn from the Japan Air Self Defense Force from 1993. In June 1988 US Defense Secretary Carlucci and Japanese Defense Agency Director Kawara signed an MoU by which the requirement would be met by an aircraft based on the US F-16 design. The anticipated requirement would be up to 130 aircraft.¹²² The decision to use the F-16 as the basis for the FS-X (also known as the SX-3) had been taken by Japan in October 1987. At the time, this decision was put in the context of Japanese efforts to allay US criticisms concerning burden sharing within the US-Japanese alliance.¹²³

This issue was one focus of the Report of the Defense Burdensharing Panel of the Congressional Committee on Armed Services in August 1988; it is discussed in greater detail in chapter 5. It seems unlikely, however, that the question of burden sharing exerted a particularly strong influence on the FS-X decision. The terms of the eventual agreement stipulate that the USA will provide all technological data at cost. All of the work will be done in Japan, with many of the major subsystems being developed by Japanese companies, although the USA will provide the engines, to be built under licence in Japan, and some electronic warfare systems.¹²⁴ Up to 80 per cent of the final aircraft may be of Japanese design.¹²⁵

The FS-X contract has highlighted the relationship between military technology transfers and wider US-Japanese economic relations. In particular, the deal led to an agreement obliging Japan to keep US patents secret if they are classified by the USA as being militarily sensitive, and under which the data would be in the custody of the Defense Agency rather than the Patent Office.¹²⁶ Under the FS-X agreement, all of the technical data would be available to the US Government, which would have the right to release it to US companies under existing regulations. Therefore the agreement meant no change in US procedure. However, under Japanese law all patents have been available to other Japanese companies (though not to foreigners). This caused serious concern in Japan that the USA would henceforth classify most items as militarily sensitive, preventing their diffusion into the Japanese economy.

US attitudes towards a sustained Japanese defence effort have been modified in light of the wider development of US-Japanese relations.¹²⁷ In the late 1970s and early 1980s there were unequivocal exhortations to Japan to spend more on defence generally. While this attitude still has considerable support in the United States, it has been modified in light of concerns about the overall bilateral trade imbalance. This change has not been without consequence in Japan, where the opinion that Japan should modify its military relationship with the USA rather than pay for US fiscal irresponsibility has been voiced in influential journals and newspapers. These views have not received any acknowledgement from the Japanese Government, however.

VI. Arms trade control

The issue of arms transfer control received greater attention in 1988 than in the previous several years. At the United Nations Third Special Session on Disarmament (SSOD III) in 1988, 30 countries made reference to the need for some form of action on arms transfer control. Both the United States and the Soviet Union supported the concept of arms transfer control, although each linked action to its own wider foreign policy agenda. For the USA, Secretary of State Shultz noted: 'Advanced weapons technology is spreading throughout the globe. It has been used in conflicts even as I speak to you. Terrorists are making use of advanced explosives and missiles. The diffusion of nuclear and chemical weapons capabilities, of ballistic missile technology, even of biotechnology is a global problem. These are not simply east/west issues, they concern every state here represented. And we must all recognize that if we are not part of the solution, we are part of the problem'. For the USSR, Minister of Foreign Affairs Shevardnadze stated: 'One of the obstacles impeding settlement of regional conflicts is the intensive transfusion of weapons into zones of increased confrontation. Therefore the Soviet Union favours restrictions on the sale and supplies of conventional arms'.¹²⁸

Three proposals were submitted for consideration, all proposing the establishment of a UN register of arms transfers.¹²⁹ Peru and Colombia submitted a proposal endorsed by Australia which requested that the Secretary-General 'carry out, with the assistance of governmental experts and taking into account geographical and political distribution, a comprehensive study on arms transfers in both their overt and covert forms, conducive to the adoption in future of concrete international measures aimed at the control of arms transfers'. Italy called for a similar study on 'the problem of illicit arms transfers, the spread of such a practice and means to prevent it, as well as on the possibility of establishing adequate procedures to monitor, within existing structures of the United Nations, international arms transfers based on import and export data provided by all member states'. The UK requested the Secretary-General to submit to the General Assembly proposals for encouraging 'greater openness on all types of international transfer of conventional weapons, including the possibility of establishing a system for member states to report to the United Nations a list and the overall value of their imports and exports of arms on a universal and non-discriminatory basis'. Peru also introduced a related resolution calling for regional conventional disarmament, on which the abstentions included Afghanistan, Angola, Cuba and Israel.

The issue of an international register as an adjunct to arms trade control was also raised in Europe, in both the EC and the Council of Europe. Hans Dietrich Genscher, representing the EC, asked at SSOD III: 'would it not be possible for the United Nations likewise to provide a framework for more openness and transparency with regard to world-wide arms exports and imports'. The Council of Europe, following a meeting of its Political Affairs Committee in Athens in June 1988, put forward a proposal that all countries should require a licensing systems of arms sales to a value of \$100 000 or greater, including a realistic end-user certificate. Details of these transactions should be lodged

with an independent body which would issue an annual report of activities, principally for the attention of legislative bodies. The depositary body proposed was SIPRI.¹³⁰

The discussion of arms transfer control pointed to an information gap between the superpowers and the rest of the international community. Whereas both Shultz and Shevardnadze used data available to them from national means, other states called for the establishment of an authoritative data base, in the form of an arms trade register. Two rationales have been advanced for such a register: first, the need for greater transparency in and understanding of the global arms trade system; and second, as a contribution to the application of the considerable body of existing national laws and regulations pertaining to the arms trade in many supplier countries. Arms confirmed to be in the possession of recipient countries but not registered with the stipulated depositary body would be subject to scrutiny by interested parties in exporting countries, and explanation would be required of the process by which they were acquired. This would not impose any new statutory obligations on any exporting government but would simply assist them in applying existing law.

VII. Conclusion

Arms deliveries made and new arms deals struck during 1988 have illustrated that the arms market remains dominated by a relatively small number of stable and long-term relationships. Moreover, this pattern of relationships underlines that the distribution of major conventional weapons is not determined principally by economic or market forces but by political and strategic considerations.

In the case of Western Europe, arms exports may assist in the maintenance of a defence industrial base which could not be supported by demand from domestic armed forces. Moreover, commercial rationales clearly play a part in shaping the way defence manufacturers think about arms exports—and this group of companies is regarded by governments as a key element of national defence. The growing unit costs of military equipment suggest that sales of the next generation of European combat aircraft, naval vessels and armoured vehicles will be dependent on accompanying economic assistance and technology transfer packages, which make the overall balance of economic advantage in any deal difficult to determine.

Notes and references

¹ For an explanation of the methodology for estimation see appendix 6D.

² It is questionable whether such a measurement is possible to make given the available sources. SIPRI tracks deliveries of major weapons in an effort to highlight changing trends in the volume and distribution of arms flows. However, two elements required for a satisfactory, comprehensive estimate of the *economics* of the arms trade are elusive: first, information about the prices agreed by supplier and recipient in any given transfer; and second, the means of payment—if in hard currency, whether with or without counter-trade or offset agreements or barter, etc. Moreover, these figures would still be insufficient for an assessment of the costs and benefits of the arms trade.

Production costs would be needed to see whether there is a profit or loss on the transaction for the supplier. For a recipient, the true costs of arms imports involve an even more complex series of judgements which have generated a weighty literature.

³ The CSS-2 has an estimated range of 2500–3000 km when armed with a nuclear warhead according to *Jane's Weapon Systems 1988–89* (Jane's Information Group: Coulsdon, Surrey, 1988), p. 2.

⁴ The MiG-29 is a multi-role aircraft but is principally regarded as an air-superiority fighter. First reported in the West in 1979, it has a combat radius of 1150 km. The Su-25 is a short-range ground attack aircraft with a combat radius of 550 km. *Jane's All the World's Aircraft 1987–88* (Jane's Information Group: Coulsdon, Surrey, 1987), pp. 262 and 276–77 respectively. The SA-5 is the longest-range SAM made by the Soviet Union, with a range of 300 km according to *Jane's Weapon Systems 1988–89* (note 3), pp. 178–79.

⁵ 'The Iraq–Iran War 1980–88: Military Costs and Arms Transfers', SIPRI mimeograph available on request. For a similar view see also 'Why peace doesn't mean disarmament', *The Middle East*, Sep. 1988, pp. 23–24; Williams, F., 'Arms spending will be top priority in Iran and Iraq', *The Independent*, 20 Sep. 1988.

⁶ The statistical information in this section is drawn from 'The Iraq–Iran War 1980–88: Military Costs and Arms Transfers', SIPRI (note 5). While sales of dual-use and military-related equipment and technology to Iran are almost inevitable, the sale of weapon systems per se by Western countries would come up against considerable legal and political barriers.

⁷ Kemp, I., 'The international arms industry: final casualty of the Gulf War', *Jane's Defence Weekly*, 30 July 1988, pp. 164–65; Tai Ming Cheung, 'Bad for business: Gulf peace threatens slump in arms industry', *Far Eastern Economic Review*, 22 Sep. 1988, p. 42.

⁸ Carneiro, M. R. V. and Pesce, E. I., 'Budget cuts for Brazil's military', *Jane's Defence Weekly*, 30 July 1988, pp. 160–61; 'Brazil drops weapons in budget response', *Jane's Defence Weekly*, 23 July 1988, p. 113.

⁹ *Jane's Armour and Artillery, 1988–89* (Jane's: London, 1988), p. 2; 'Osorios around the Gulf', *Defense & Foreign Affairs Weekly*, 15 May 1988, p. 1.

¹⁰ 'Arms spree', *The Independent*, 22 Jan. 1988; Margolis, M., 'Brazilians close to deal to sell arms to Libyans', *International Herald Tribune*, 29 Jan. 1988; de Onis, J., 'Brazil seeks arms sales in Middle East', *International Herald Tribune*, 25 Jan. 1988; Barham, J., 'Brazil ignores US protest over arms for Libya', *Sunday Times*, 31 Jan. 1988, p. 16; 'US critical of arms sales to Libya', *Latin American Regional Report*, 17 Mar. 1988, p. 6; 'Brazil defies Washington and arms Libya', *Defence*, July 1988, p. 472.

¹¹ See for instance Brzoska, M. and Ohlson, T. (eds), SIPRI, *Arms Production in the Third World* (Taylor & Francis: London, 1986), chapters 6 and 8.

¹² 'Iraq increases Scud's range' *Flight International*, 21 May 1988, p. 18.

¹³ Carus, W. S. and Bermudez, J. S., 'Iran's growing missile forces', *Jane's Defence Weekly*, 23 July 1988, pp. 126–31; 'Iran repairs damaged F-14', *Jane's Defence Weekly*, 2 July 1988, p. 1347; Haeri, S., 'Success for first fighter built in Iran', *The Independent*, 6 Nov. 1987; George, A., 'Iran claims self-sufficiency', *Defence*, Jan. 1988, p. 17; 'Iran launches landing craft', *Jane's Defence Weekly*, 2 July 1988, p. 1356; 'First Iranian made APC', *Jane's Defence Weekly*, 2 Apr. 1988, p. 615.

¹⁴ 'Egypt set to head Arab arms bid', *Jane's Defence Weekly*, 9 Apr. 1988, pp. 681 and 685; Buhl, P., 'Gulf states look to defence cooperation', *Jane's Defence Weekly*, 9 July 1988, pp. 34–35.

¹⁵ Jordan has been an important trans-shipment station for Iraqi war material as well as providing air base facilities for Iraqi aircraft. For a discussion of the regional impact of the Iraq–Iran War, see Chubin, S. and Tripp, C., *Iran and Iraq at War* (I.B. Taurus: London, 1988).

¹⁶ Gasparini, E., 'East–South economic relations: Warsaw Pact shifts to military deals with developing world', *NATO Review*, Apr. 1985, pp. 24–32; Miller, M. S., 'Conventional arms trade in the developing world, 1976–86: reflections on a decade', *World Military Expenditures and Arms Transfers 1987* (US Arms Control and Disarmament Agency: Washington, DC, Mar. 1988), pp. 19–24; Machowski, H. and Schultz, S., 'Soviet economic policy in the Third World', ed. R. E. Kanet, *The Soviet Union, Eastern Europe and the Third World* (Cambridge University Press: Cambridge, 1987), pp. 122–23.

¹⁷ 'Soviet economic reform may force change of entire military', *Aviation Week & Space Technology*, 2 May 1988, p. 19.

¹⁸ Mikhail S. Gorbachev, President of the Presidium of the Supreme Soviet of the USSR, *Statement at the Plenary Meeting of the United Nations General Assembly*, 7 December 1988.

¹⁹ Soviet Treaties of Friendship with major arms clients are as follows: North Korea, 1961; India, 1971; Iraq, 1972; Syria, 1980.

²⁰ 'The peace habit reaches Africa', *The Economist*, 19 Nov. 1988, pp. 51–52.

²¹ 'Soviet supplied air defence systems in Angola', *Jane's Defence Weekly*, 19 Mar. 1988, pp. 532–33.

²² See appendices 6B and 6C for a full presentation of the Indian programmes.

²³ Ali, S., 'The travelling arms bazaar', *Far Eastern Economic Review*, 31 Oct. 1988, p. 35. India is already producing under licence the MiG-27 fighter-bomber, the T-72 tank and the BMP-1 APC.

²⁴ Freedman, R. O., 'Soviet policy toward Syria in the Andropov era', in Kanet (note 16), pp. 183–210; Hansen, J., 'Moscow and Damascus: how binding the ties?', *International Defence Review*, Aug. 1988, pp. 925–30. (Hansen is a senior analyst with the US DIA.)

²⁵ Quoted in Levavi, L., 'Soviet aim in ME is to curb US', *Jerusalem Post* (int'l edn), week ending 28 May 1988.

²⁶ Levran, A., 'Changes in the Syrian armed forces and their impact on the military balance with Israel', ed. A. Levran, *Middle East Military Balance, 1987–88* (Westview Press: Boulder, Col., 1988), pp. 197–212.

²⁷ *Air & Cosmos*, 29 Oct. 1988, p. 7; O'Ballance, E., 'Intelligence update: Syria', *Armed Forces*, Jan. 1989, p. 13. The Su-24 is a long-range bomber usually considered as the Soviet version of the US F-111, though it is actually much smaller. It has a maximum combat radius of 1300 km according to *Jane's All the World's Aircraft 1987–88* (Jane's Information Group: Coulsdon, Surrey, 1987), pp. 275–76.

²⁸ Levran (note 26), p. 210.

²⁹ *Navy International*, Sep. 1988, p. 242.

³⁰ Ja'afar, K. M., 'Syria's military build up after June 1982', *RUSI & Brassey's Defence Yearbook 1988* (Brassey's: London, 1988), pp. 171–97.

³¹ 'Soviet supplied air defence systems in Angola', *Jane's Defence Weekly*, 19 Mar. 1988, pp. 532–33; 'Soviet military presence in Angola', *African Defence Journal*, Apr. 1988, pp. 58–60; Brittain, V., 'Cubans building Angola airbase', *The Guardian* 7 June 1988, p. 7.

³² Tin Shield is a version of the target acquisition and missile tracking radar known as Square Pair which is the basis for the air defence of Moscow. It is associated with the SA-5 Gammon surface-to-air missile. 'North Korea's strong link with Soviets', *Jane's Defence Weekly*, 5 Nov. 1988, p. 1155.

³³ Carr, J., 'US buoys up Israeli defence industry', *Defence*, Aug. 1988, p. 553.

³⁴ Although the Arrow programme helped to focus attention on Israeli concerns about a threat from ballistic missiles, US-Israeli research into anti-ballistic missile systems dates back to the ADAMS programme of the early 1980s, from which Arrow is evolved. 'Israel: new ADAMS SAM details', *Defense & Foreign Affairs Daily*, 13 Feb. 1985; 'ADAMS: vertical launch comes ashore', *Defense & Foreign Affairs*, Mar. 1985, pp. 14–15; 'Rafael: a name to be respected', *Military Technology*, Sep. 1986, pp. 146–51; Donnelly, T., 'Westinghouse, IAI, Rafael team to offer ADAMS missile as Sgt. York alternative', *Defense News*, 2 Mar. 1987, p. 6; 'The United States and Israel', *Atlantic News*, 30 Dec. 1987, p. 3; 'Israel and the United States to split Arrow costs', *Defense Electronics*, Feb. 1988, p. 20; Darwish, A., 'US gives backing of Israeli missile shield', *The Independent*, 1 July 1988; 'USA, Israel agree on missile development', *Jane's Defence Weekly*, 9 July 1988, p. 13; 'Deal with US to counter threat: worry remains over missiles', *Jerusalem Post* (int'l edn), week ending 9 July 1988.

³⁵ 'US interest in Arrow grows', *International Defense Review*, Sep. 1988, p. 1059.

³⁶ The joint statement is reproduced in full in *Pravda*, 2 June 1988.

³⁷ 'Why China sells arms', *Newsweek*, 11 July 1988, pp. 22–27; 'China in talks', *The Guardian*, 15 July 1988, p. 9; Dinmore, G., 'US alarmed at China's Middle East arms sales', *The Independent*, 7 Sep. 1988, p. 10; 'Washington se déclare pleinement satisfait des assurances fournies par Pékin', *Le Monde*, 9 Sep. 1988, p. 4; Southerland, D., 'Beijing cool on missiles', *International Herald Tribune*, 7 Sep. 1988; Higgins, A., 'China calms US over arms sales', *The Independent*, 8 Sep. 1988, p. 11.

³⁸ 'US concern at sale of Silkworm missiles', *Times of India*, 10 June 1988.

³⁹ Oberdorfer, D., 'US tries to veto Argentine missile', *The Guardian Weekly*, 25 Sep. 1988, pp. 17–18.

⁴⁰ SIPRI, *SIPRI Yearbook 1988: World Armaments and Disarmament* (Oxford University Press: Oxford, 1988), pp. 360–61.

⁴¹ Thomas, C., 'UK joins bid to halt flight of Argentina's Condor', *The Guardian*, 20 Sep. 1988, p. 8. Immediately after the Rome meeting, the Fiat company was accused of having been involved through its subsidiary SNIA in the provision of guidance technology for the Condor project between 1984 and 1986. This activity apparently stopped with the Italian joining of the Missile Technology Control Regime. Sheridan, M., 'Fiat denies missile aid to Egypt and Argentina', *The Independent*, 24 Sep. 1988.

⁴² Chanda, N., 'The end of an era: bilateral irritants emerge in Sino-US ties', *Far Eastern Economic Review*, 8 Sep. 1988, p. 24.

⁴³ Burt, R., 'European defense protectionism could weaken alliance with US', *Aviation Week & Space Technology*, 7 Nov. 1988, pp. 75-77; Palmer, J., 'Britain to fight Community plan to levy tax on defence imports', *The Guardian*, 19 May, 1988, p. 20; 'World round up', *Defence*, July 1988, p. 469; Silverberg, D., 'EEC import plan draws rebuke from Carlucci', *Defense News*, 12 Sep. 1988, p. 1; 'Draft rule bans import of US-made defense goods', *Defense News*, 12 Sep. 1988, p. 45; 'EEC's protectionist tendencies', *Defense News*, 19 Sep. 1988, p. 34.

⁴⁴ 'Proposal for Council regulation temporarily suspending import duties on certain weapons and military equipment', Commission on European Communities document COM(88)502, 15 Sep. 1988.

⁴⁵ Hewish, M., 'Canada's procurement programme', *International Defense Review*, Sep. 1987, p. 1230; 'Canadian SSN choice: more delays possible', *Jane's Defence Weekly*, 6 Aug. 1988, p. 196.

⁴⁶ While not endorsing the Canadian decision, the State Department noted that 'the President has determined that if the Canadians select the Trafalgar design, the interests of the United States are best served by agreeing to the British request'. Brogan, P., 'Reagan allows Ottawa to buy British submarines', *The Independent*, 28 Apr. 1988.

⁴⁷ 'US Navy fears may snag Canadian nuclear sub buy', *Defense News*, 23 Nov. 1987, p. 1. Ashford, N., 'US technology may bar Britain from Canada sub order', *The Independent*, 12 Oct. 1987, p. 13.

⁴⁸ 'USA's Argentine plans for UH-1s and M113s', *Jane's Defence Weekly*, 7 May 1988, p. 874; Dowden, R., 'Argentina sells Mirage aircraft to South Africa', *The Independent*, 9 June 1988, p. 12; 'Argentina negotiates weapons deals with South Africa and Iran', *International Defense Intelligence*, 27 June 1988, p. 3.

⁴⁹ 'Argentina wins \$18m credit aid from the USA', *Jane's Defence Weekly*, 15 Oct. 1988, p. 909.

⁵⁰ Tran, M., 'Washington urges Britain to cut military ties with Chile', *The Guardian*, 5 Sep. 1988, p. 6.

⁵¹ For a detailed discussion, see Cordesman, A. H., *Western Strategic Interests in Saudi Arabia* (Croom Helm: London, 1987).

⁵² 'Kuwait keeps options open', *Jane's Defence Weekly*, 9 July 1988, p. 13; 'Le Sénat américain refuse la fourniture au Koweït de missiles aéroportés', *Le Monde*, 10-11 July 1988, p. 3; 'US DoD in \$2 bn arms deal with Kuwait', *Jane's Defence Weekly*, 16 July 1988, p. 80; 'Go ahead for Kuwaiti F/A-18 deal', *Jane's Defence Weekly*, 13 Aug. 1988, p. 246.

⁵³ For example, the upgrading of the Egyptian T-54 tank fleet has been undertaken in the past by Teledyne Continental Motors of the USA, while Royal Ordnance of the UK have made replacement gun barrels for Egyptian T-62 tanks. In 1988, Mercedes Benz of FR Germany and Horstman Defence Systems of the UK also won contracts to upgrade 160 Egyptian T-54 tanks. Foss, C. F., 'Modernising AFVs', *Jane's Defence Weekly*, 19 Dec. 1987, pp. 1417-20; Schaefer, W. F., 'Upgrading the T-54 and T-55', *Asian Defence Journal*, Aug. 1987, pp. 38-44; 'Egyptian tank upgrade winners', *Jane's Defence Weekly*, 21 May 1988, p. 1005. For a recent overview, see Hadar, L. T., 'The Egyptian armed forces', *Journal of Defense & Diplomacy*, Oct. 1988, pp. 40-50.

⁵⁴ The changing place of Asia within the international economy was a central issue at the 1988 meeting of the OECD (Organization for Economic Co-operation and Development). Pauley, R., 'East Asia challenges the economic order', *Financial Times*, 19 Jan. 1988, p. 4; Rowley, A., 'OECD looks east', *Far Eastern Economic Review*, 31 Mar. 1988, pp. 48-49.

⁵⁵ See Blandin, J. Y., 'Les Déboires des Exportations d'Armement', *Défense Nationale*, Oct. 1988, pp. 79-94.

⁵⁶ 'Super Etendard licence offered to Indonesia', *Jane's Defence Weekly*, 6 Feb. 1988, p. 192; Richardson, M., 'European aerospace giants major push', *Pacific Defence Reporter*, Apr. 1988, p. 11.

⁵⁷ 'BAe looks to expand joint defence ventures in Asia', *Jane's Defence Weekly*, 6 Feb. 1988, p. 210.

⁵⁸ Richardson, M., 'Aerospace firms set sights on Asia', *International Herald Tribune*, 5 Feb. 1988, p. 11; 'MBB looking for customers for Airbus tanker', *Jane's Defence Weekly*, 6 Feb. 1988, p. 206; Snieder, D., 'Industrialists cut deals, tout goods at growing Asian Aerospace '88 show', *Defense News*, 1 Feb. 1988, p. 9; 'IPTN comes of age', *Indonesian News*, Aug./Sep. 1988 (Indonesian Embassy: Stockholm, 1988), p. 10. In April 1988, MBB proposed as a private venture with no government support the development of an AST (Airbus Special Transport) version of the A-300 Airbus. The aircraft could lift 40 tonnes of cargo or offer 33 tonnes of fuel. Future versions of the aircraft equipped for electronic warfare were also proposed. *AAS-Milavnews*, Apr. 1988, p. 8. It should be noted that several other proposals made for the Airbus have not survived to the production stage. Geisenheyner, S., 'Militarized European Airbus?', *Air Force Magazine*, July

1973, p. 94; Rutherford, M., 'Airbus may carry NATO early warning system', *Financial Times*, 19 May 1977.

⁵⁹ For an overview of the South-East Asian aerospace industry, see Gething, M. J., 'ASEAN aerospace requirement', *Defence*, Dec. 1987, pp. 769-74; 'Asian Aerospace '88 Report', *Flight International*, 6 Feb. 1988, pp. 4-9.

⁶⁰ Richardson, M., 'European aerospace giants major push', *Pacific Defence Reporter*, Apr. 1988, p. 11.

⁶¹ Wulf, H., 'The West German arms industry and arms exports', *Alternatives*, no. 13 (1988), p. 330; Hoffman, W., 'Die Stellung wird geräumt', *Die Zeit*, 28 Oct. 1988, p. 25.

⁶² 'Saudi Arabia: the Tornado deal', *Defense & Foreign Affairs Daily*, 18 Sep. 1985; 'Tornado wins first export order', *Flight International*, 24 Aug. 1985, p. 8; 'Tornado earns growing recognition', *Jane's Defence Weekly*, 28 Sep. 1985, p. 683; Bloom, B., 'A unique partnership succeeding against the odds', *Financial Times*, 17 Sep. 1985; McInain, L., 'Tornado group urges technology 2 pact with Japan', *Financial Times*, 11 Feb. 1987; Sheridan, M., 'Thatcher holds firm on limit to European political unity', *The Independent*, 22 Oct. 1988, p. 1; Clough, P., 'Tornado finance upsets Germans', *The Independent*, 26 Oct. 1988, p. 11.

⁶³ 'Deutsche Finanzierung des Tornado-Kaufes?', *Frankfurter Allgemeine Zeitung*, 25 Oct. 1988, p. 5; Winter, M., 'Enrüstung über Rüstungsprojekt', *Frankfurter Rundschau*, 26 Oct. 1988, p. 1; 'Neue Waffenaffäre in Bonn', *Neue Zürcher Zeitung*, 27 Oct. 1988, p. 2; 'Nein der FDP zum Tornado-Geschäft', *Neue Zürcher Zeitung*, 28 Oct. 1988, p. 2.

⁶⁴ AAS-Milavnews, Jan. 1988, p. 9; AAS-Milavnews, Oct. 1988, p. 12.

⁶⁵ 'EFA awaits clearance', *Flight International*, 30 Apr. 1988, pp. 53-54; Cook, N., 'Eurofighter: biggest hurdle already passed', *Jane's Defence Weekly*, 14 May 1988, p. 921; Gething, M. J., 'EFA moves forward', *Defence*, June 1988, p. 378; 'Euro-fighter agreed', *The Times*, 17 May 1988, p. 6; Fairhall, D., 'Younger's spending problems mount as defence budget ends its growth', *The Guardian*, 18 June 1988, p. 5; Fagan, M., 'Eurofighter faces key test for engines', *The Independent*, 6 Sep. 1988; Gething, M. J., 'The EFA radar battle', *Defence*, June 1988, p. 444.

⁶⁶ 'Report raises new debate on Rafale costs', *Jane's NATO Report*, 19 Sep. 1988, p. 5; 'EFA's turn to be in the news', *Interavia Air Letter*, 21 Sep. 1988, pp. 1-2.

⁶⁷ 'EFA's turn to be in the news', *Interavia Air Letter*, 21 Sep. 1988, pp. 1-2.

⁶⁸ 'Way cleared for Spanish EFA role', *Jane's NATO Report*, 12 Sep. 1988, p. 5; 'Spain EFA role confirmed', *Jane's NATO Report*, 11 Oct. 1988, p. 6.

⁶⁹ 'EFA enters full-scale development', *Jane's NATO Report*, 15 Nov. 1988, p. 6.

⁷⁰ 'Bonn EFA debate', *Jane's NATO Report*, 4 Oct. 1988, p. 7; 'Spain moves on US, WEU, French and domestic defence issues', *Jane's NATO Report*, 18 Oct. 1988, p. 4; 'Spain will take part in EFA project', *Atlantic News*, 26 Oct. 1988, p. 3.

⁷¹ 'Spain will take part in EFA project' (note 70).

⁷² L'Écotais, Y. D., 'Rafale: les extraits du rapport', *L'Express*, 30 Sep. 1988, p. 11; 'Report raises new debate on Rafale costs', *Jane's NATO Report*, 19 Sep. 1988, p. 5.

⁷³ See Segal, G., *Defending China* (Oxford University Press: Oxford, 1985); Segal, G. and Gilks, A., *China and the Arms Trade* (Croom Helm: London, 1985); Segal, G. and Tow, W., *Chinese Defence Policy* (Macmillan: London, 1984); Joffe, E., *The Chinese Army after Mao* (Weidenfeld & Nicolson: London, 1987); Segal, G., 'As China grows strong', *International Affairs* (London), vol. 64, no. 2 (spring 1988), pp. 217-31; Joffe, E., 'The Chinese Army: a decade of reforms', *RUSI & Brassey's Defence Yearbook 1988* (note 30), pp. 251-67.

⁷⁴ 'The international arms trade: final casualty of the Iran-Iraq war', *Jane's Defence Weekly*, 30 July 1988, pp. 164-65.

⁷⁵ Cook, N., 'Egypt aiming at Arab arms market', *Jane's Defence Weekly*, 28 Nov. 1987, p. 1255; Cook, N., 'Ultimate upgrades', *Jane's Defence Weekly*, 19 Dec. 1987, p. 1429; Deen, T., 'Egypt set to head Arab arms bid', *Jane's Defence Weekly*, 9 Apr. 1988, p. 681; *Defense & Foreign Affairs Handbook, 1987-88* (Perth Corporation: Washington, DC, 1987), pp. 274-75; Shichor, Y., 'The Year of the Silkworms: China's arms transactions, 1987', ed. R. M. Yang, *SCPS Yearbook on PLA Affairs* (Sun Yat-Sen Centre for Policy Studies: Kaohsiang, Taiwan, 1988), pp. 153-68.

⁷⁶ Thailand approached China in 1982 for arms but was refused. Later China offered a joint production project which was not accepted. Paribatra, S., *From Enmity to Alignment: Thailand's Evolving Relations with China*, ISIS paper (Institute of Security and International Studies, Chulalongkorn University: Bangkok, 1987), pp. 26-27.

⁷⁷ 'Thailand to buy Chinese frigates', *International Defense Review*, Aug. 1988, p. 1013; 'Bangkok to buy arms from China', *Asian Defence Journal*, June 1988, p. 92; 'Royal Thai Army show off Chinese-made armour', *Jane's Defence Weekly*, 16 July 1988, p. 61; 'Asia: PRC clinches defense deal with Thailand', *Defense & Foreign Affairs Weekly*, 18 May 1988, p. 2; 'New Chinese SAM missile system', *International Defense Review*, Mar. 1988, p. 226.

⁷⁶ Deron, F., 'La Chine justifie ses ventes de missiles à l'Arabie saoudite', *Le Monde*, 9 Apr. 1988.

⁷⁹ Hu, B., 'More professional and much less political', *Far Eastern Economic Review*, 24 Mar. 1988, pp. 65–66; 'Defense gets low priority in China', *Asian Aviation*, Apr. 1988, pp. 46–7; Hollingworth, C., 'The tasks of China's Minister Qin', *Jane's Defence Weekly*, 23 Apr. 1988, p. 788.

⁸⁰ 'China's F-811 upgrade to include Litton Navigation System', *Jane's Defence Weekly*, 19 Mar. 1988, p. 529; 'Collins to handle Avionics fit on new Chinese jet trainer', *Asian Aviation*, June 1988, p. 52; 'Collins EFIS for Chinese L-8', *Defense & Foreign Affairs*, 3 July 1988, p. 3; 'Fantan: the Chinese gamble', *Air International*, July 1988, pp. 10–11; 'Three nation helicopter', *Armada International*, May 1988, p. 97; 'China buys Lavi radar', *Flight International*, 16 Apr. 1988, p. 3; 'Growing link between China, Israel could create strong arms exports', *Defense News*, 13 June 1988, p. 28 and p. 32; 'Secret missile deal with Israel', *Asian Defence Journal*, May 1988, p. 115; Lau, E., 'Who blew the gaff?', *Far Eastern Economic Review*, 8 Sep. 1988, p. 23.

⁸¹ Milivojevic, M., 'The People's Liberation Army of China', two-part series in *Armed Forces*, Aug. and Sep. 1988, pp. 362–68 and 410–15 respectively.

⁸² Parallel to the negotiations on arms there were discussions about the level of British aid to be provided to Malaysia through the Overseas Development Administration programme. 'Malaysia throws doubt on UK Oberon deal', *Jane's Defence Weekly*, 6 Aug. 1988, p. 200; Eglin, R. and Adams, J., 'Scoring on defence', *Sunday Times*, 2 Oct. 1988, p. D9; Harrison, M., 'UK credit for £1 bn Malaysian arms deal', *The Independent*, 10 Sep. 1988.

⁸³ Fagan, M., 'Turnkey package was crucial factor for agreement', *The Independent*, 9 July 1988, p. 2; Bailey, B., 'Al Yamamah—shifting the balance of power', *Jane's Defence Weekly*, 23 July 1988, p. 123; Getler, W., 'Britain and Saudi outline: a huge base and arms deal', *International Herald Tribune*, 9–10 July 1988, p. 1.

⁸⁴ Poole, T., 'UK and Saudi sign joint venture memo', *The Independent*, 23 Sep. 1988.

⁸⁵ Milner, M., 'Concern on arms payment puts pressure on oil price', *The Guardian*, 13 July 1988, p. 10; Milner, M., 'Saudi denial fails to lift oil prices', *The Guardian*, 14 July 1988, p. 10.

⁸⁶ Poole, T., '£1 bn ECGD scheme to aid defence sales', *The Independent*, 29 June 1988; Fairhall, D., '£1 bn fund to aid arms sales', *The Guardian*, 29 June 1988, p. 3.

⁸⁷ For general discussions of the economics of Soviet relations with developing countries, including arms sales, see Smith, A. H., 'Soviet trade relations with the Third World', ed. R. Casson, *Soviet Interests in the Third World* (SAGE/Royal Institute for International Affairs: London, 1985), pp. 140–58; and Becker, A. S., 'A note on Soviet arms transfers to the Middle East', eds S. L. Spiegel, M. A. Heller and J. Goldberg, *The Soviet-American Competition in the Middle East* (D. C. Heath: Lexington, Mass., 1988), pp. 49–60.

⁸⁸ A clearing account is a bank account in the name of the supplier held in the recipient country where money is deposited to cover the cost of imports. The Soviet Union has tried to move away from the practice of using clearing accounts since they tend to focus overall trade relations on balancing on a bilateral rather than a multilateral basis. In fact, in the 1980s the Soviet Union has built up a substantial deficit in overall trade with India. For recent discussions of the Indo-Soviet relationship, see Lyon, P., 'The Soviet Union and South Asia in the 1980s', in Casson (note 87), pp. 32–46; Banerjee, J., 'Indo-Soviet security relations', in Kanet (note 16), pp. 211–27; and Anthony, I., 'Indo-Soviet defence cooperation', *RUSI & Brassey's Defence Yearbook 1988* (note 30), pp. 221–35.

⁸⁹ Levran (note 26), p. 209.

⁹⁰ Statement to the US Senate Subcommittee on Appropriations by General L. C. Menetrey, Commander-in-Chief, US Forces Korea, reproduced in *Asian Defence Journal*, Aug. 1988, pp. 12–20. Menetrey notes that North Korea's only significant export product able to generate hard currency is armaments and military equipment.

⁹¹ 'Asia: PRC clinches defense deal with Thailand', *Defense & Foreign Affairs Weekly*, 18 May, 1988, p. 2; Shichor (note 75), p. 154.

⁹² Pollack, J. D., 'China and Taiwan in 1987', Rand-P-7413, Jan. 1988 (RAND Corporation: Santa Monica, Calif., 1988), pp. 5–9.

⁹³ Tai Ming Cheung, 'Proliferation is good, and there's money in it too', *Far Eastern Economic Review*, 2 June 1988, p. 26.

⁹⁴ 'Why China sells arms', *Newsweek*, 11 July 1988, p. 23; 'Israel's links with China', *Jane's Defence Weekly*, 10 Oct. 1987, pp. 832–33.

⁹⁵ 'Chinese still trying to sell F-7Ms to Brazil', *World Weapons Review*, 12 Aug. 1987, p. 3.

⁹⁶ The programme seems to have undergone significant changes since a Dassault design team began working on it. Compare the accounts of the programme in *AAS-Milavnews* of Feb. 1988 and

Sep. 1988. For a single description of the programme see Mama, H. P., 'Indian aerospace programs: opportunity knocks', *International Defense Review*, Oct. 1988, pp. 1336-39.

⁹⁷ Joshi, M., 'The case of the Rs. 30 crore agent', *Frontline*, 18 Apr.-1 May, 1987, pp. 11-12.

⁹⁸ Recorded in *Parliamentary Debates—Rajhya Sabha*, Official Report, Part I, Tuesday 6 Dec. 1983 (Government of India Press: New Delhi, 1984), pp. 11-12.

⁹⁹ Jacobs, G., 'India's expanding naval forces', *Navy International*, Feb. 1986, pp. 75-78.

¹⁰⁰ The European countries involved were France, FR Germany, Italy, the Netherlands and Sweden, with FR Germany and Sweden favoured by 1980. 'India makes submarine decision', *Maritime Defence International*, Sep. 1980, p. 329; Loudon, B., 'Indian sub order not for Russia', *Daily Telegraph*, 29 Apr. 1980.

¹⁰¹ 'India: German sub buy', *Defense & Foreign Affairs Daily*, 27 Mar. 1981, pp. 1-2; 'INS Shishumar commissioned', *Asian Defence Journal*, Dec. 1986, p. 74.

¹⁰² 'India: German submarine snag', *Defense & Foreign Affairs Daily*, 11 May 1981; Sharma, K. K., 'West Germany to build submarines for India', *Financial Times*, 2 Dec. 1981.

¹⁰³ *AAS-Milavnews*, May 1984, p. 22.

¹⁰⁴ 'Defence and Disarmament Review', *IDSA Strategic Digest*, Nov. 1984, pp. 1342-43; 'India negotiates for new arms from East and West', *International Defense Intelligence*, 7 Jan. 1985, pp. 1-2.

¹⁰⁵ It is alleged that HDW supplied the blueprints for a submarine of around 1500 tons between June 1984 and June 1985. It has further been alleged that the company was given permission to make the transfer by the Government. However, a Parliamentary Committee of the Bundestag with the authority to subpoena witnesses has been unable to uncover sufficient evidence to lead to any prosecution. 'Submarines: the South African connection', *The Hindu*, 14 Apr. 1987; 'Doch mehr Pläne an Pretoria?', *Frankfurter Rundschau*, 20 Apr. 1988, p. 4; Lölhöff, H., 'Howaldtswerft wollte U-Boot-Ausschuß kippen', *Frankfurter Rundschau*, 6 May 1988, p. 1; Krämer, R., 'Wozu und warum will Südafrika eigentlich deutsche U-Boote?', *Frankfurter Rundschau*, 11 May 1988, p. 18; 'Kohl hat von U-Boot-Plänen mehr gewußt', *Frankfurter Allgemeine Zeitung*, 22 June 1988, p. 2; 'Wann wußte Kohl von dem U-Boot-Geschäft?', *Frankfurter Allgemeine Zeitung*, 30 June 1988, p. 2; 'U-Boot-Ausschuß läßt Kohl', *Frankfurter Rundschau*, 9 Sep. 1988, p. 4; 'U-Boot-Ausschuß vor Ende?', *Frankfurter Rundschau*, 27 Sep. 1988, p. 4; Clough, P., 'Kohl aide probed over SA submarine papers', *The Independent*, 17 Sep. 1988, p. 11; 'U-Boot-Ausschuß soll nicht sterben', *Frankfurter Rundschau*, 1 Oct. 1988, p. 4.

¹⁰⁶ Preston, A., 'Trends in Asian navies', *Asian Defence Journal*, Aug. 1988, p. 10.

¹⁰⁷ 'France clinches Saudi deal', *Flight International*, 18 June 1988, p. 3; 'French clinch Super Puma sale to Saudi Arabia', *Asian Aviation*, June 1988, p. 45; 'France to deliver boats, Puma copters to Saudis', *Defense News*, 20 June 1988, p. 15; 'Saudis order US and French helicopters', *Rotor & Wing International*, Aug. 1988, p. 10; 'Saudis go shopping in France and in UK', *International Defense Review*, Aug. 1988, p. 880.

¹⁰⁸ Cordesman (note 51), p. 151.

¹⁰⁹ 'Saudis buy ballistic missiles', *Flight International*, 26 Mar. 1988, p. 2; 'Saudi purchase of Chinese missiles changes Middle East military balance', *Aviation Week & Space Technology*, 28 Mar. 1988, p. 30; Bulloch, J., 'Britain and US at odds over Saudi missiles', *The Independent*, 1 Apr. 1988, p. 1; 'Saudi Arabia deploys Chinese IRBMs', *Military Technology*, May 1988, p. 133; 'Chinese missiles in Saudi', *Defence*, May 1988, p. 303.

¹¹⁰ Evans, M., 'Britain's biggest arms sale', *The Times*, 9 July 1988, p. 1; Adams, J., 'Saudi deal a saver for Westland', *Sunday Times*, 10 July 1988, 'Britain, Saudis agree to \$18 billion arms deal', *Defense News*, 11 July 1988, pp. 1 and 40; 'Saudis to make 2nd buy of military aircraft from Britain', *Asian Aviation*, July 1988, p. 54.

¹¹¹ The British-Saudi relationship is discussed in Cordesman (note 51).

¹¹² 'Saudi Arabia monitors the progress of Kuwait buy', *Defense News*, 18 July 1988, p. 1 and p. 22.

¹¹³ *AAS-Milavnews*, Feb. 1984, p. 14.

¹¹⁴ Quoted in Drite, R., *Arms Production in Japan* (Westview: Boulder, Colo., 1986), p. 12.

¹¹⁵ This process is designed to meet force goals set in the National Defense Program Outline drawn up by the National Defense Council in 1976. The planning process is described in Drite (note 114) and in *Asian Security*, Yearbook of the Research Institute for Peace and Security in Tokyo (Brassey's: London, successive issues).

¹¹⁶ *Asian Security 1988-89* (Brassey's: London, 1988), p. 149; 'Asia: Japan boosts defenses with Aegis', *Defense & Foreign Affairs Weekly*, 4 July 1988, p. 2. For a description of Aegis and a discussion of its capabilities, see the interview with Rear Admiral W. E. Meyer, Aegis project manager from 1970 to 1983, in *USNI Proceedings*, Oct. 1988, pp. 102-6.

¹¹⁷ Manning, R., 'Zeroing in on Japan; Congress moves to stop US Navy sale of defence system',

logged

Far Eastern Economic Review, 7 Jan. 1988, p. 21; Bennett, C. E., 'Let's think twice about Aegis', *Armed Forces Journal International*, Apr. 1988, p. 44. Bennett is the Congressman who sponsored the motion, which had no legal or prohibitive force in the United States.

¹¹⁸ At the end of March, Congress banned Toshiba from all US Government contracts for three years. Miura, M., 'Toshiba faces 3-year ban on exports to US market', *Daily Yomiuri*, 2 Apr. 1988.

¹¹⁹ The Japanese version incorporates a SPY-1D radar with a network of UYK-43 computer systems while the US version includes the SPY-1A with the UYK-7 computer system. *Jane's Defence Weekly*, 23 July 1988, p. 119.

¹²⁰ 'Transfer of Aegis technology to Japan faces further obstacles', *Defense News*, 13 June 1988, p. 50; 'Carlucci ices Japanese Aegis pending congressional action', *Navy News & Undersea Technology*, 17 July 1988, pp. 1 and 3; 'Strings on Aegis sale to Japan may cost billions in future', *Defense News*, 25 July 1988, pp. 4 and 37. In the event, the entire Appropriations Act was defeated by Congress and sent back to the White House for amendment.

¹²¹ Chanda, N., 'Billions at stake; US Congress tries to block Aegis sale to Japan', *Far Eastern Economic Review*, 18 Aug. 1988, p. 14; 'Senate clears sale of Aegis to Japanese', *Defense News*, 8 Aug. 1988, p. 11.

¹²² 'Check FSX technology spill', *Mainichi Daily News*, 8 June 1988; Ebata, K., 'USA and Japan sign MoU for FS-X', *Jane's Defence Weekly*, 11 June 1988, p. 1131; 'The FSX agreement—working together', *Japan Times*, 15 June 1988.

¹²³ In part this was because the decision to use a US design was taken in preference to a purely national programme suggested by the Air Self Defense Force. 'JASDF revises FS-X selection policy', *Flight International*, 8 Aug. 1987, p. 9; 'On a wing and a prayer', *The Economist*, 29 Aug. 1987, p. 40; Holloway, N., 'Public relations fighter: Japan to buy US warplanes for the sake of ties with Washington', *Far Eastern Economic Review*, 15 Oct. 1987, pp. 37–38; Holloway, N., 'US designed, Japan made', *Far Eastern Economic Review*, 5 Nov. 1987, p. 34.

¹²⁴ *Asian Security 1988–89* (note 116), p. 36; *AAS–Milavnews*, Aug. 1988, p. 19; Ebata, K., 'USA and Japan sign MoU for FS-X', *Jane's Defence Weekly*, 11 June 1988, p. 1131.

¹²⁵ 'Japan picks F-16 fighters for its JASD', *Asian Defence Journal*, Jan. 1988, p. 103; 'Turbulence ahead', *Far Eastern Economic Review*, 19 May 1988, p. 13; *AAS–Milavnews*, Mar. 1988, p. 17.

¹²⁶ 'Handling secret patents', *Asahi Evening News*, 15 Apr. 1988; 'Military secret patents spell trouble', *Asahi Evening News*, 18 Apr. 1988.

¹²⁷ *Japan Times*, weekly edn, 10 Sep. 1988, p. 4.

¹²⁸ I am indebted to the United Nations Office of the Society of Friends for supplying transcripts of arms transfer discussions at the SSOD III.

¹²⁹ Herby, P., 'Missed opportunities: the UN Third Special Session on Disarmament', *Council for Arms Control Bulletin*, Aug. 1988, pp. 3–4.

¹³⁰ Council of Europe (Political Affairs Committee), press communiqué, 27 June 1988.

Appendix 6A. Aggregate tables of the value of the trade in major weapons with the Third World, 1969–88

Table 6A.1. Values of imports of major weapons by the Third World: by region, 1969–88^a

Figures are SIPRI trend indicator values, as expressed in US \$m., at constant (1985) prices.

A = yearly figures, B = five-year moving averages.^b

Region ^c		1969	1970	1971	1972	1973	1974	1975
Middle East	A	3 240	4 893	5 610	5 357	10 264	6 643	6 995
	B	4 123	4 549	5 873	6 554	6 974	7 264	8 121
South Asia	A	865	798	1 208	1 734	1 049	936	2 240
	B	889	1 085	1 131	1 145	1 434	1 405	1 445
Far East	A	1 925	2 249	3 130	5 552	1 825	1 786	1 447
	B	2 416	3 061	2 936	2 908	2 748	2 414	1 703
Sub-Saharan Africa	A	126	389	430	266	477	831	645
	B	261	274	338	479	530	650	1 103
South America	A	601	285	786	1 156	2 268	1 338	1 552
	B	461	632	1 019	1 167	1 420	1 647	1 983
North Africa	A	343	185	224	373	340	591	1 755
	B	255	258	293	342	656	1 174	1 623
Central America	A	60	181	135	261	309	299	204
	B	91	138	189	237	242	261	321
South Africa	A	67	275	104	292	459	533	232
	B	185	181	240	333	324	378	353
Total^d	A	7 228	9 255	11 627	14 992	16 991	12 957	15 071
	B	8 681	10 178	12 019	13 165	14 328	15 193	16 652

^a The values include licensed production of major weapons in Third World countries (see appendix 6C). For the values for the period 1951–68, see Brzoska, M. and Ohlson, T., *SIPRI, Arms Transfers to the Third World, 1971–85* (Oxford University Press: Oxford, 1987).

^b Five-year moving averages are calculated as a more stable measure of the trend in arms imports than the often erratic year-to-year figures.

^c The regions are listed in rank order according to their five-year average values in the column for 1986. The following countries are included in each region:

Middle East: Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates, North Yemen, South Yemen.

South Asia: Afghanistan, Bangladesh, India, Nepal, Pakistan, Sri Lanka.

Far East: Brunei, Burma, Fiji, Indonesia, Kampuchea, North Korea, South Korea, Laos, Malaysia, Mongolia, Papua New Guinea, Philippines, Samoa, Singapore, Solomon Islands, Taiwan, Thailand, Vanuatu, Viet Nam.

South America: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela.

1976	1977	1978	1979	1980 ^a	1981	1982	1983	1984	1985	1986	1987	1988
7 058	9 643	7 548	5 932	8 379	9 187	11 501	11 366	11 248	9 749	10 577	13 474	8 156
7 578	7 435	7 712	8 138	8 509	9 273	10 336	10 610	10 888	11 283	10 641	..	..
1 066	1 932	1 873	1 427	2 317	2 607	2 724	2 345	2 034	2 741	3 990	6 153	5 381
1 610	1 708	1 723	2 031	2 190	2 284	2 405	2 490	2 767	3 452	4 060	..	..
1 461	1 995	3 548	5 644	2 893	2 791	1 723	2 545	2 819	3 269	3 379	3 406	4 795
2 047	2 819	3 108	3 374	3 320	3 119	2 554	2 629	2 747	3 084	3 534	..	..
1 032	2 532	2 536	896	1 453	2 004	1 537	1 173	1 937	2 005	1 700	1 864	1 376
1 515	1 528	1 690	1 884	1 685	1 413	1 621	1 731	1 671	1 736	1 777	..	..
1 922	2 836	2 335	1 634	2 106	3 169	2 480	2 845	2 953	1 147	1 043	1 536	680
1 997	2 056	2 167	2 416	2 345	2 447	2 710	2 519	2 093	1 905	1 472	..	..
2 810	2 617	3 855	5 642	3 059	2 648	2 953	1 703	1 504	1 109	1 400	692	226
2 326	3 336	3 597	3 564	3 631	3 201	2 373	1 983	1 734	1 282	986	..	..
234	557	255	295	185	644	1 077	886	588	649	608	360	175
310	309	305	387	491	618	676	769	762	618	476	..	..
371	171	343	102	109	4	4	158	5	4	154	142	89
330	244	219	146	112	75	56	35	65	93	79	..	..
15 955	22 285	22 293	21 571	20 502	23 052	23 999	23 022	23 089	20 674	22 851	27 627	20 877
17 712	19 435	20 521	21 941	22 284	22 429	22 733	22 767	22 727	23 453	23 024	..	..

Sub-Saharan Africa: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Djibouti, Equatorial Guinea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, Somalia, Sudan, Swaziland, Tanzania, Togo, Uganda, Zaire, Zambia, Zimbabwe.

North Africa: Algeria, Libya, Morocco, Tunisia.

Central America: Bahamas, Barbados, Belize, Costa Rica, Cuba, Dominican Republic, Dominica, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, St Vincent and the Grenadines, Trinidad and Tobago.

^a Items may not add up to totals due to rounding.

.. Not applicable.

Source: SIPRI data base.

Table 6A.2. Values of exports of major weapons to regions listed in table 6A.1: by supplier, 1969–88^a

Figures are SIPRI trend indicator values, as expressed in US \$m., at constant (1985) prices.
A = yearly figures, B = five-year moving averages.^b

Supplier ^c		1969	1970	1971	1972	1973	1974	1975
USSR	A	2 164	4 121	4 985	5 901	7 072	4 803	2 916
	B	3 877	4 194	4 849	5 376	5 135	5 150	5 471
USA	A	3 108	3 551	3 787	5 866	6 233	4 336	8 503
	B	2 895	3 705	4 509	4 754	5 745	6 393	7 125
France	A	274	693	677	786	1 643	1 270	1 155
	B	500	602	815	1 014	1 106	1 256	1 530
China	A	86	134	358	417	232	372	320
	B	191	231	245	303	340	310	250
UK	A	1 038	472	1 214	1 195	1 309	1 071	1 196
	B	744	887	1 046	1 052	1 197	1 121	1 211
FR Germany	A	56	3	86	108	—	462	282
	B	50	58	51	132	188	204	223
Italy	A	85	37	95	137	148	268	139
	B	87	95	100	137	157	171	202
Brazil	A	1	—	—	—	—	11	25
	B	0	0	0	2	7	38	64
Israel	A	9	5	1	34	4	67	127
	B	3	10	10	22	47	59	64
Spain	A	6	—	—	10	—	—	5
	B	5	5	3	2	3	4	4
Other Third World	A	15	26	48	134	30	184	146
	B	29	47	51	84	108	143	154
Other Industrialized, West ^d	A	241	68	223	327	254	83	207
	B	141	193	223	191	219	276	247
Other Industrialized, neutral ^e	A	6	3	95	5	10	13	24
	B	23	23	24	25	29	23	36
Other Industrialized, East ^f	A	139	143	60	72	56	19	23
	B	137	127	94	70	46	47	72
Totals	A	7 228	9 255	11 627	14 992	16 991	12 957	15 071
	B	8 681	10 178	12 019	13 165	14 328	15 193	16 652

^a The values include licensed production of major weapons in Third World countries (see appendix 6C). For the values for the period 1951–68, see Brzoska, M. and Ohlson, T., *SIPRI, Arms Transfers to the Third World, 1971–85* (Oxford University Press: Oxford, 1987).

^b Five-year moving averages are calculated as a more stable measure of the trend in arms imports than the often erratic year-to-year figures.

^c The regions are listed in rank order according to their five-year average values in the column for 1986.

^d Other NATO, Australia and Japan.

^e Austria, New Zealand, Sweden, Switzerland and Yugoslavia.

^f Other WTO.

^g Items may not add up to totals due to rounding.

— Nil.

.. Not applicable.

Source: SIPRI data base.

1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
5 056	7 507	9 428	10 210	8 899	7 644	7 238	7 030	7 423	8 634	9 136	11 672	9 001
5 942	7 023	8 220	8 738	8 684	8 204	7 647	7 594	7 892	8 779	9 173	..	..
7 027	9 525	6 794	3 961	5 617	6 143	6 976	6 220	4 905	4 009	4 845	6 229	3 490
7 237	7 162	6 585	6 408	5 898	5 784	5 972	5 651	5 391	5 242	4 696	..	..
1 424	2 157	2 411	3 264	2 411	3 286	3 191	2 978	3 345	3 664	3 420	2 635	1 671
1 683	2 082	2 333	2 706	2 913	3 026	3 042	3 293	3 320	3 209	2 947	..	..
211	114	459	412	548	328	787	978	1 207	1 011	1 313	2 187	2 011
295	303	349	372	507	611	770	862	1 059	1 339	1 546	..	..
836	1 643	1 203	773	723	1 185	1 674	579	1 136	849	1 396	1 717	1 464
1 190	1 130	1 036	1 105	1 112	987	1 059	1 085	1 127	1 135	1 312	..	..
166	204	258	162	283	938	324	1 175	1 830	395	649	252	482
274	214	215	369	393	577	910	933	875	860	722	..	..
163	294	323	975	653	1 332	1 346	988	811	575	397	317	334
237	379	481	715	926	1 059	1 026	1 010	823	618	487	..	..
154	130	120	112	268	273	202	298	271	172	124	466	338
88	108	157	181	195	231	262	243	214	266	274	..	..
61	59	470	228	209	277	375	384	263	160	242	394	178
157	189	206	249	312	295	302	292	285	289	247	..	..
3	13	30	21	9	97	366	545	475	139	163	139	205
10	14	15	34	105	207	298	324	337	292	224	..	..
221	187	95	507	194	491	577	877	652	456	509	584	633
167	231	241	295	373	529	558	610	614	615	567	..	..
506	184	457	301	230	282	437	431	141	129	203	447	628
288	331	336	291	341	336	304	284	268	270	310	..	..
63	68	36	485	314	350	235	292	227	264	272	385	289
41	135	193	250	284	335	284	274	258	288	287	..	..
63	199	209	160	145	426	270	246	404	216	180	202	152
103	131	155	228	242	250	298	313	263	250	231	..	..
15 955	22 285	22 293	21 571	20 502	23 052	23 999	23 022	23 089	20 674	22 851	27 627	20 877
17 712	19 435	20 521	21 941	22 284	22 429	22 733	22 767	22 727	23 453	23 024	..	..

Appendix 6B. Register of the trade in major conventional weapons with industrialized and Third World countries, 1988

This appendix lists major weapons on order or under delivery during 1988. The column 'Year(s) of deliveries' includes aggregates of all deliveries since the beginning of the contract. This gives a better idea of the scale of the contract. The sources and methods for the data collection, and the conventions, abbreviations and acronyms used, are explained in appendix 6D. The entries are made alphabetically, by recipient and supplier.

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
I. Industrialized countries								
7 Australia	France	5	Falcon-900	Transport	1988			For VIP use
	Italy	(10)	HSS-1	Surveillance radar	1986	1988	(2)	Deal worth \$20 m; number ordered unspecified
	UK	.	Rapier	Landmob SAM	1975	1978-88	(510)	
	USA	2	B-707-320C	Transport	1988	1988	2	In addition to 4 in service; for tanker conversion
		8	SH-60B Seahawk	Helicopter	1985			Assembly plans abandoned
		8	SH-60B Seahawk	Helicopter	1986			In addition to 8 ordered 1985; assembly plans abandoned
		14	UH-60 Blackhawk	Helicopter	1986	1988	(4)	Deliveries delayed
		25	UH-60 Blackhawk	Helicopter	1986			In addition to previous orders for 30 Blackhawk/Seahawks
		2	RGM-84A Launch	ShShM launcher	1983			Arming FFG-7 frigates produced under licence; in addition to 4 delivered earlier
		2	RIM-66A Launch	ShAM launcher	1985			Arming FFG-7 frigates produced under licence; in addition to 4 delivered earlier
		.	AIM-7F Sparrow	Air-to-air missile	1984	1986-88	(400)	Arming F/A-18 Hornet fighters
		.	AIM-9M	Air-to-air missile	1984	1986-88	(880)	Arming F/A-18 Hornet fighters
		(8)	RGM-84A Harpoon	ShShM	1987			Arming FFG-7 Class frigates and Oberon Class submarines
		(65)	RIM-67C/SM-2	ShAM/ShShM	(1987)			Deal worth \$50 m
		(40)	RIM-67C/SM-2	ShAM/ShShM	1988	1988	(40)	Deal worth \$31 m; from US stocks

6 Austria	France	(4)	Milan-2	Anti-tank missile	1988			For evaluation
	Sweden	24	J-35 Draken	Fighter	1985	1988	14	Offsets worth 130 %
		(4)	RBS-56 Bill	Anti-tank missile	1988			For evaluation
	USA	18	M-109-A2 155mm	SPH	1987	1987-88	18	Deal worth \$18 m incl spares, support and machine-guns
		36	M-109-A2 155mm	SPH	1988			Deal worth \$36 m; brings total ordered to 109
		(4)	BGM-71D TOW-2	Anti-tank missile	(1988)			For evaluation
4 Belgium	France	(530)	Magic-2	Air-to-air missile	(1985)	1988	(106)	Arming Mirage-5 fighters
		714	Mistral	Portable SAM	1988			Deal worth \$93 m incl 112 launchers; offsets worth 75 %
	Italy	46	A-109	Helicopter	1988			Deal worth \$317 m incl TOW missiles; offsets worth 96 %
	USA	545	AIM-9M	Air-to-air missile	1988			May be from FRG production line; arming F-16 fighters
5 Bulgaria	USSR	. .	SA-13 Launcher	AAV(M)	(1984)	1985-88	(16)	
		. .	ZSU-23-4 Shilka	AAV	(1984)	1985-88	(48)	
		. .	SA-13 Gopher	Landmob SAM	(1984)	1985-88	(768)	
4 Canada	France	. .	Eryx	Anti-tank missile	(1987)			Deal worth \$187 m; future licensed production probable
	Italy	. .	EH-101	Helicopter	1988			Total requirement approximately 100 ASW and utility versions
	Sweden	(12)	Giraffe	Fire control radar	(1985)	1988	2	Shipborne version for Halifax Class destroyers
	Switzerland	36	ADATS	SAM system	1986	1988	(3)	Deal worth \$1 b incl SAMs, AA guns and fire control radars
		10	Skyguard	Air defence radar	1986	1988	(1)	Part of ADATS contract
	UK	. .	EH-101	Helicopter	1987			
	USA	138	F/A-18 Hornet	Fighter	1980	1982-88	138	Incl 98 F/A-18A and 40 F/A-18B versions
		6	Phalanx	CIWS	1986	1988	(2)	Arming Halifax Class frigates
		4	Phalanx	CIWS	1987	1988	(1)	Arming Tribal Class frigates
		6	RGM-84A Launch	ShShM launcher	(1984)			Arming City Class frigates
		6	Seasparrow VLS	ShAM/PDM launcher	1984	1988	1	Arming City Class frigates; deal worth \$75 m incl modifications to missiles
		4	Seasparrow VLS	ShAM/PDM launcher	1986	1988	1	Arming Tribal Class frigates; for delivery 1988-90
		408	AIM-7M Sparrow	Air-to-air missile	1984	1985-88	(408)	Arming F/A-18 Hornet fighters; deal worth \$113 m incl spares and training
		184	AIM-7M Sparrow	Air-to-air missile	1985			Arming F/A-18 Hornet fighters

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
		96	AIM-7M Sparrow	Air-to-air missile	(1987)			Arming F/A-18 Hornet fighters; deal worth \$31 m incl 24 Mk 48 torpedoes
		416	AIM-9M	Air-to-air missile	1984	1985-88	(416)	Arming F/A-18 Hornet fighters; deal worth \$41 m, incl 40 training missiles
		100	AIM-9M	Air-to-air missile	1988			Deal worth \$21 m
		2 160	BGM-71D TOW-2	Anti-tank missile	1985	1987-88	(2 160)	
		..	RGM-84A Harpoon	ShShM	1984			Arming City Class frigates
		74	RIM-66C/SM-2	ShAM/ShShM	1988	1988	(15)	Arming Tribal Class frigates; deal worth \$48 m
		22	RIM-67C/SM-2	ShAM/ShShM	1987	1988	(5)	Arming Tribal Class frigates
		168	Seasparrow	ShAM	1984	1988	(28)	Arming City Class frigates; deal worth \$75 m
		(128)	Seasparrow	ShAM	1986	1988	(32)	Arming 4 Tribal Class frigates; for delivery 1988-90
3 China	Canada	2	Challenger-601	Transport	1988			Follows order for 3
	France	8	SA-342L Gazelle	Helicopter	1987	1988	(8)	Deal worth \$29.7 m
		(96)	HOT	Anti-tank missile	1987	1988	(96)	Arming SA-342L Gazelle helicopters
	Israel	..	Mapats	Anti-tank missile	(1986)			Unconfirmed; Israeli version of TOW ATM
	USA	2	L-100-30	Transport	1987	1988	2	For China Air Cargo; offsets probable
		4	AN/TPQ-37	Tracking radar	(1987)			Deal worth \$62 m incl spares and support equipment
		(2)	Phalanx	CIWS	(1987)	1988	(2)	For trials with new class of destroyer
		..	BGM-71A TOW	Anti-tank missile	(1987)			Agreed in principle June 1984
6 Cyprus	Brazil	120	EE-3 Jararaca	Scout car	(1982)	1984-88	(120)	Some with Milan anti-tank missiles
		(120)	EE-9 Cascavel	Armoured car	1982	1984-88	(120)	
	France	6	SA-342L Gazelle	Helicopter	1987	1987-88	6	
		16	AMX-30-B2	MBT	1987	1988	16	
		127	VAB	APC	1984	1985-88	(127)	
		..	HOT-2	Anti-tank missile	1987	1987-88	144	Arming SA-342 helicopters and VAB APCs; total deal worth \$250 m
		(200)	Milan	Anti-tank missile	1987	1987-88	(200)	
	Switzerland	(1)	Escorter 35	AAV(G)	(1987)	1988	1	
		..	Skyguard	Air defence radar	(1987)	1988	2	Fire control for new 35mm AAGs
	Yugoslavia	(8)	M-77 Oganj	MRL	1987	1987-88	(8)	
		20	SA-7 Grail	Portable SAM	1987	1988	20	

5	Czechoslovakia	USSR	(40)	An-26 Curt	Transport	(1984)	1985-88	(40)	Replacing Avia-148 and Il-148
			..	Mi-17 Hip-H	Helicopter	(1985)	1985-88	(48)	Replacing Mi-4s
			..	2S1 122mm	SPH	(1979)	1980-88	(324)	May be from Poland
			..	2S4 240mm	SPM	(1985)	1986-88	(36)	
			..	2S7 203mm	SPG	(1987)	1988	(25)	First WTO country to deploy
			..	BRDM-2 Gaskin	AAV(M)	1979	1980-88	(90)	
			..	M-1938 122mm	Towed gun	(1980)	1985-88	(400)	
			..	SA-13 Launcher	AAV(M)	(1984)	1984-88	(25)	
			(24)	SA-8 SAMS	Mobile SAM system	(1986)	1987-88	(16)	
			..	AT-4 Spigot	Anti-tank missile	1979	1980-88	(2 160)	
			..	SA-13 Gopher	Landmob SAM	(1984)	1984-88	(400)	
			..	SA-8 Gecko	Landmob SAM	(1986)	1987-88	(64)	
			..	SA-9 Gaskin	Landmob SAM	1979	1980-88	(1 440)	

4	Denmark	Australia	1	Lynx	Helicopter	(1987)	1988	1	Deal worth \$3.5 m incl 3 spare engines; for fishery protection
		France	12	AS-350 Ecureuil	Helicopter	1987			Deal worth \$67 m incl Helitow sight system and TOW-2 missiles
		Germany, FR	..	RAM	ShAM/PDM	(1985)			Arming 3 Niels Juel Class frigates
		Norway	3	Type-207	Submarine	1985			
		Sweden	12	Helitow	Fire control system	1987	1988	(6)	
		USA	8	F-16A	Fighter	1985	1987-88	(5)	Deal worth \$210 m incl spares and technical support
			4	F-16B	Fighter/trainer	1985	1987-88	(4)	
			2	Cardion DCR	Coastal radar	1979	1988	(2)	
			(132)	AGM-65D	ASM	1988			Arming F-16 fighters
			(196)	BGM-71D TOW-2	Anti-tank missile	1987	1988	(98)	Arming 12 AS-350 Ecureuil helicopters
			840	FIM-92A Stinger	Portable SAM	1988			Deal worth \$61 m incl 336 launchers
6	Finland	France	(20)	Crotale SAMS	Mobile SAM system	(1988)			
			(6)	TRS-2230/15	Air defence radar	1988			Part of Crotale air defence system
			(240)	R-440 Crotale	Landmob SAM	1988			
		Sweden	(4)	Giraffe	Fire control radar	(1987)			Sea Giraffe equipping Helsinki 2 Class FACs
			6	RBS-15 Launcher	ShShM launcher	1987			Arming Helsinki Class FACs
			..	RBS-15 Launcher	ShShM launcher	(1987)	1988	2	Coastal defence version mounted in Finnish trucks
			(96)	RBS-15	ShAM/ShShM	(1987)			Arming Helsinki Class FACs
			..	RBS-15	ShAM/ShShM	(1987)	1988	(32)	Coastal defence version mounted in Finnish trucks
		UK	4	Watchman	Surveillance radar	1988			Second order; deliveries to begin 1989
		USA	..	BGM-71C I-TOW	Anti-tank missile	(1985)	1988	(48)	Undisclosed number ordered
		USSR	6	BMP-2	MICV	1988	1988	6	Deal reported to be worth \$17.6 m incl undisclosed number of AT-4 Spigot ATMs

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
		(100)	MT-LB	APC	(1986)	1986-88	(30)	
		(60)	T-72	MBT	(1986)	1986-87	(24)	For delivery 1986-90
		. .	AT-4 Spigot	Anti-tank missile	(1986)	1986-88	(180)	Part of \$400 m 5-year agreement also incl T-72 tanks and MT-LB APCs
		. .	AT-4 Spigot	Anti-tank missile	(1988)	1988	(18)	Arming BMP-2 APCs
4 France	Brazil	20	EMB-312 Tucano	Trainer	1988			
	Spain	5	C-212-300	Transport	1987	1988	2	Offset by Spanish order for AS-332 helicopters; first French purchase of Spanish military aircraft
	UK	8	CN-235	Transport	1988			Deal worth \$80 m; option for 7 more
		4	Lynx	Helicopter	(1985)	1987-88	(4)	For Cassard Class frigates; aircraft containing major French input
	USA	6	C-130H Hercules	Transport	(1987)	1987-88	6	Deal worth \$128 m
		4	C-130H-30	Transport	1988			Follows order for 6 C-130s in 1987
		4	E-3A Sentry	AEW	1987			130% offsets in aerospace; option for 1 more abandoned
		2	MLRS 227mm	MRL	1987	1988	2	Prior to licensed production of 80
		2	RIM-67A Launch	ShAM launcher	1985	1988	1	Arming Cassard Class frigates
		80	RIM-67A/SM-1	ShAM/ShShM	1985	1988	(40)	Arming Cassard Class frigates
5 German DR	Bulgaria	. .	MT-LB	APC	(1982)	1984-88	(50)	Unconfirmed
	USSR	. .	MiG-29	Fighter	(1987)	1988	(18)	
		. .	BMP-2	MICV	(1978)	1982-88	(700)	May be from Czechoslovakian production
		. .	BRDM-2 Spandrel	TD(M)	1978	1980-88	(450)	
		. .	BTR-70	APC	(1982)	1983-88	(390)	Replacing BTR-60; also designated SPW-70
		. .	SA-13 Launcher	AAV(M)	(1984)	1985-88	(20)	Unconfirmed
		. .	T-72	MBT	(1978)	1979-88	(350)	May be from Czechoslovakian or Polish production
		. .	AT-4 Spigot	Anti-tank missile	1978	1979-88	(3 840)	
		. .	AT-5 Spandrel	Anti-tank missile	1978	1980-88	(10 000)	Arming BMP-2 and BRDM-2 armoured vehicles
		. .	SA-13 Gopher	Landmob SAM	(1984)	1985-88	(240)	Unconfirmed
4 Germany, FR	France	20	TRS-3050	Surveillance radar	(1986)	1986-88	(12)	Improved fire control system for Type 148 FACs
	UK	5	Lynx	Helicopter	1986	1988	(3)	For Type 122 Bremen Class frigates; offsets worth 30%
		(100)	Sea Skua	Anti-ship missile	1986	1988	(50)	Arming Sea King Mk 41 helicopters

USA		12	F-3G	Mar patrol	1988			Deliveries planned from 1990
		6	MLRS 227mm	MRL	1985	1988	6	Prior to licensed production of 200
		3	AN/FPS-117	Air defence radar	1988			
		28	Patriot battery	Mobile SAM system	(1983)			14 units on loan from USA, 14 purchased through FMS; each bty includes 8 launchers
		2	RGM-84A Launch	ShShM launcher	(1986)	1988	1	Arming Type 122 Bremen Class frigates
		(2)	Seasparrow L	ShAM/PDM launcher	1986	1988	1	Arming Type 122 Bremen Class frigates
		100	AGM-65A	ASM	1988			
		300	AGM-65D	ASM	(1988)			
		1 200	AGM-65G	ASM	(1988)			
		368	AGM-88 Harm	ARM	1986	1988	(180)	Arming Tornado fighters
		994	AGM-88 Harm	ARM	1987			Arming Tornado fighters
		804	MIM-104 Patriot	SAM	1984			
		(150)	RAM	ShAM/PDM	(1985)	1988	(150)	Prior to licensed production from 1990
		(48)	RGM-84A Harpoon	ShShM	(1986)	1988	(24)	Arming Type 122 Bremen Class frigates
		(56)	Seasparrow	ShAM	(1986)	1988	(28)	Arming Type 122 Bremen Class frigates
4 Greece	France	40	Mirage-2000	Fighter	1984	1988	20	36 fighters and 4 trainers; for delivery 1988-89
		.	Stentor	Battlefield radar	(1987)	1988	(2)	Includes agreement for licensed production
		(240)	Magic-2	Air-to-air missile	(1986)	1988	(120)	Arming Mirage-2000 fighters; domestic criticism of high price compared to US Sidewinder
	Germany, FR	4 000	Milan	Anti-tank missile	1987	1988	(1 000)	Deal worth \$54 m incl 100 launchers
		(28)	F-104G	Fighter	1988	1988	(28)	Gift as offset for Greek order for 4 Meko-200 frigates
		75	Leopard-1-A3	MBT	1988			Gift as offset for Greek order for 4 Meko-200 frigates
		4	MPDR	Surveillance radar	1988			Deal worth \$11.7 m; financed by NATO military aid
	Italy	(96)	NATO Seasparrow	ShAM/ShShM	(1988)			Arming Meko-200 Class frigates
		1	Meko-200 Type	Frigate	1988			Deal worth \$1.2 b; prior to licensed production of 3
		18	AB-212ASW	Helicopter	1978	1983-88	(18)	
		10	F-5A	Fighter	1987	1988(10)		
	USA	40	F-16C	Fighter	1985	1988	(4)	Includes 6 F-16D versions
		50	F-4E Phantom	Fighter	(1988)	1988	(20)	From US stockpiles
		19	F-4G Wildweasel	Fighter	(1988)			Part of military aid package with 50 F-4E fighters
		14	Model 205 UH-1H	Helicopter	1988	1988	14	Ex-US Army
		300	M-48-A5	MBT	1986	1987-88	(60)	Deal worth \$103 m; 250 financed by FMS

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
		2	HADR	Air defence radar	1985	1988	(1)	Part of NADGE air defence system
		4	Phalanx	CIWS	(1987)			Arming Meko-200 Class frigates
		(4)	RGM-84A Launch	ShShM launcher	(1988)			Arming Meko-200 Class frigates
		(4)	Seasparrow L	ShAM/PDM launcher	1988			Arming Meko-200 Class frigates
		(152)	AGM-45A Shrike	ARM	1988			Arming F-4G Wild Weasels
		80	AIM-7F Sparrow	Air-to-air missile	(1987)	1988	(30)	Arming 40 F-4E fighters
		80	AIM-9F	Air-to-air missile	(1987)	1988	(30)	Arming 40 F-4E Phantom fighters
		1 000	FIM-92A Stinger	Portable SAM	1988			Deal worth \$124 m incl 500 launchers
		32	RGM-84A Harpoon	ShShM	1986	1988	(32)	Deal worth \$43 m incl containers and spares; arming Elli (Kortenaer) Class frigates
		(64)	RGM-84A Harpoon	ShShM	1988			Arming Meko-200 Class frigates
5 Hungary	Czechoslovakia	. .	L-39 Albatross	Jet trainer	1988			
	USSR	. .	Mi-17 Hip-H	Helicopter	1988			
		. .	MiG-29	Fighter	(1988)			Deliveries expected 1989
6 Ireland	Italy	5	SF-260 Warrior	Trainer/COIN	(1987)			For Air Corps
	UK	2	Peacock Class	OPV	(1988)	1988	(2)	Deal worth \$12 m; may be funded by EC
4 Italy	Germany, FR	. .	Kormoran-2	Anti-ship missile	(1986)	1988	(22)	Arming Tornado fighters
	Sweden	60	Helitow	Fire control system	(1987)	1987-88	(60)	For A-129 Mangusta helicopters ordered by Italian Army; option for 30 more
	USA	20	MLRS 227mm	MRL	1985			For delivery 1989
		2	HADR	Air defence radar	1985	1988	(1)	Part of NADGE system
		6 629	BGM-71C I-TOW	Anti-tank missile	1984	1986-88	(6 000)	Deal worth \$67 m incl 1239 practice missiles
		(3 900)	BGM-71D TOW-2	Anti-tank missile	1987	1987-88	(1 100)	Arming A-129 Mangusta helicopters
		450	FIM-92A Stinger	Portable SAM	1984	1986-88	(450)	Deal worth \$51 m incl 150 launchers
7 Japan	France	3	AS-332	Helicopter	1987	1988	(3)	
		2	Falcon-900	Transport	1987			For delivery 1989
	Italy	. .	Sparviero Class	Hydrofoil FAC	(1988)			For training crews prior to construction of Japanese 200t hydrofoil
	UK	(197)	FH-70 155mm	Towed howitzer	(1983)	1983-88	(197)	375 more for licensed production
	USA	3	C-130H Hercules	Transport	1987	1988	2	
		2	C-130H-30	Transport	1988			Deal worth \$60 m
		5	E-2C Hawkeye	AEW	1988			In addition to 8 previously delivered

		16	King Air C-90	Trainer	(1979)	1980-88	15	
		6	Learjet-35A	Mar patrol/trpt	1985	1985-88	(4)	1 target tug; 5 for recce training
		(1)	Learjet-36A	Transport	(1987)	1988	1	In addition to 1 delivered 1987
		6	MH-53E	Helicopter	(1987)			
		1	Patriot battery	Mobile SAM system	(1984)			To be followed by co-production
		6	Phalanx	CIWS	1981	1982	(2)	Retrofitted into Tachikaze Class
		(2)	Phalanx	CIWS	(1985)	1986-88	(2)	On Hatakaze Class destroyers
		. .	Phalanx	CIWS	1985	1986-88	(6)	Arming Asagiri Class and second batch of Hatsuyuki Class
		(8)	Phalanx	CIWS	1988	1988	(2)	Part of Aegis air defence system arming new class of Japanese destroyer
		. .	RGM-84A Launch	ShShM launcher	(1979)	1980-88	(36)	Arming various Japanese escorts and Yuushio Class submarines
		(4)	RGM-84A Launch	ShShM launcher	1988	1988	(2)	Part of Aegis air defence system arming new class of Japanese destroyer
		. .	Seasparrow L	ShAM/PDM launcher	1980	1981-88	(19)	Arming various classes of Japanese escort
		(8)	Seasparrow VLS	ShAM/PDM launcher	1988	1988	(2)	Part of Aegis air defence system arming new class of Japanese destroyer
		55	AGM-84A Harpoon	Anti-ship missile	(1987)	1988	(12)	Deal worth \$80 m; mix of air-, sea-, and submarine-launched versions unclear
		49	AGM-84A Harpoon	Anti-ship missile	1988			Deal worth \$60 m; mix of air- and sea-launched versions unclear
		. .	FIM-92A Stinger	Portable SAM	1982	1984-88	(555)	
		. .	FIM-92A Stinger	Portable SAM	(1988)			
		20	MIM-104 Patriot	SAM	(1984)			
		. .	RGM-84A Harpoon	ShShM	(1979)	1980-88	(864)	Arming various Japanese destroyers, frigates and submarines
		(64)	RGM-84A Harpoon	ShShM	1988	1988	(16)	Part of Aegis air defence system arming new class of Japanese destroyer
		(350)	RIM-66C/SM-2	ShAM/ShShM	1988	1988	(88)	Part of Aegis air defence system arming new class of Japanese destroyer
		. .	RIM-7M Sparrow	SAM	1980	1981-88	(280)	Arming various Japanese-built frigates and destroyers
4	Netherlands							
		10	PC-7	Trainer	1988			
		21	MLRS 227mm	MRL	1986			Deal worth \$192 m incl 2700 rocket pods; for delivery from 1989
		46	MLRS 227mm	MRL	1987			
		4	AN/TPQ-37	Tracking radar	1986			
		4	Patriot battery	Mobile SAM system	1984			US waived \$100 m of \$300 m contract value as an offset; btys incl 5 launchers

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
		4	Patriot battery	Mobile SAM system	(1988)			Each battery incl 8 launchers
		8	RGM-84A Launch	ShShM launcher	1985	1987	(1)	Arming 8 M Class frigates
		..	AGM-84A Harpoon	Anti-ship missile	1988			
		900	AIM-9L	Air-to-air missile	1983	1985-88	(800)	Arming F-16 fighters; deal worth \$78 m
		290	AIM-9M	Air-to-air missile	1988			Arming F-16 fighters; deal worth \$27 m
		1 878	BGM-71D TOW-2	Anti-tank missile	1986	1987-88	(1 878)	Deal worth \$22 m
		646	FIM-92A Stinger	Portable SAM	1982	1985-88	(646)	
		1 709	FIM-92A Stinger	Portable SAM	1988	1988	(154)	
		160	MIM-104 Patriot	SAM	1983			Arming 4 btys with 5 launchers each
		256	MIM-104 Patriot	SAM	(1988)			
		(168)	RGM-84A Harpoon	ShShM	1988			Includes unspecified mix of air-launched Harpoon missiles; arming M-Class frigates
7 New Zealand	Australia	24	Hamel 105mm	Towed gun	1986	1987-88	16	
		..	ASI-315	Patrol craft	(1985)			For Cook Islands under Pacific Patrol Boat Programme
	Korea, South	(1)	Endeavour Class	Support ship/tanker	(1985)	1988	1	Fleet oiler
	USA	..	AGM-65D	ASM	1988			Arming 22 A-4 Skyhawk fighters; anti-shipping version
		..	AIM-9P	Air-to-air missile	1988			Arming A-4 Skyhawk fighters
4 Norway	Germany, FR	6	Type-210	Submarine	1983			Offsets incl 12 fire control systems for FRG submarines; Norwegian designation Ula Class
	Sweden	..	Ersta 120mm	Coastal gun	1986	1986-88	(6)	For coastal defence
		..	Giraffe	Fire control radar	1985	1986-88	(30)	Unspecified number; for RBS-70 SAMs
		..	RBS-70	Portable SAM	1985	1987-88	(100)	Deal worth \$90 m; fifth order
		(800)	RBS-70	Portable SAM	1988			Deal worth \$80 m; offsets worth 45%; sixth order
	UK	1	SH-3D Sea King	Helicopter	(1987)	1988	(1)	To replace 1 helicopter lost Nov 1986
	USA	(24)	F-16A	Fighter	1983			Mix of F-16A and B versions
		2	F-16A	Fighter	1986			Deal worth \$30 m
		18	Model 412	Helicopter	1986	1987-88	(9)	Lead unit to be followed by assembly of 17
		4	P-3C Orion	Mar patrol/ASW	1986	1988	2	
		16	M-113-A2	APC	(1986)	1988	(8)	In addition to 44 M-901 tank destroyers
		36	M-48-A5	MBT	1986	1987-88	(30)	Deal worth \$26 m

		24	AN/TPQ-36	Tracking radar	(1987)	1987-88	(24)	
		7 612	BGM-71D TOW-2	Anti-tank missile	1985	1987-88	(1 000)	Deal worth \$126 m incl 300 launchers and spares
5	Poland	USSR	(20) SA-11 SAMS	Mobile SAM system	(1987)	1988	(20)	1 regiment
			5 SA-N-5 Launcher	ShAM launcher	(1985)			Arming 5 Tarantul Class corvettes
			5 SSN-2 Styx L	ShShM launcher	1982	1983-84	2	Arming 5 Tarantul Class corvettes
			AS-7 Kerry	ASM	(1985)	1986-88	(600)	
		(320)	SA-11 Gadfly	Landmob SAM	(1987)	1988	(320)	
		(60)	SA-N-5	ShAM	(1985)			Arming 5 Tarantul Class corvettes
		(60)	SSN-2 Styx	ShShM	1982			Arming 5 Tarantul Class corvettes
		(60)	SSN-2 Styx	ShShM	(1985)			Arming 5 Tarantul Class corvettes; improved Styx with longer range and new guidance system
		(4)	Kilo Class	Submarine	(1984)	1986-87	2	Replacing Whiskey Class submarines
		(5)	Tarantul Class	Corvette	1982	1983-84	2	Order number may be up to 8
4	Portugal	France	.. Milan	Anti-tank missile	(1988)			Partial funding from NATO military fund
		Germany, FR	3 Meko-200 Type	Frigate	1986			Deal worth \$700 m; partial funding from NATO military fund
		Italy	4 A-109	Helicopter	1986	1988	(1)	
			24 Aspide	Air-to-air missile	1986			Arming 3 Meko-200 frigates
		UK	2 Watchman	Surveillance radar	1988			Deal worth \$9 m incl 2 AN/TPS-44 radars; funded by NATO modernization programme
		USA	6 P-3B Orion	Mar patrol/ASW	1985	1988	6	Ex-Australian; 1 refurbished in USA, 5 in Portugal
			(34) M-163 Vulcan	AAV	(1987)	1987-88	(20)	
			5 M-730 Chaparral	AAV(M)	1986	1988	(5)	Deal worth \$45 m incl 66 missiles and 2 AN/MPQ-54 radars
			2 AN/MPQ-54	Guidance radar	1986	1988	(2)	Part of low-level air defence system
			2 AN/TPS-44	Surveillance radar	1988			
			3 HADR	Air defence radar	1985	1988	(1)	Part of NADGE air defence system
			3 Phalanx	CIWS	1986			Arming 3 Meko-200 Type frigates
			3 RGM-84A Launch	ShShM launcher	1986			Arming 3 Meko-200 Type frigates
			3 Seasparrow VLS	ShAM/PDM launcher	1986			Arming 3 Meko-200 Type frigates
		(66)	MIM-72F	SAM/ShAM	1986	1988	28	
		24	RGM-84A Harpoon	ShShM	1986			Arming 3 Meko-200 Type frigates
		17	RIM-7M Sparrow	SAM	1988			Arming 3 Meko-200 Type frigates
4	Spain	Chile	40 T-35 Pillan	Trainer	1984	1985-88	(40)	Offsetting Chilean purchase of C-101s; Spanish designation: E-26 Tamiz
		France	1 Falcon-900	Transport	(1988)	1988	1	For VIP use
			18 AMX-30 Roland	AAV(M)	1984	1988	(6)	Deal worth \$182.4 m incl 414 Roland-2 mobile SAMs

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
		(2 000)	HOT	Anti-tank missile	1984	1986-88	(1 500)	Incl 150 launchers
		(3 500)	Milan-2	Anti-tank missile	1984	1986-88	(3 000)	Incl 250 launchers
		3 000	Mistral	Portable SAM	(1987)			
		414	Roland-2	Landmob SAM	1984	1986-88	(414)	Deal worth \$182.4 m; mounted on AMX-30
	Italy	28	Skyguard Launch	Mobile SAM system	1985	1987-88	(10)	Roland launch units; offsets worth 65 % For delivery over 5 years; 28 launch units in 6 btys
		(800)	Aspide	Air-to-air missile	1985	1987-88	(320)	Deal worth \$129 m incl 13 Aspide/Spada launch systems; offsets worth 40 %
	Norway	5	P-3B Orion	Mar patrol/ASW	(1988)			Refurbished in USA
		12	Penguin Launch	ShShM launcher	(1988)			Arming Lazaga and Barcelo Class patrol vessels; unconfirmed
		(48)	Penguin-2	ShShM	(1988)			Arming Lazaga and Barcelo Class patrol vessels; unconfirmed
	USA	12	AV-8B Harrier	Fighter	1983	1987-88	12	Deal worth \$378 m; offsets worth \$130 m; to equip aircraft-carrier
		2	B-707-320C	Transport	(1987)	1988	2	Converted by Boeing from civilian use
		1	C-130H Hercules	Transport	1987	1988	(1)	In addition to 1 delivered 1987
		(3)	Citation-2	Transport	(1987)	1988	3	
		72	F/A-18 Hornet	Fighter	1983	1986-88	(46)	60 F/A-18As and 12 F/A-18Bs
		6	Model 212 UH-1N	Helicopter	1987	1988	6	
		6	SH-60B Seahawk	Helicopter	1984	1987-88	6	Deal worth \$275 m; equipping FFG-7 frigates
		2	AN/TPQ-36	Tracking radar	(1987)	1988	(1)	Follow-on order for 3 more expected
		96	M54 Chaparral	Mobile SAM system	1981	1986-88	(30)	
		1	RGM-84A Launch	ShShM launcher	(1986)			Arming 4th FFG-7 Class frigate
		. .	RGM-84A Launch	ShShM launcher	1988			Coastal defence version mounted on trucks; for deployment near Gibraltar
		1	RIM-67A Launch	ShAM launcher	(1986)			Arming fourth FFG-7 Class frigate; dual- purpose launcher for Harpoon ShShMs and Seasparrow SAMs
		(70)	AGM-84A Harpoon	Anti-ship missile	(1987)			Arming F/A-18 fighters
		80	AGM-88 Harm	ARM	1987			Cost incl containers and spares; for F/A-18 fighters
		(400)	BGM-71D TOW-2	Anti-tank missile	1987			Arming Piranha APCs; for co-production in addition to previous TOW orders
		50	MIM-23B Hawk	Landmob SAM	(1987)			Deal worth \$22 m incl spares and support
		1 760	MIM-72F	SAM/ShAM	1981	1986-88	(540)	Deal worth \$272 m incl 96 M54 Chaparral

		20 (48) (64)	RGM-84A Harpoon RGM-84A Harpoon RIM-67A/SM-1	ShShM ShShM ShAM/ShShM	1987 (1988) (1986)			Arming fourth FFG-7 Class frigate Arming coastal defence bty Arming fourth FFG-7 Class frigate
6	Sweden							
	France	10	AS-332	Helicopter	1987	1988	(2)	Deal worth \$106 m; for Navy
	UK	(400)	Sky Flash	Air-to-air missile	1981	1983-88	(400)	Second order
	USA	16	Model 300C	Helicopter	1985	1988	(16)	Deal worth \$4 m
		(2)	M-113-A2	APC	(1986)	1988	(2)	For trials as platform for RBS-70; prospective low-level air defence system
		700	AGM-114A	ASM/ATM	1987			Deal worth \$65 m; Hellfire coastal defence version
		(1 000)	BGM-71D TOW-2	Anti-tank missile	1984	1988	(500)	
6	Switzerland							
	UK	1	Hawk-60	Jet trainer	1987			Delivery of 1 from UK prior to Swiss co- production of 19
	USA	34	F/A-18 Hornet	Fighter	(1988)			Deal worth \$1.9 b incl missiles, spares and training; offsets worth 100 %
		204	AIM-7M Sparrow	Air-to-air missile	1988			Arming F/A-18 Hornet fighters
		(272)	AIM-9L	Air-to-air missile	(1988)			Arming F/A-18 Hornet fighters
		12 000	BGM-71D TOW-2	Anti-tank missile	(1985)	1988	(1 000)	Deal worth \$209 m incl 3 000 practice rounds, 400 launchers and night vision sights
4	Turkey							
	Canada	12	T-33A	Jet trainer	1987	1988	12	
	Egypt	33	F-4E Phantom	Fighter	(1987)			Negotiating; US approval granted for resale; Saudi funding expected
	France	5	Stentor	Surveillance radar	1987	1988	(1)	
		1	TRS-2230/15	Air defence radar	1987			Air defence package incl surveillance radars and command posts; designations uncertain
	Germany, FR	2	Tiger	Point defence radar	1987	1988	(1)	
		(148)	F-104G	Fighter	1980	1980-88	148	
		8	Leopard	ARV	1988			Part of deal worth \$346 m
		(150)	Leopard-1	MBT	1986	1988	(50)	Negotiations on Leopard-2 resulted in contract for ex-FRG Leopard-1s
		100	Leopard-1-A4	MBT	(1987)			
		6 520	Milan	Anti-tank missile	1981	1981-88	6 520	Including 438 launchers
		2	Meko-200 Type	Frigate	1983	1987-88	2	Prior to licensed production of 2
	Indonesia	52	CN-235	Transport	(1986)			Co-production expected to follow; supplier may be Spain
	Italy	10	AB-212	Helicopter	(1986)	1987-88	10	Second order
		(96)	Aspide	Air-to-air missile	(1986)	1987-88	(48)	Arming 4 Meko-200 Type frigates
	Netherlands	24	F-104G	Fighter	1987	1988	24	

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
	Spain	70	F-5A	Fighter	1987	1988	24	
		33	F-4C Phantom	Fighter	1988			
	Switzerland	4	RF-4C Phantom	Fighter/recce	1988			
		4	Seaguard	CIWS	(1985)	1987-88	2	Arming 4 Meko-200 Type frigates
	UK	40	Shorland S-55	APC	1988			
		8	F-16C	Fighter	1984	1987-88	8	Delivery prior to assembly
	USA	40	F-4E Phantom	Fighter	1987			Ex-USAF
		15	Model 205 UH-1H	Helicopter	1985	1987-88	15	Deal worth \$33 m; for local assembly
		15	Model 205 UH-1H	Helicopter	1988			Brings total UH-1H Huey orders to 183 (incl 96 from Italy)
		12	T-33A	Jet trainer	1988	1988	12	Includes Canadian spare parts
		6	UH-60 Blackhawk	Helicopter	1988	1988	6	Deal worth \$40 m
		(2)	AIFV	MICV	(1988)	1988	(2)	Delivered directly prior to licensed production of 1068 in Turkey
		36	M-198 155mm	Towed howitzer	(1986)			
		12	MLRS 227mm	MRL	1988			Part of \$1 b deal; 168 more to be co-produced
		6	AN/TPQ-36	Tracking radar	(1986)	1988	(1)	
		3	HADR	Air defence radar	1985			Part of NADGE air defence system
		8	Phalanx	CIWS	(1982)	1987-88	4	Arming 4 Meko-200 Type frigates
		4	RGM-84A Launch	ShShM launcher	1983	1987-88	(4)	Arming 4 Meko-200 Type frigates
		(4)	Seasparrow L	ShAM/PDM launcher	(1986)	1987-88	2	Arming 4 Meko-200 Type frigates
		80	AIM-7F Sparrow	Air-to-air missile	1987			Arming 40 F-4E fighters from US stockpiles
		(320)	AIM-7M Sparrow	Air-to-air missile	(1983)	1986-88	(225)	
		80	AIM-9F	Air-to-air missile	1987			Arming 40 F-4E fighters from US stockpiles
		(48)	RGM-84A Harpoon	ShShM	1983	1987-88	(24)	Arming 4 Meko-200 Type frigates
4 UK	France	3	AS-365N	Helicopter	1988			For Hong Kong
		8	Falcon-20G	Mar patrol	1985	1987-88	8	
	Netherlands	(24)	Goalkeeper	CIWS	1985	1987-88	7	Arming Type-22 frigates and Invincible Class aircraft-carriers
								130% offsets
	USA	6	E-3A Sentry	AWACS	(1987)			Deal worth \$120 m with offsets of 130%
		1	E-3A Sentry	AWACS	1987			
		4	MLRS 227mm	MRL	1985	1988	4	Licensed production to follow
		4	Phalanx	CIWS	(1985)	1988	2	Arming Type-22 frigates

		(330)	AIM-120A	Air-to-air missile	(1988)			Alternatives still under consideration
		(192)	AMRAAM	ShShM	1984	1985-88	(120)	Arming Type-22 and Type-23 frigates; offsets worth 130%
		(64)	RGM-84A Harpoon	SLBM	(1983)			Arming 4 Vanguard submarines; delivery mid-1990s; replacing Polaris force
1	USA							
	Canada	2	Dash-8	Transport	1985	1988	2	US designation E-9A; extensively modified for telemetry monitoring
		758	LAV-25	APC	1982	1983-88	(758)	For US Army and Marine Corps; based on Swiss Piranha APC
		153	LAV-25	APC	(1987)			For Air Force air base defence
		2	LAV-AD	AAV(M)	1988			Air defence versions for evaluation; order for up to 125 to follow
	France	(90)	Milan-2	Anti-tank missile	1985	1987-88	(90)	For evaluation against RBS-56 Bill
	Germany, FR	6	Tpz-1	APC	(1988)	1988	6	For evaluation; order of up to 570 for US Army halted by Congress
		7	Wiesel	Scout car	1988			For trials as robotic armoured vehicles
		27	Roland Launcher	Mobile SAM system	(1983)	1987-88	16	For defence of USAF bases in FRG; terms of sale unclear
	Israel	14	Have Nap	AGM	(1986)	1987-88	14	For evaluation; USA may co-produce
		100	Have Nap	AGM	(1988)			May involve US production
	Kuwait	(29)	A-4M Skyhawk-2	Fighter/bomber	1988			Partial exchange for Kuwaiti F/A-18 fighters
	Norway	(212)	Penguin-3	Anti-ship missile	(1986)			Status uncertain
	Spain	3	P-3A Orion	Mar patrol/ASW	(1988)			Returned to USA in exchange for ex-Norwegian P-3Bs
	Sweden	(110)	RBS-56 Bill	Anti-tank missile	1986	1987-88	(110)	For evaluation
	Switzerland	4	ADATS	SAM system	1987			Initial order
	UK	1	Airship	AEW	1987			Prototype AEW/communications relay
		6	BAe-125-800	Utility jet	1988			US designation C-29A
		6	Bulldog-125	Trainer	1988			Flight inspection aircraft
		10	Sherpa	Transport	1988			In addition to 18 previously ordered
		53	L119 105mm gun	Towed gun	1987	1988	(26)	Part of deal worth \$161 m; to be followed by US co-production of 489
		1	Watchman	Surveillance radar	1988			For evaluation
2	USSR							
	Czechoslovakia	. .	L-39 Albatross	Jet trainer	(1972)	1974-88	(1 050)	
		. .	BMP-1	MICV	(1972)	1972-87	(4 800)	70% of Czechoslovakian BMP production
	Peru	(15)	An-26 Curl	Transport	(1986)	1987-88	(15)	Part-payment in exchange for An-32s
	Poland	. .	Mi-2 Hoplite	Helicopter	1965	1965-88	(2 160)	Deliveries started 1965 and continue at approx 90 per year; many no longer in service

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
	Romania	. .	Yak-52	Trainer	(1980)	1981-88	(1 450)	About 200 per year produced for USSR
6 Yugoslavia	Canada	1	CL-215	Amphibian	1986	1988	(1)	Replacing 1 lost 1984
	USSR	(12)	Ka-27 Helix	Helicopter	1986	1987-88	(12)	
		(48)	MiG-29	Fighter	(1987)	1988	(32)	
		(16)	SA-11 SAMS	Mobile SAM system	(1986)	1987-88	(16)	1 regiment
		. .	SSC-3 Launcher	SShM launcher	1983	1985-88	(8)	
		(288)	AA-7 Apex	Air-to-air missile	(1987)	1988	(96)	Arming MiG-29 fighters
		(368)	AA-8 Aphid	Air-to-air missile	(1987)	1988	(128)	Arming MiG-29 fighters
		. .	AT-3 Sagger	Anti-tank missile	(1971)	1971-88	(1 800)	Arming Mi-8 helicopters, armoured vehicles and field launchers
		(264)	SA-11 Gadfly	Landmob SAM	(1986)	1987-88	(264)	
		. .	SSC-3	SShM	1983	1985-88	(60)	

II. Third World countries

9 Afghanistan	China	. .	Type-63 107mm	MRL	(1982)	1982-88	(300)	For Mujahideen; 122mm rockets without launchers supplied from Feb 1988
		. .	Hong Ying-5	Portable SAM	(1982)	1982-88	(750)	SA-7 copy; for Mujahideen
	Czechoslovakia	. .	L-39 Albatross	Jet trainer	(1979)	1979-88	(18)	
	Egypt	. .	SA-7 Grail	Portable SAM	(1984)	1985-88	(200)	For Mujahideen; unconfirmed
	France	. .	Milan	Anti-tank missile	(1988)	1988	(140)	For Mujahideen; supplier country uncertain
	Poland	. .	An-2	Lightplane	(1979)	1979-88	(19)	
	USA	(40)	BGM-71A TOW	Anti-tank missile	(1988)	1988	(40)	For Mujahideen
		. .	FIM-92A Stinger	Portable SAM	1986	1986-88	(1 300)	For Mujahideen; deliveries briefly resumed after 10 Apr 1988 depot blast
	USSR	. .	AN-30 Clank	Survey aeroplane	(1985)	1985-88	(4)	Unconfirmed
		. .	An-26 Curl	Transport	(1978)	1978-88	(55)	
		. .	Mi-24 Hind-D	Helicopter	(1984)	1984-88	(39)	Replacing losses from fleet of approx 90 Hind-A/Bs
		. .	Mi-8 Hip	Helicopter	(1979)	1979-88	(109)	
		. .	MiG-27	Fighter/grd attack	(1988)	1988	(30)	May be Soviet Air Force
		. .	Su-22 Fitter-J	Fighter/grd attack	(1979)	1979-88	(38)	
		. .	BM-21 122mm	MRL	(1979)	1979-88	(142)	
		. .	BMP-1	MICV	(1979)	1979-88	(186)	May include Czechoslovakian-built BMPs
		. .	BTR-50P	APC	(1979)	1979-88	(560)	
		. .	BR-107	APC	(1979)	1979-88	(560)	

			.. D-1 152mm	Towed howitzer	(1979)	1979-88	(120)	
			.. D-30 122mm	Towed howitzer	(1978)	1978-88	(374)	
			.. M-1976 152mm	Towed gun	(1987)			Status uncertain
			.. M-46 130mm	Towed gun	(1979)	1979-88	(124)	
			.. PT-76	Light tank	1979	1979-88	(95)	
			.. T-55	MBT	(1978)	1978-88	(520)	
			.. T-62	MBT	(1979)	1979-88	(95)	
			.. Scud-B Launcher	Mobile SSM system	(1988)	1988	(3)	May be for Soviet Army
		(240)	.. AA-2 Atoll	Air-to-air missile	(1988)	1988	(240)	Arming MiG-27 fighters
			.. AA-8 Aphid	Air-to-air missile	(1979)	1979-88	(228)	Arming SU-22 fighters
			.. Scud-B	SSM	(1988)	1988	(50)	
12	Algeria	Brazil	2 EMB-111	Mar patrol	1987	1988	(2)	
		Czechoslovakia	16 L-39 Albatross	Jet trainer	1987			Second order
		USSR	(40) MiG-29	Fighter	1988			Negotiating
13	Angola	Brazil	2 EMB-111	Mar patrol	1987	1988	2	
		France	(6) AS-365N	Helicopter	(1987)	1988	(6)	Order may be as high as 12; in addition to 6 previously bought
		Spain	4 C-212-200	Transport	1988	1988	4	
		USSR	.. Mi-24 Hind-C	Helicopter	(1983)	1984-88	(39)	Includes Mi-25/35 export versions
			.. Mi-8 Hip	Helicopter	(1982)	1983-88	(64)	
			.. MiG-23	Fighter/interceptor	(1986)	1986-88	(48)	Follow-on and attrition replacements; some flown by Cuban pilots
			.. BRDM-2	Scout car	(1985)	1986-88	(80)	
			.. BRDM-2 Gaskin	AAV(M)	(1986)	1987-88	(12)	Designation unconfirmed
			.. BTR-60P	APC	1987	1987-88	(250)	Replacement order; may include some BTR-70s
			.. D-30 122mm	Towed howitzer	(1985)	1986-88	(120)	D-44 85mm guns also delivered
			.. M-46 130mm	Towed gun	(1986)	1986-88	(54)	
			.. T-55	MBT	(1987)	1987-88	(200)	Supplier unconfirmed
			.. T-62	MBT	(1987)	1987-88	(100)	
			.. Barlock	Tracking radar	(1985)	1987-88	(7)	
			.. Flat Face	Tracking radar	(1980)	1981-88	(16)	
			.. SA-6 SAMS	Mobile SAM system	(1979)	1980-88	(68)	
			.. SA-8 SAMS	Mobile SAM system	(1983)	1984-88	(48)	
			.. Side Net	Heightfinding radar	(1979)	1980-88	(25)	
			.. Spoon Rest P-13	Early warning radar	(1979)	1980-88	(16)	
			.. SA-14 Gremlin	Portable SAM	(1987)	1987	(300)	Revealed when captured by UNITA
			.. SA-6 Gainful	Landmob SAM	(1979)	1980-88	(735)	
			.. SA-8 Gecko	Landmob SAM	(1983)	1984-88	(768)	
			.. SA-9 Gaskin	Landmob SAM	(1986)	1987-88	(192)	

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
15 Argentina	Brazil	30	EMB-312 Tucano	Trainer	1987	1987-88	30	Deal worth \$50 m; partially offset by Brazilian technology purchases
	France	6	MM-40 Launcher	ShShM launcher	1980	1984-86	(4)	Arming 6 Meko-140 frigates
		(72)	MM-40 Exocet	ShShM/SShM	1980	1984-86	(48)	Arming 6 Meko-140 frigates
	Israel	(120)	Shafir-2	Air-to-air missile	(1986)	1988	(60)	Arming A-4 Skyhawks
	Italy	4	A-109	Helicopter	1987			Deal worth \$7 m
		4	SH-3D Sea King	Helicopter	1987	1988	4	
		2	SHORAR	Tracking radar	(1986)	1988	(2)	
8 Bahrain	Spain	5	C-212-200	Transport	1988			
	Germany, FR	2	Type 62-001	Corvette	1981	1988	2	
	USA	12	F-16C	Fighter	(1987)			Partly financed by Saudi Arabia; with electronic countermeasures and laser designators
		4	F-16C	Fighter	1988			Follows 1987 order for 12
		50	M-60-A3	MBT	1986	1987-88	(50)	Deal worth \$90 m
		4	RGM-84A Launch	ShShM launcher	1984	1987-88	(4)	Arming 2 Type 62-001 corvettes
		(24)	AGM-65D	ASM	(1987)			Arming F-16 fighters
		(48)	AIM-7M Sparrow	Air-to-air missile	(1987)			Arming F-16 fighters
		(96)	AIM-9L	Air-to-air missile	(1987)			Arming F-16 fighters
		70	FIM-92A Stinger	Portable SAM	1987	1988	(70)	Deal worth \$7.1 m; terms incl strict US safeguards
9 Bangladesh	Denmark	2	693 Class	Landing craft	1986			
	Indonesia	1	AS-332	Helicopter	(1988)			Negotiating for VIP use
13 Benin	France	(9)	VBL	Scout car	(1986)			
15 Bolivia	Brazil	3	HB-315B Gaviao	Helicopter	1985	1987-88	(3)	Deal worth \$3.8 m
	USA	6	C-130B Hercules	Transport	(1988)	1988	3	
		10	Model 205 UH-1H	Helicopter	(1987)	1988	10	In addition to 6 received 1987
13 Botswana	Canada	6	Model 206B	Helicopter	(1986)			Unconfirmed
		3	Model 412	Helicopter	(1987)	1988	3	
	Spain	2	CN-235	Transport	(1987)	1988	2	
	UK	9	Strikemaster	Trainer/COIN	(1987)	1988	(9)	Botswana's first jet combat aircraft; previously owned by Kuwait

15	Brazil	Angola	1	F-27 Maritime	Mar patrol	1986	1988	1	Partial payment for 2 EMB-111 maritime patrol aircraft bought by Angola from Brazil
		Argentina	10	IA-63 Pampa	Jet trainer	(1987)			Status uncertain
		France	15	AS-332	Helicopter	1987			For Navy
			26	AS-365F	Helicopter	1988			Part of deal worth \$249 m incl licensed production of 10 HB-365s and 16 HB-350s
			6	Mirage-3E	Fighter/bomber	1988	1988	4	Includes 2 Mirage-3 conversion trainers
		Germany, FR	1	Type-209/3	Submarine	1982	1988	1	Order incl 3 submarines for licensed production; also designated Type 1400
		Italy	10	MAF/MSS-1	Anti-tank missile	1988	1988	10	For trials; if selected will be produced by Orbita of Brazil; also called MSS-11
		Sweden	24	BOFI 40mm	AAV(G)	1985	1986-88	(24)	Deal worth \$33 m
		Switzerland	(1)	FILA	Point defence radar	1987	1988	(1)	Prior to licensed production of 150; production now jeopardized by Brazilian budget cuts
		USA	3	C-130C Hercules	Transport	(1987)	1988	(3)	Attrition replacement
			23	F-5E Tiger-2	Fighter	1988			Deal worth \$67 m incl 3 F-5F versions
			3	F-5F Tiger-2	Jet trainer	1988			
			8	Phalanx	CIWS	1988			Arming 4 Niteroi Class frigates and 4 Inhauma Class corvettes; deal worth \$63 m
10	Brunei	France	24	VAB	APC	1988			
13	Cameroon	France	4	Alouette-3	Helicopter	1987	1988	4	
			7	Magister	Jet trainer	1987	1988	7	
		UK	1	Peacock Class	OPV	1988			Produced in Hong Kong
13	Chad	USA	50	C-130B Hercules	Transport	(1988)	1988	1	May be ex-RAAF
			50	BGM-71C I-TOW	Anti-tank missile	(1987)	1988	50	Incl 5 launchers
15	Chile	China	(60)	Hong Jian-73	Anti-tank missile	(1987)	1988	(60)	Limited number to be mounted on Chilean APCs; prototype displayed at FIDA 88
			10	Red Arrow-8	Anti-tank missile	(1987)	1988	(10)	Small number for evaluation with VTP APCs
		France	4	AS-365F	Helicopter	1987			To be deployed on County Class frigates; first export of ASW version
			2	Falcon-20G	Mar patrol	1988			Part of \$210 m deal
			(3)	Mirage-50	Fighter/bomber	(1987)	1988	(3)	Refurbished with avionics by ENAER
			(16)	AM-39 Exocet	Anti-ship missile	(1988)			Arming 4 AS-332 Superpumas
		Indonesia	4	AS-332	Helicopter	1988			Part of deal worth \$210 m incl 4 SA-365Fs from France
			6	CN-235	Transport	1988			

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
	Israel	12	Kfir-C7	Fighter/bomber	1988			Status uncertain
	Spain	6	C-212-200	Transport	(1986)	1988	6	
	UK	50	Blowpipe	Portable SAM	(1987)	1988	50	
15 Colombia	Israel	13	Kfir-C7	Fighter/bomber	1988			Includes 2 trainers; partial payment in commodities; deal worth \$200 m
	Spain	3	C-212-300	Transport	1988			
	USA	5	UH-60 Blackhawk	Helicopter	1987	1988	5	Deal worth \$36 m incl training and support; for drug traffic control
		3	UH-60 Blackhawk	Helicopter	1988			Second order
13 Congo	France	1	Noratlant 2501	Transport	1988	1988	1	
14 Cuba	USSR	..	BMP-1	MICV	(1980)	1981-88	(80)	
15 Ecuador	Brazil	10	EMB-312 Tucano	Trainer	1988			Deal worth \$19 m
	Italy	40	A-109	Helicopter	(1988)			To replace SA-319Bs; unconfirmed
	Spain	1	CN-235	Transport	(1988)			CN-235 Mk version; for delivery 1989
	Switzerland	1	PC-6	Lightplane	1988	1988	1	Attrition replacement
	UK	6	Strikemaster	Trainer/COIN	1986	1987-88	6	
	USA	5	Model 206B	Helicopter	(1986)			For Esmeralda Class corvettes
		24	T-33A	Jet trainer	(1987)	1987-88	24	Ex-US reserves; refurbished to AT-33 standard before transfer
8 Egypt	Argentina	50	IA-58C Pucara	COIN	(1988)			Unconfirmed
		..	Condor-2	SSM	(1987)			Egyptian designation Badr-2000
	France	(20)	Mirage-2000	Fighter	(1986)			
	Italy	18	Skyguard Launch	Mobile SAM system	1988			Second order; Egyptian designation Amoun
		(576)	Aspide	Air-to-air missile	1988			For Skyguard/Amoun air defence system
	Spain	600	BMR-600	ICV	1982	1983-88	(550)	Deal includes 3000 lorries
	USA	6	Commuter-1900	Transport	1985	1988	4	Deal worth \$73 m; incl spares and training
		40	F-16C	Fighter	(1987)			Third order of 40; incl unspecified number of F-16D versions
		1	F-16D	Fighter/trainer	1988			Deal worth \$21 m incl spare parts; attrition replacement
		2	UH-60 Blackhawk	Helicopter	1988			For evaluation
		15	M-1 Abrams	MBT	1988			Part of \$2 b deal incl 540 AVs to be produced

			90	M-113-A2	APC	(1987)			Fourth order
			69	M-113-A2	APC	1988			Cost incl machine-guns \$19 m; fifth order
			..	M-60-A3	MBT	(1988)			Status uncertain
			26	M-981	Support vehicle	1987	1988	26	
			2	AN/TPQ-37	Tracking radar	1986			
			4	AN/TPS-59	3-D radar	1980	1985-88	4	
			8	AN/TPS-63	Surveillance radar	1984	1986-88	8	Total value \$190 m; co-production of 34 more
			..	I-Hawk SAMS	Mobile SAM system	1988			
			26	M54 Chaparral	Mobile SAM system	1984	1987-88	26	
			2	RGM-84A Launch	ShShM launcher	(1988)			Modernizing 2 Chinese frigates; unconfirmed
			144	AGM-65D	ASM	1988			Arming F-16 fighters; deal worth \$27 m incl training missiles, parts and electronic countermeasure pods
			282	AIM-7M Sparrow	Air-to-air missile	(1987)			Arming F-16 fighters; deal worth \$42 m
			560	AIM-9L	Air-to-air missile	(1986)	1987-88	(378)	Arming F-16 fighters; total cost: \$42 m
			7 511	BGM-71D TOW-2	Anti-tank missile	1988			Includes 180 launchers and 504 night vision sights as well as spare parts
			..	MIM-23B Hawk	Landmob SAM	1988			
			(478)	MIM-72F	SAM/ShAM	1984	1987-88	(478)	Arming 25 Chaparral btys
			(32)	RGM-84A Harpoon	ShShM	(1988)			Unconfirmed; modernizing 2 Chinese frigates
			514	RIM-7M Sparrow	SAM	(1984)	1985-88	(480)	Deal worth \$190 m; part of Skyguard air defence system
<hr/>									
13	Ethiopia	Czechoslovakia	..	T-55	MBT	(1985)	1985-88	(240)	May be Soviet-supplied
		USA	2	C-130H Hercules	Transport	(1987)	1988	2	
		USSR	..	BM-21 122mm	MRL	(1984)	1984-88	(60)	May be North Korean BM-11
			..	BRDM-1	Scout car	(1985)	1985-88	(120)	
			..	BTR-60P	APC	(1985)	1985-88	(280)	
			..	D-30 122mm	Towed howitzer	1985	1985-88	(144)	
			..	M-46 130mm	Towed gun	1985	1985-88	(60)	
<hr/>									
10	Fiji	Australia	(4)	ASI-315	Patrol craft	1985	1987	(2)	Status of programme unclear after military coup
		Israel	(3)	IAI-202 Arava	Transport	(1986)			
<hr/>									
13	Gabon	France	(9)	VBL	Scout car	(1986)	1987-88	(9)	
			1	P-400 Class	Patrol craft	1985	1988	1	
<hr/>									
13	Ghana	USA	1	C-212-200	Transport	1988	1988	1	Purchased for Ghanaian Air Force from a private user

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
14 Honduras	UK USA	2	Jetstream-31	Transport	(1986)			
		12	F-5E Tiger-2	Fighter	1987	1987-88	7	From USAF stocks; deal worth \$75 m incl 2 F-5F versions
		2	F-5F Tiger-2	Jet trainer	(1987)	1987-88	2	From USAF stocks; part of 14 aircraft deal
9 India	France	(186)	R-550 Magic	Air-to-air missile	(1984)	1986-88	(186)	Arming 31 Jaguar fighters
	Netherlands	(40)	Flycatcher	Mobile radar	1987	1988	(20)	Licensed production of additional 212 to follow
	Poland	4	Polnocny Class	Landing ship	(1985)			Possibly for licensed production; in addition to 8 in service
	Sweden	410	FH-77 155mm	Towed howitzer	1986	1986-88	(320)	Deal worth \$1300 m incl ammunition, SAAB lorries and production technology; delivery over 5 years; co-production to follow
	UK	3	Commando Mk-3	Helicopter	1986			
		10	Sea Harrier	Fighter	1985	1986-88	(10)	Deal worth \$230 m incl 1 trainer
		7	Sea Harrier	Fighter	1986	1988	(7)	In addition to 19 ordered earlier
		1	Sea Harrier T-4	Fighter/trainer	1986			
		25	Sea King HAS-5	Helicopter	1984	1986-88	(25)	Deal worth \$80 m; in addition to 12 ordered 1983; to carry Sea Eagle ASHMs
		6	Sea King HAS-5	Helicopter	1986	1987-88	(6)	For delivery 1987-88; in addition to 35 ordered earlier
		(5)	Watchman	Surveillance radar	(1987)	1987-88	(5)	For surveillance of missile test range
		(84)	Sea Eagle	Anti-ship missile	1983	1987-88	(84)	Arming Sea King helicopters
		(48)	Sea Eagle	Anti-ship missile	1985	1987-88	(48)	Arming Sea Harrier fighters
		(24)	Sea Eagle	Anti-ship missile	(1986)	1987-88	(24)	Arming 8 Jaguar aircraft converted to maritime strike role
		(156)	Sea Skua	Anti-ship missile	(1985)	1987-88	(36)	Arming Navy and Coast Guard Do-228 aircraft
	USA USSR	2	SRA-1	Reconnaissance plane	1987			
		20	An-32 Cline	Transport	1987	1988	20	Second order; built in USSR with Indian-made sub-systems
		24	Il-76 Candid	Transport	1984	1985-88	(16)	Order increased from 20 to 24 in 1987
		(8)	Ka-27 Helix	Helicopter	(1985)	1985-88	(6)	8-18 ordered; on Kashin Class destroyers
		20	Mi-35	Helicopter	1988			
		(100)	Mi-17 Hip-H	Helicopter	(1984)	1984-88	(90)	Replacing Mi-8s

		(10)	Mi-26 Halo	Helicopter	(1985)	1986-88	(10)	
		10	Mi-26 Halo	Helicopter	1988			Second order
		..	Mi-28 Havoc	Helicopter	(1988)			Indian request; Soviet response not known
		48	MiG-29	Fighter	(1988)			Follow-on order
		5	Tu-142 Bear	Reconnaissance plane	1984	1988	5	For Navy
		..	SA-11 SAMS	Mobile SAM system	(1984)	1987-88	(40)	
		..	SA-8 SAMS	Mobile SAM system	(1982)	1984-88	(40)	
		6	SA-N-1 Launcher	ShAM launcher	1982	1986-87	(4)	Arming 3 Kashin Class destroyers
		(2)	SA-N-4 Launcher	ShAM launcher	1983			Arming Nanuchka Class corvettes
		(4)	SA-N-5 Launcher	ShAM launcher	(1983)	1986-88	(3)	Arming Indian-designed Khukri Class corvettes
		3	SSN-2 Styx L	ShShM launcher	1982	1986-88	(2)	Arming 3 Kashin Class destroyers
		(5)	SSN-2 Styx L	ShShM launcher	1982			Arming 5 Nanuchka Class corvettes
		(4)	SSN-2 Styx L	ShShM launcher	(1983)	1986-88	(3)	Arming Indian-designed Khukri Class corvettes
		(2)	SSN-2 Styx L	ShShM launcher	(1985)	1987-88	(2)	Arming Tarantul Class corvettes
		..	SA-11 Gadfly	Landmob SAM	(1984)	1987-88	(640)	
		..	SA-8 Gecko	Landmob SAM	(1982)	1984-88	(640)	Reportedly operational early 1984
		(72)	SA-N-1	ShAM	1982	1986-87	(48)	Arming 3 Kashin Class destroyers
		(40)	SA-N-4	ShAM	1982			Arming 2 Nanuchka Class corvettes
		(80)	SA-N-5	ShAM	(1983)	1986-88	(60)	Arming Indian-designed Khukri Class corvette
		(36)	SSN-2 Styx	ShShM	1982	1986-88	(24)	Arming 3 Kashin Class destroyers
		(24)	SSN-2 Styx	ShShM	1982			Arming 2 Nanuchka Class corvettes
		(48)	SSN-2 Styx	ShShM	(1983)	1986-88	(36)	Arming Indian-designed Khukri Class corvette
		(24)	SSN-2 Styx	ShShM	(1985)			Arming Tarantul Class corvettes
		1	Charlie-1 Class	SSN	(1985)	1988	1	Nuclear-powered submarine leased for 3 years
		3	Kashin Class	Destroyer	1982	1986-88	2	In addition to 3 previously delivered
		6	Kilo Class	Submarine	(1984)	1986-88	4	Follow-on order for additional 2 possible
		(3)	Kresta-2 Class	Cruiser	(1983)			May be cancelled
		2	Nanuchka Class	Corvette	1982			In addition to 3 in service
		6	Natya Class	MSO	1982	1986-88	(5)	In addition to 6 delivered 1978-80
		(2)	Tarantul Class	Corvette	(1985)	1987-88	(2)	Licensed production of 6 more may be in progress
		6	Yevgenia Class	MSC	(1985)			In addition to 6 in service
10	Indonesia							
	France	(2)	MM-38 Launcher	ShShM launcher	(1978)	1981	(1)	Arming 2 Yugoslavian frigates; fitted in Indonesia
		(24)	MM-38 Exocet	ShShM	(1978)	1981	(12)	Arming 2 Yugoslavian frigates

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
	Netherlands	2	Alkmaar Class	Minehunter	1985	1988	(2)	Prior to licensed production of up to 10 in Indonesia
		4	V. Speijk Class	Frigate	1986	1986-88	4	Request for further 2 depending on availability
	UK	(25)	Rapier SAMS	Mobile SAM system	1984	1986-88	(25)	Deal worth \$128 m incl missiles; offsets for electronics industry
		(20)	Rapier SAMS	Mobile SAM system	1985			Second order; deal worth \$100 m incl missiles
		(10)	Rapier SAMS	Mobile SAM system	1986			Third order; deal worth \$60 m
		(4)	Seacat Launcher	ShAM launcher	1986	1986-88	(4)	Arming 4 Van Speijk Class frigates
		(300)	Improved Rapier	Landmob SAM	1984	1986-88	(300)	
		(240)	Improved Rapier	Landmob SAM	1985			
		(120)	Improved Rapier	Landmob SAM	1986			
	USA	(96)	Seacat	ShAM/ShShM	1986	1986-88	(96)	Arming 4 Van Speijk Class frigates
		8	F-16A	Fighter	(1986)			Deal worth \$336 m incl 4 F-16Bs; offsets worth \$52 m
		4	F-16B	Fighter/trainer	1986			
		4	RGM-84A Launch	ShShM launcher	1986	1986-88	4	Arming 4 Van Speijk Class frigates
		(48)	AGM-65D	ASM	1987			Arming F-16 fighters; status uncertain
		(96)	AIM-9P	Air-to-air missile	(1986)			Arming F-16 fighters
		(64)	RGM-84A Harpoon	ShShM	1986	1986-88	(64)	Arming 4 Van Speijk Class frigates
8 Iran	Brazil	(50)	EMB-312 Tucano	Trainer	(1988)			Unconfirmed
	China	. .	F-6	Fighter	(1981)	1986-88	(30)	Possibly via North Korea
		(60)	F-7	Fighter	(1986)	1986-88	(60)	Status uncertain
		. .	T-59	MBT	(1986)	1987-88	(240)	
		. .	Type 501	APC	1986	1986-88	(300)	
		. .	Type-63 107mm	MRL	(1982)	1983-88	(900)	
		. .	Hai Ying-2 L	ShShM launcher	(1986)	1987-88	(8)	
		. .	Hai Ying-2	ShShM/SShM	(1986)	1987-88	(124)	NATO designation: Silkworm
		. .	Hong Jian-73	Anti-tank missile	(1982)	1982-88	(6 500)	
		. .	Hong Ying-5	Portable SAM	(1985)	1985-88	(600)	
		. .	PL-2A	Air-to-air missile	(1986)	1986-88	(540)	Arming F-6 and F-7 fighters
		. .	PL-7	Air-to-air missile	(1986)	1986-88	(360)	Arming F-7 fighters
	Czechoslovakia	. .	BMP-1	MICV	(1986)	1986-88	(300)	
		. .	BTR-60P	APC	(1986)	1986-88	(120)	Supplier uncertain
	Korea, North	. .	T-62	MBT	(1983)	1984-88	(150)	
		. .	Type 59/1 130mm	Towed gun	(1983)	1983-88	(480)	Deliveries incl some Soviet M-46s
		. .	Hai Ying-2 L	ShShM launcher	(1987)	1988	1	

	UK		. . Hai Ying-2	ShShM/SShM	(1987)	1988	6	May be retransferred from China
			. . Scud-B	SSM	1987	1987-88	(100)	Part of \$500 m deal
			6 AR-3D	3-D radar	(1988)			Old deal reopened after cease-fire
			(5) Watchman	Surveillance radar	(1987)			Negotiating
8	Iraq	Brazil	. . Astros-II SS-30	MRL	(1983)	1984-88	(66)	Delivery confirmed by use in Faw peninsula battle 1986
			. . Astros-II SS-60	MRL	(1985)	1987-88	(20)	
		250	EE-9 Cascavel	Armoured car	1986	1987-88	(200)	Some with 25mm AA cannon
			. . Astros Guidance	Fire control radar	(1983)	1984-88	(13)	Fire control system for Astros MRS
			. . SS-60	SSM	(1985)	1987-88	(640)	
	Canada	(6)	Bo-105LS	Helicopter	(1987)	1988	(6)	May be for civilian use
	China	(4)	B-6	Bomber	(1987)	1988	(4)	First export for Chinese Tu-16 copy
			. . T-59	MBT	(1981)	1982-88	(700)	
			. . T-69	MBT	(1982)	1983-88	(600)	1000-2000 ordered in early 1980s
			. . Type 531	APC	(1981)	1982-88	(650)	
			. . Type 59/1 130mm	Towed gun	(1981)	1982-88	(720)	
			. . C-601	Anti-ship missile	1987	1988	(128)	
			. . Hai Ying-2	ShShM/SShM	(1986)			Arming Osa-2 Class FACs
	Czechoslovakia		. . BMP-1	MICV	(1981)	1981-88	(900)	
			. . BMP-1	MICV	(1982)	1983-88	(800)	May be from USSR
	Egypt	100	EMB-312 Tucano	Trainer	1983	1985-88	(80)	Order raised from 80 in spring 1988; built in Egypt under Brazilian licence
			(18) SA-342L Gazelle	Helicopter	(1986)	1986-88	(18)	Unconfirmed
			. . D-130 122MM	Towed gun	(1985)	1986-88	(90)	
			. . D-30 122mm	Towed howitzer	(1985)	1985-88	(96)	Supplier uncertain
		(100)	Sakr-30 122mm	MRL	(1987)	1987-88	(200)	Egyptian version of BM-21 MRL
		4	SA-6 SAMS	Mobile SAM system	(1987)			Status uncertain; 4 btys
		40	SA-6 Gainful	Landmob SAM	(1987)			Status uncertain
			. . Sakr Eye	Portable SAM	(1987)			Unspecified number
	France	24	Mirage F-1C	Fighter/interceptor	1985	1986	(24)	
		20	Mirage F-1C	Fighter/interceptor	1987	1988	20	
		(10)	Mirage F-1C	Fighter/interceptor	1988			Brings total Mirage F-1C orders to 143
		(136)	AMX-30 Roland	AAV(M)	1981	1982-88	(105)	
			. . AM-39 Exocet	Anti-ship missile	1983	1983-88	(734)	Arming Mirage F-1s
			. . ARMAT	ARM	(1983)	1983-88	(600)	Up to 75 % of French Armat production
			. . AS-30L	ASM	(1984)	1985-88	(1 200)	Arming Mirage F-1s
			. . HOT	Anti-tank missile	(1981)	1981-88	(1 600)	
			. . Milan	Anti-tank missile	(1981)	1981-88	(4 800)	
			. . Roland-2	Landmob SAM	1981	1982-88	(1 050)	
	Italy	5	AB-212ASW	Helicopter	1984	1987-88	5	Originally intended for Lupo Class frigates
			(6) AB-412 Griffon	Helicopter	(1987)	1988	(6)	

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
		(10)	Aspide/Albatros	ShAM/ShShM launcher	(1981)			Arming Lupo Class frigates and Wadi Class corvettes; delivery prevented by war with Iran
		(14)	Otomat-2 L	ShShM launcher	(1981)			Arming Lupo Class frigates and Wadi Class corvettes; delivery prevented by war with Iran
		(224)	Aspide	Air-to-air missile	(1981)			Arming 4 Lupo Class frigates and 6 Wadi Class corvettes; delivery prevented by war with Iran
		(60)	Otomat-2	ShShM	(1981)			Arming 4 Lupo Class frigates and 6 Wadi Class corvettes; delivery prevented by war with Iran
		4	Lupo Class	Frigate	1981			Order incl 6 Wadi Class corvettes and 1 Stromboli Class support ship; delivery prevented by war with Iran
		6	Wadi Class	Corvette	1981			Iraqi designation: Assad Class; delivery prevented by war with Iran
	South Africa	(200)	G-5 155mm	Towed howitzer	1984	1985-88	(200)	Total package worth \$400 m
	Switzerland	(20)	PC-9	Trainer	1986	1987-88	(20)	
	USSR	. .	2S1 122mm	SPH	(1986)	1987-88	(80)	Part of deal worth estimated \$3 b
		. .	2S3 152mm	SPG	(1986)	1987-88	(80)	Mix of 152mm and 122mm guns unknown
		. .	BM-21 122mm	MRL	(1986)	1986-88	(360)	Part of deal worth \$3 b
		. .	D-30 122mm	Towed howitzer	(1982)	1982-88	(576)	
		. .	T-62	MBT	(1982)	1982-88	(900)	Supply of Soviet-made tanks resumed in late 1982 after 2-year hiatus
		. .	T-72	MBT	(1985)	1985-88	(700)	May be from Czechoslovakia or Poland
		. .	Scud-B	SSM	(1985)	1986-88	(350)	
8 Israel	France	(6)	C-130B Hercules	Transport	(1987)			Negotiating
	Germany, FR	3	Dolphin	Submarine	(1988)			
	USA	5	F-15D Eagle	Jet trainer	1988			Deal worth \$265 m
		51	F-16C	Fighter	1983	1987-88	51	Deal worth \$2200 m incl 24 F-16Ds; half grant, half credit
		(60)	F-16C	Fighter	1988			Replacing cancelled Lavi; order may be up to 75
		12	Kfir-C1	Fighter/bomber	1988	1988	12	Returned after loan to US Navy
		25	Model 209 AH-1S	Helicopter	1986			
		(20)	SA-365N	Helicopter	1987	1988	(10)	To equip Saar-5 Class corvettes; US version

			12 UH-60 Blackhawk	Helicopter	1988			Arming Saar-5 Class corvettes
		(4)	RGM-84A Launch	ShShM launcher	(1988)			Arming Saar-5 Class corvettes
		(64)	RGM-84A Harpoon	ShShM	(1988)			Built in USA to Israeli design; fully
		3	Saar-5 Class	Corvette	1988			financed with FMS credits worth \$300 m;
								some sub-systems to be fitted in Israel
8	Jordan		12 AS-332	Helicopter	(1987)	1987-88	(12)	
			12 Mirage-2000	Fighter	1988			
	Iraq	(192)	Magic-2	Air-to-air missile	1988	1988	1988	Deal worth \$1 b incl Super 530 and Magic-2 missiles and Durandal runway cratering bombs; option on further 8 Arming Mirage 2000s
			(96) Super-530	Air-to-air missile	1988			
		90	Chieftain-3	MBT	1988			
		29	FV-101 Scorpion	Light tank	1988			
		35	M-113	APC	1988			
		(60)	M-47 Patton	MBT	1988			
	Spain	16	C-101 Aviojet	Jet trainer	1986	1987-88	(16)	Captured from Iran and transferred to Jordan
		8	Tornado IDS	MRCA	1988			
		5	S-700	Surveillance radar	1985			
		. .	S-723 Martello	3-D radar	1985			
	UK	3	Constitution Class	Patrol craft	1987	1987-88	(5)	Deal worth \$91 m
		(2)	AN/TPQ-37	Tracking radar	(1986)			
		. .	SA-13 Launcher	AAV(M)	(1986)			
		. .	SA-13 Gopher	Landmob SAM	(1986)			
10	Kampuchea		6 Type 60 122mm	Towed gun	(1986)	1988	(6)	For Khmer Rouge
			(20) Hong Ying-5	Portable SAM	(1988)			
13	Kenya	UK	(10) EMB-312 Tucano	Trainer	1988			Status uncertain
10	Korea, North	USSR	. . MiG-29	Fighter	(1987)	1988	(30)	
			. . Su-25 Frogfoot	Fighter/grd attack	(1987)			
			. . ZSU-23-4 Shilka	AAV	(1984)			
			(24) SA-5 SAMS	Mobile SAM system	(1984)			
			(12) SSN-2 Styx L	ShShM launcher	(1979)			
			. . AA-7 Apex	Air-to-air missile	(1987)			
								2 regiments
								Arming Soju Class FACs
								Arming MiG-29; may be AA-10 Alamos

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
		. .	AA-8 Aphid	Air-to-air missile	(1987)	1988	(720)	Arming MiG-29, Su-25 and other Soviet-supplied aircraft
		. .	SA-5 Gammon	SAM	1984	1987-88	(234)	
		(300)	SA-7 Grail	Portable SAM	(1985)	1986-88	(300)	May be SA-14 Gremlins
		. .	SSN-2 Styx	ShShM	(1979)	1980-88	(120)	Arming Soju Class FACs
		(240)	Scud-B	SSM	(1984)	1985-88	(240)	About 100 re-sold to Iran; may be produced in North Korea
10 Korea, South	France	3	AS-332	Helicopter	1987	1988	3	For VIP transport
		(8)	MM-38 Launcher	ShShM launcher	(1982)	1984-88	(8)	Arming Jupiter Class corvettes
		(48)	MM-38 Exocet	ShShM	(1982)	1984-88	(48)	Arming Jupiter Class corvettes
	Germany, FR	1	Type-206	Submarine	1987			Delivered directly prior to licensed assembly of 2 more; technology transfer package for local construction of 2500t submarines
	UK	12	Lynx	Helicopter	1988			Part of \$200 m deal incl Sea Skua missiles; Super Lynx with upgraded navigation system
		(600)	Javelin	Portable SAM	(1985)	1986-88	(600)	Some parts to be made locally
		(48)	Sea Skua	Anti-ship missile	1988			Arming Lynx helicopters
	USA	(6)	C-130H-30	Transport	(1987)	1988	3	
		30	F-16C	Fighter	1981	1987-88	(24)	Deal worth \$931 m incl 6 F-16D versions
		6	F-16D	Fighter/trainer	1981	1986-88	(6)	
		4	F-16D	Fighter/trainer	1988			Deal worth \$102 m; in addition to 36 delivered previously
		24	F-4D Phantom	Fighter/interceptor	1987	1987-88	24	Deal worth \$77 m; ex-USAF
		24	F-4E Phantom	Fighter	1988			
		50	Model 205 UH-1H	Helicopter	1986	1987-88	(25)	Deal worth \$115 m incl 60 engines
		42	Model 209 AH-1S	Helicopter	1986	1988	(20)	Deal worth \$260 m incl TOW missiles
		12	RF-4C Phantom	Fighter/recce	1988			Supplied with electronic countermeasure pods; ex-USAF
		(5)	RGM-84A Launch	ShShM launcher	(1985)	1985-86	(4)	Arming Ulsan Class frigates
		(144)	AIM-7E Sparrow	Air-to-air missile	(1987)			Arming 24 F-4D Phantom fighters
		76	AIM-7F Sparrow	Air-to-air missile	1988			
		(672)	BGM-71D TOW-2	Anti-tank missile	1986	1988	(320)	Arming Model-209 helicopters
		704	BGM-71D TOW-2	Anti-tank missile	1987			
		. .	RGM-84A Harpoon	ShShM	(1985)	1985-88	(192)	Arming Ulsan Class frigates
		52	RGM-84A Harpoon	ShShM	1988			Filling reserve stocks

8	Kuwait						
	Egypt	100	Fahd	APC	1988	(4)	Part of \$50 m deal incl Amoun air defence system
		1	AN/TPS-63	Surveillance radar	1988		Part of Amoun air defence system
		10	Skyguard Launch	Mobile SAM system	(1987)	1988	Egyptian designation Amoun
		(320)	Aspide	Air-to-air missile	(1987)	1988	(320) Part of Amoun air defence system
		..	Sakr Eye	Portable SAM	1987		
	Netherlands	(2)	Alkmaar Class	Minehunter	1987	1988	(2) Ships built for Netherlands Navy
	UK	..	Valkyr	APC	1988		First export order; deliveries expected from 1989
	USA	42	F/A-18 Hornet	Fighter	1988		Deal worth \$1.9 b incl Sidewinder, Harpoon, Sparrow and Maverick missiles
		..	AN/TPS-63	Surveillance radar	1988		
		300	AGM-65G	ASM	1988		Anti-ship version; arming F/A-18 Hornet fighters
		40	AGM-84A Harpoon	Anti-ship missile	1988		Arming F/A-18 Hornet fighters
		200	AIM-7F Sparrow	Air-to-air missile	1988		Arming F/A-18 Hornet fighters
		120	AIM-9L	Air-to-air missile	1988		Arming F/A-18 Hornet fighters
		4 840	BGM-71C I-TOW	Anti-tank missile	1982	1984-88	(4 840) Deal worth \$300 m incl anti-tank missiles
	USSR	245	BMP-2	MICV	1988		Small number for evaluation
		..	BTR-70	APC	1988		Deal incl BMP-2 APCs
		..	SA-8 SAMS	Mobile SAM system	1988		Arming BMP-2 APCs
		(1 220)	AT-5 Spandrel	Anti-tank missile	1988		
		..	SA-8 Gecko	Landmob SAM	1988		
10	Laos						
	USSR	(2)	Mi-6 Hook	Helicopter	1987	1987-88	2
8	Lebanon						
	Iraq	(6)	Astros-II SS-30	MRL	1988	1988	(6) For Christian forces
		(50)	M-113-A1	APC	(1988)	1988	(50) Captured from Iran and given to Christian forces
		37	T-55	MBT	1988	1988	37 For Christian forces
	Switzerland	12	Piranha	APC	(1987)	1988	(12)
	Syria	30	T-55	MBT	(1988)	1988	30 For Palestinian factions
13	Liberia						
	Romania	(6)	M-1938 122mm	Towed gun	(1986)	1988	(6) Designation uncertain
12	Libya						
	Brazil	(30)	Astros-II SS-40	MRL	(1985)	1986-88	(30)
		(15)	Astros-II SS-60	MRL	(1987)	1987	(15)
		(3)	Astros Guidance	Fire control radar	(1985)	1987-88	(3) Astros-II fire control system; denied by Brazilian Government
		..	SS-60	SSM	(1987)	1987-88	(450)
	Yugoslavia	4	Koncar Class	FAC	1985		Based on Swedish Spica design; contract signed June 1985

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
13 Malawi	Germany, FR	3	Do-228-200	Transport	1985	1986-88	3	
10 Malaysia	France	1	Falcon-900	Transport	1988			For VIP use
	Indonesia	1	AS-332	Helicopter	1987	1988	1	For trials
	UK	(8)	Tornado IDS	MRCA	1988			Deal incl artillery, SAMs, radar and 1 submarine subject to final negotiation
		6	Wasp	Helicopter	1987	1988	6	Ex-British Royal Navy; armed with ASHMs of unknown type
		6	Wasp	Helicopter	1988			Second order
		12	FH-70 155mm	Towed howitzer	1988			
		(24)	L119 105mm gun	Towed gun	1988			
		12	DN-181 Rapier	Mobile SAM system	1988			
		(1)	S-713 Martello	3-D radar	1988			
		(2)	S-723 Martello	3-D radar	(1988)			
		(144)	Improved Rapier	Landmob SAM	1988			
		48	Javelin	Portable SAM	1988			
		(6)	Oberon Class	Submarine	(1988)			
	USA	(12)	F-16A	Fighter	1988			Letter of Offer; status uncertain
14 Mexico	France	40	ERC-90 Lynx	Armoured car	1986	1987-88	(40)	
	USA	1	B-727-200	Transport	(1987)			For VIP use; deal worth \$40 m
		(9)	C-130B Hercules	Transport	1988	1988	(9)	Ex-USAF
		12	Model 206L	Helicopter	(1987)			For drug control
12 Morocco	Denmark	2	Osprey-55 Class	OPV	(1985)	1987-88	2	
	Egypt	. .	Sakr-30 122mm	MRL	(1984)	1984-88	(60)	
	France	20	AML-90	Armoured car	(1987)	1988	20	
		108	AMX-10RC	Scout car	1978	1982-88	(108)	
		. .	HOT-2	Anti-tank missile	1987			
	Libya	. .	AT-4 Spigot	Anti-tank missile	(1987)			Unconfirmed; for Polisario insurgents
	Spain	6	Lazaga Class	Patrol craft	1985	1988	2	Second order; also called Vigilance Class
	USA	100	M-48-A5	MBT	1987	1988	(50)	Deal worth \$68 m incl ammunition and communications equipment
13 Mozambique	Spain	4	C-212-300	Transport	(1987)	1988	4	
		. .	CN-235	Transport	1988			

14	Nicaragua	USSR	. . BTR-60P . . D-30 122mm	APC Towed howitzer	(1981) (1981)	1984-88 1981-88	(205) (96)	According to US DoD
13	Nigeria	France	12 AS-332 40 ERC-90 Sagaie	Helicopter Armoured car	1987 (1986)	1987-88	40	
		Italy	2 Lerici Class	Minehunter	1983	1988	2	Ordered June 1983; deal worth \$100 m
8	Oman	Egypt	(6) Fahd	APC	(1985)	1988	(6)	
		France	(1) MM-40 Launcher (24) MM-40 Exocet	ShShM launcher ShShM/SShM	1986 1986	1988 1988	(1) (24)	Arming fourth Province Class FAC Arming fourth Province Class FAC
		UK	8 Tornado ADV (28) DN-181 Rapier 2 S-723 Martello 48 Sky Flash	MRCA Mobile SAM system 3-D radar Air-to-air missile	1987 1987 1985 1988	1988	1	Deal worth \$362 m Arming 8 Tornado ADV fighters; postponed until 1992
			1 Province Class	FAC	1986	1988	1	In addition to 3 in service; armed with MM-40 Exocet missiles, 76mm and 40mm guns
9	Pakistan	China	98 A-5 Fantan-A 60 F-7 (150) F-7	Fighter Fighter Fighter	1984 (1983) (1987)	1986-88 1986-88	(98) (60)	Second order To have US engines and fire control systems
			. . T-59 . . Romeo Class	MBT Submarine	(1975) (1988)	1978-88	(825)	Negotiating retrofit packages with Western firms before ordering
		France	1 Atlantic-1 (2) Falcon-20G 6 Ramsa	Mar patrol/ASW Mar patrol Surveillance radar	1988 (1986) 1988	1988	1 (2)	Joins 3 Atlantics already in PAF service Ordered unspecified ground-based military radars of advanced design
		Romania	6 SA-316B	Helicopter	(1987)	1988	6	
		Sweden	. . Giraffe	Fire control radar	(1986)	1987-88	(8)	Ordered with RBS-70 SAMs
		UK	(2) Lynx 20 Transac GS (2) Seacat Launcher (24) Seacat 2 Leander Class	Helicopter APC ShAM launcher ShAM/ShShM Frigate	1988 (1987) 1988 1988 1988	1988 1988	(2) 20 (2) (24) 2	Equipping 2 Leander Class frigates Arming 2 Leander Class frigates Arming 2 Leander Class frigates Ex-Royal Navy ships <i>HMS Diomed</i> and <i>HMS Apollo</i>
		USA	11 F-16A	Fighter	1988			Second order; deal worth \$256 m; attrition replacements

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
		3	P-3C Update-2	Mar patrol/ASW	1988			Deal worth \$240 m incl spares, training and services; financed with FMS credit
		88	M-109-A2 155mm	SPH	(1985)	1986-88	(66)	Deal worth \$78 m
		(20)	M-109-A2 155mm	SPH	1988			Deal worth \$40 m incl M-198 howitzers and support equipment
		(20)	M-198 155mm	Towed howitzer	1988			Deal worth \$40 m incl M-109-A2 howitzers and support equipment
		5	AN/TPQ-36	Tracking radar	1988			
		4	AN/TPQ-37	Tracking radar	(1985)	1987-88	(2)	
		6	Phalanx	CIWS	(1987)	1987-88	(6)	Arming Gearing Class destroyers
		200	AIM-7F Sparrow	Air-to-air missile	1988			Arming F-16 fighters
		360	AIM-9L	Air-to-air missile	1988			Arming F-16 fighters
		2 030	BGM-71C I-TOW	Anti-tank missile	1986	1987-88	(800)	Deal worth \$20 m
		2 386	BGM-71D TOW-2	Anti-tank missile	1987			First Pakistani TOW-2 order; with 144 launchers
		4	Brooke Class	Frigate	1988	1988	4	Mix of Brooke and Garcia Class frigates and 1 repair ship to be leased for \$6.3 m annually
		.	Garcia Class	Frigate	(1988)	1988	4	
14 Panama	Chile	4	T-35 Pillan	Trainer	1987	1988	4	
	Spain	3	C-212-200	Transport	1987	1988	3	
		1	CN-235	Transport	1987			
	USA	1	AN/TPS-70	Air defence radar	1987	1988	1	First of 6 for Caribbean region
10 Papua New Guinea	Australia	4	ASI-315	Patrol craft	1985	1987	2	For delivery 1987-89
15 Paraguay	Brazil	6	EMB-312 Tucano	Trainer	1988			
15 Peru	USA	4	C-130A Hercules	Transport	(1988)	1988	4	Ex-USAF
		(6)	Model 412	Helicopter	(1987)	1988	(6)	
	USSR	15	An-32 Cline	Transport	(1986)	1987-88	15	
10 Philippines	Italy	18	S-211	Trainer	1988			Deal worth \$80 m; status uncertain
	USA	15	Bromon BR-2000	Transport	1988			
		20	Model 500D	Helicopter	1988			Deal worth \$30 m
		7	T-33A	Jet trainer	1987	1988	7	Ex-USAF

8 Qatar	France	4	Mirage F-1C	Fighter/interceptor	1987			
		6	AMX-10P	MICV	1987	1988	6	Includes 1 AMX-10PC
		6	AMX-155 Mk-F3	SPH	1987	1988	(6)	
		9	AMX-30 Roland	AAV(M)	1986	1987-88	9	Some Roland launchers mounted on trucks
		162	VAB	APC	(1985)	1986-88	(162)	Incl 4 with 81mm mortar
		6	TRS-2201	Air defence radar	(1986)	1986-88	(3)	
		(128)	AS-30L	ASM	(1987)	1988	(64)	Arming Mirage F-1 fighters
		(128)	Magic-2	Air-to-air missile	(1987)	1988	(64)	Arming Mirage F-1 fighters
		(128)	R-530	Air-to-air missile	(1987)	1988	(64)	Arming Mirage F-1 fighters
		(72)	Roland-2	Landmob SAM	1986	1987-88	(72)	
	Iran	12	FIM-92A Stinger	Portable SAM	(1988)	1988	12	Originally supplied to Afghan Mujahideen and acquired by Iran
13 Rwanda	France	(9)	VBL	Scout car	(1986)	1988	(9)	
10 Samoa	Australia	1	ASI-315	Patrol craft	1985	1988	(1)	
8 Saudi Arabia	Brazil	..	Astros-II SS-30	MRL	1987	1988	(10)	Deal worth \$500 m
		..	Astros-II SS-40	MRL	1987	1987-88	(30)	Deal worth \$500 m
	China	..	Astros Guidance	Fire control radar	1987	1987-88	(4)	Part of \$500 m deal
		..	CSS-2	IRBM	1985	1987-88	(50)	Chinese designation DF-3
	Egypt	..	Fahd	APC	1986	1988	40	
	France	12	AS-332	Helicopter	1988			Armed with Exocet missiles; deal worth \$430 m incl 20 speed boats armed with 20mm cannon
		2	Atlantic-2	Mar patrol	(1987)			
		(80)	AMX-30 Shahine	AAV(M)	1984	1986-88	(30)	Improved version developed with Saudi financial assistance
		48	Shahine-2 L	Mobile SAM system	1984	1986-88	(30)	'Al Thakeb' deal; 16 mounted on AMX-30 chassis; 32 towed
		(120)	AM-39 Exocet	Anti-ship missile	1988			Arming 6 of 12 Super Pumas
	Indonesia	(1 000)	Shahine-2	Landmob SAM	1984	1986-88	(400)	Total value of 'Al Thakeb' deal: \$4.1 b
		40	CN-212	Transport	1984			Erroneous report; no evidence of any Saudi purchase
	Italy	(2)	Otomat CDS	SShM system	(1986)	1987-88	(2)	
		(32)	Otomat-2	ShShM	1988			Arming 4 F-2000 frigates
	Spain	(155)	Otomat-2/Teseo	SShM	(1986)	1987-88	(155)	For coastal defence btys
		140	BMR-600	ICV	1984	1985-88	(140)	Deal worth \$62 m
	Switzerland	30	PC-9	Trainer	1985	1986-88	30	Part of 1985 Tornado deal
	UK	12	BAe-125-800	Utility jet	1988			Part of 1988 Tornado deal; for VIP use
		(4)	BAe-146	Transport	1988			Part of 1988 Tornado deal

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
		..	Hawk-200	Fighter	1988			Part of 1988 Tornado deal
		30	Hawk-60	Jet trainer	1985	1987-88	20	Part of 1985 Tornado deal
		60	Hawk-60	Jet trainer	1988			Part of 1988 Tornado deal; some Hawk-200 versions
		24	Tornado ADV	MRCA	1985			1985 Tornado deal Al Yamamah I; incl 72 Tornados, 30 Hawks, 30 PC-9s, missiles, training and facilities; deal worth \$7 b
		36	Tornado ADV	MRCA	1988			1988 Tornado deal Al Yamamah II; incl 48 Tornados, 60 Hawks, 12 BAe-125s, 4 BAe-146s, minehunters, missiles, training and facilities; deal worth \$17 b
		48	Tornado IDS	MRCA	1985	1986-88	(48)	Part of 1985 Tornado deal
		12	Tornado IDS	MRCA	1988			Part of 1988 Tornado deal
		..	WS-70	Helicopter	1988			Part of 1988 Tornado deal; up to 88 expected
		40	Shorland S-55	APC	1988			For Gendarmerie
		(60)	Transac GS	APC	(1988)			Unconfirmed
		(480)	ALARM	ARM	1986			Arming Tornado IDS fighters; status uncertain
		(480)	Sea Eagle	Anti-ship missile	1985			Arming Tornado IDS fighters
		(560)	Sky Flash	Air-to-air missile	(1986)			Arming Tornado ADV fighters
		6	Sandown Class	Minehunter	1988			Part of 1988 Tornado deal
		(12)	F-15C Eagle	Fighter	1987			Deal worth \$1 b; attrition replacements delivered at the same rate as aircraft losses
		15	Model-406CS	Helicopter	(1987)			Part of \$400 m deal; armed with TOW missiles
		1	Super King Air	Transport	1987	1988	(1)	Deal worth \$400 m
		13	UH-60 Blackhawk	Helicopter	(1987)			Part of deal worth \$400 m; 1 for VIP use
		100	M-60-A3	MBT	1983	1988	100	
		125	M-88-A1	ARV	(1985)			
		16	AN/FPS-117	Air defence radar	(1985)	1988	(1)	Similar to AN/TPS-59 sets
		(20)	AN/TPS-32	3-D radar	(1985)	1987-88	(4)	
		(6)	AN/TPS-43	3-D radar	1985	1987-88	(2)	
		100	AGM-84A Harpoon	Anti-ship missile	1986	1988	(20)	Arming F-15 fighters
		495	AIM-9L	Air-to-air missile	1986	1987-88	(400)	Number ordered also reported to be 995
		671	AIM-9P	Air-to-air missile	1986			For delivery 1989-91
USA								

2 538 BGM-71C TOW Anti-tank missile 1985 1986-88 (1 550) Deal worth \$20 m
4 460 BGM-71D TOW-2 Anti-tank missile 1988

13	Seychelles	India	1	SA-316B Chetak	Helicopter	1987	1988	1	
10	Singapore	Germany, FR Italy USA	1 26 2 4 4 4 5 5 6 6 (6) (32) 31 (64) (96) (72)	Type 62-001 SF-260M C-130C Hercules E-2C Hawkeye F-16A F-16B F-5E Tiger-2 F-5E Tiger-2 Phalanx RGM-84A Launch RGM-84A Launch AGM-65D AGM-84A Harpoon AIM-9P RGM-84A Harpoon RGM-84A Harpoon	Corvette Trainer Transport AEW Fighter Fighter/trainer Fighter Fighter CIWS ShShM launcher ShShM launcher ASM Anti-ship missile Air-to-air missile ShShM ShShM	(1985) (1987) 1987 1983 1985 1985 1987 1988 (1986) (1986) (1987) 1985 1985 1985 (1986) (1987)	1988 1988 1987-88 1988 1988 1988 1988 1988 1988 1988 1988 1987-88 1988 1988 1988	1 2 4 4 4 5 2 1 1 (1) (32) (31) (64) (16) (12)	Prior to licensed production of 5 Deal worth \$600 m Deal worth \$280 m incl 4 F-16B versions Deliveries 1988-89 Arming 6 Type 62-001 corvettes Arming Type 62-001 corvettes Arming TNC-45 FACs Arming F-16 fighters Arming AS-332s; chosen over AM-39 Exocets Arming F-16 fighters Arming Type 62-001 corvettes Arming refitted TNC-45 FACs
10	Solomon Islands	Australia	1	ASI-315	Patrol craft	1985	1988	(1)	
13	Somalia	Italy	(6)	S-211	Trainer	(1985)			
16	South Africa	Angola Chile Spain USSR	(3) (126) (3) (6)	FIM-92A Stinger Blowpipe C-212-200 SA-7 Grail	Portable SAM Portable SAM Transport Portable SAM	1988 (1987) (1986) 1988	1988 1988 1988 1988	(3) (126) 2 (6)	Diverted or bought from UNITA 20 launchers with 126 missiles For Bophuthatswana Air Force Seized from ANC guerrillas in May 1988
9	Sri Lanka	China Israel Italy South Africa UK	. . 6 (2) (6) 50 9	Y-12 Dvora Class Dvora Class SF-260TP Buffalo Strikemaster	Transport FAC FAC Trainer APC Trainer/COIN	(1987) 1986 1987 (1986) (1987) 1987	 1987-88 1988	 6 (50)	Unspecified number ordered in addition to 10 delivered 1986-87 In addition to 6 delivered earlier In addition to 6 in service; unconfirmed Recently purchased by Army together with artillery pieces from Yugoslavia and Pakistan Deal worth \$11 m; ex-Kuwaiti Air Force
13	Sudan	Egypt	(12)	BTR-152	APC	1988	1988	12	Part of new Egyptian aid programme

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
	Ethiopia	. .	SA-7 Grail	Portable SAM	(1986)	1987-88	(80)	Used by SPLA rebels to destroy government aircraft; supplier uncertain
	Italy	6	AB-212	Helicopter	1984	1987-88	6	
	Libya	. .	MiG-23	Fighter/interceptor	(1987)	1987-88	8	4 shot down by guerrillas; may be Libyan-operated
	USA	24	V-150 Commando	APC	(1986)	1987-88	(24)	
		9	V-150 Commando	APC	1988			In addition to about 80 previously ordered
8 Syria	China	. .	M-9 Launcher	Mobile SSM system	1988			Deal being protested by the USA
		. .	M-9	SSM	1988			
	USSR	. .	MiG-29	Fighter	(1986)	1987-88	(48)	
		. .	Su-24 Fencer	Fighter/bomber	(1988)			Status uncertain
		. .	BM-27 220mm	MRL	(1986)	1987-88	(36)	First export
		. .	BMP-1	MICV	1977	1977-88	(1 900)	May be from Czechoslovakia
		. .	T-72	MBT	1980	1980-88	(1 200)	May be from Czechoslovakia or Poland
		. .	SA-8 SAMS	Mobile SAM system	(1982)	1982-88	(42)	
		(276)	AA-7 Apex	Air-to-air missile	(1986)	1987-88	(276)	Arming MiG-29 fighters; designation uncertain, may be AA-10 Alamo
		. .	AA-8 Aphid	Air-to-air missile	(1984)	1984-88	(850)	Unconfirmed; arming MiG-21 and MiG-23 fighters
		(276)	AA-8 Aphid	Air-to-air missile	(1986)	1987-88	(276)	Unconfirmed; arming MiG-29 fighters
		. .	AT-4 Spigot	Anti-tank missile	(1980)	1981-88	(700)	
		. .	AT-5 Spandrel	Anti-tank missile	(1984)	1984-87	(400)	Unconfirmed
		. .	SA-14 Gremlin	Portable SAM	(1985)	1987-88	(200)	Replaces SA-7 Grail
		. .	SA-8 Gecko	Landmob SAM	1982	1982-88	(672)	
		. .	SS-21 Scarab	SSM	1987	1988	(18)	Second order
		3	Kilo Class	Submarine	(1987)			
		4	Nanuchka Class	Corvette	(1984)			Unconfirmed
10 Taiwan	France	4	ATR-72	Transport	1988			First export of this Franco-Italian aircraft; division of revenue not clear
	Netherlands	2	Zwaardvis Class	Submarine	1981	1987-88	2	
	USA	20	S-70C	Helicopter	1984	1986-88	20	For all three services
		(1)	AN/TPQ-37	Tracking radar	1986	1988	(1)	
		(8)	M54 Chaparral	Mobile SAM system	(1985)	1987	(8)	For Army
		(6)	RIM-67A Launch	ShAM launcher	1988			Arming FFG-7 Class frigates to be built under licence; additional orders to

		(192)	RIM-67A/SM-1	ShAM/ShShM	1988				Arming 6 FFG-7 Class frigates to be built under licence; additional orders to refit Gearing Class possible
10 Thailand	Austria	6	GHN-45 155mm	Towed howitzer	1987	1988	6		
	China	3	F-7	Fighter	1988				For evaluation
		23	T-69	MBT	1988				Part of deal worth \$47 m incl APCs
		30	T-69	MBT	1988				Second 1988 order
		(360)	Type 531	APC	1988				Part of deal worth \$47 m
		800	Type 531	APC	1988				Second 1988 order; supplied at friendship prices
		. .	Type 59/1 130mm	Towed gun	1988	1988	(50)		Emergency request by Thailand during border conflict with Laos
		. .	Type-69 Spaag	SPAAG	1987				
		4	Type-74 284mm	MRL	1988				
		(36)	Type-81 122mm	MRL	(1987)	1988	(36)		Thailand developing its own munitions
		. .	Type-83 122mm	MRL	(1988)	1988	(10)		Seen at 1988 Army Day parades
		1	CSA-1 SAMS	Mobile SAM system	1988				Part of deal worth \$47 m
		(12)	CSA-1	SAM	1988				
		(18)	Hong Ying-5	Portable SAM	1988	1988	(18)		Part of deal worth \$47 m
		2	Jiangdong Class	Frigate	1988				Deal worth \$272 m incl 2 Jianghu Class to be refitted before delivery
		2	Jianghu Class	Frigate	1988				Part of deal worth \$272 m
		(3)	Romeo Class	Submarine	(1986)				
	France	(72)	AM-39 Exocet	Anti-ship missile	(1987)				Arming 12 F-5Es converted to maritime strike role; unconfirmed
	Germany, FR	2	M-40 Type	MSC/PC	1984	1987-88	2		Option on 2 more
		(4)	M-40 Type	MSC/PC	1986				In addition to 2 ordered 1984; order may be for 6
	Israel	(12)	Gabriel-2	ShShM	(1987)	1988	(12)		Part of modification programme for TNC-45 FACs
	Italy	(36)	Aspide	Air-to-air missile	1987	1988	(36)		Towed launch canisters using Flycatcher fire control system
	Netherlands	4	F-27 Mk-400M	Transport	1986	1987-88	4		In addition to 4 supplied earlier
		(1)	Flycatcher	Mobile radar	1987	1988	(1)		
	Switzerland	(1)	Fieldguard	Fire control radar	(1987)	1988	1		Number unconfirmed
		1	Skyguard	Air defence radar	1986				Part of air defence system at Korat air base; for use with 30mm anti-air guns
	UK	(12)	Sherpa	Transport	1987	1988	2		
	USA	1	B-737-200L	Transport	(1987)	1988	1		For VIP use
		2	C-130H-30	Transport	1988	1988	2		
		3	CH-47D Chinook	Helicopter	1988				
		8	F-16A	Fighter	1985	1988	8		Deal worth \$378 m incl 3 F-16B versions

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
		6	F-16A	Fighter	1987			Second order
		4	F-16B	Fighter/trainer	1985	1988	4	
		(10)	F-5E Tiger-2	Fighter	1988	1988	(10)	Former USAF Aggressor aircraft
		3	Learjet-35A	Mar patrol/trpt	1987	1988	3	
		5	Model 212	Helicopter	1988			VIP transports
		24	Model 300C	Helicopter	1988			Following previous delivery of 24 in 1986
		(6)	T-33A	Jet trainer	1988	1988	(6)	
		20	M-109 155mm	SPH	1988			Part of deal worth \$63 m
		17	M-113-A2	APC	1988			Part of deal worth \$63 m
		40	M-48-A5	MBT	1987	1987-88	(40)	
		11	M-577-A2	CPC	1988			Deal worth \$63 m incl 20 M-981s
		20	M-981	Support vehicle	1988			Deal worth \$63 m; deliveries from 1990
		(3)	Phalanx	CIWS	1987	1987	2	For Tattankesin Class corvettes
		(3)	RGM-84A Launch	ShShM launcher	1983	1987	(2)	Arming 2 Tattankesin Class corvettes on order from USA
		(32)	AGM-65D	ASM	1985	1988	(32)	Arming F-16 fighters
		(16)	AGM-65D	ASM	(1987)			Arming F-16 fighters
		6	AGM-84A Harpoon	Anti-ship missile	1987	1988	6	Arming 3 F-27 maritime patrol aircraft
		(96)	AIM-9P	Air-to-air missile	(1985)	1988	(96)	Arming F-16 fighters
		(48)	AIM-9P	Air-to-air missile	(1987)			Arming F-16 fighters
		(3)	Tattankesin Class	Corvette	1983	1987	2	
13 Togo	France	1	Alpha Jet	Jet trainer	1987	1988	1	
		1	TB-30 Epsilon	Trainer	1987	1988	(1)	
		1	TB-30 Epsilon	Trainer	1988			
10 Tonga	Australia	3	ASI-315	Patrol craft	1985			
12 Tunisia	France	(6)	Tiger	Point defence radar	(1982)	1986-88	(6)	Deal worth over \$65 m
	USA	57	M-198 155mm	Towed howitzer	1986	1988	(20)	Deal worth \$60 m incl 70 lorries, ammunition, spares and support equipment
13 Uganda	Italy	6	AB-412 Griffon	Helicopter	1982	1985	(2)	
		4	S-211	Trainer	1987			
		6	SF-260 Warrior	Trainer/COIN	1987			
	USSR	(2)	Mi-8 Hip	Helicopter	(1987)	1988	(2)	

8 United Arab Emirates	Belgium	20	LAU-97 70mm	MRL	(1987)	1988	20	For Emirate of Sharjah; mounted on French lorries
	France	18	Mirage-2000	Fighter	1983			For Abu Dhabi; modified for US AIM-9 Sidewinder missiles
		(18)	Mirage-2000	Fighter	1985			Second order; modified for US AIM-9 Sidewinder missiles; for Abu Dhabi
		2	Crotale Naval L	ShAM launcher	1986			Arming 2 FRG-built Type 62-001 corvettes
		2	MM-40 Launcher	ShShM launcher	1986			Arming TNC-45 Class FACs
		(2)	MM-40 Launcher	ShShM launcher	(1988)			Arming 4 FACs on order
		8	Sadral	SAM system	1988			Arming 2 Type 62-001 corvettes
		(50)	Crotale Naval	ShAM	1986			Arming 2 Type 62-001 corvettes
		(24)	MM-40 Exocet	ShShM/SShM	1986			Arming TNC-45 Class FACs
		(16)	MM-40 Exocet	ShShM/SShM	(1987)	1988	(5)	Arming Mirage-5 fighters
		(208)	Magic-2	Air-to-air missile	(1987)			Arming 2 Type 62-001 corvettes; deal incl 2 Sadral launchers; to be delivered 1989
		(24)	Mistral	Portable SAM	(1988)			
		(80)	R-440 Crotale	Landmob SAM	1988			
		(72)	Super-530	Air-to-air missile	(1983)			Arming Mirage-2000 fighters
		(72)	Super-530	Air-to-air missile	(1985)			Arming second batch of 18 Mirage-2000s
	Germany, FR	2	TNC 45	FAC	(1988)			
		2	Type 62-001	Corvette	1986			For Abu Dhabi
	Italy	5	MB-339A	Jet trainer	1987	1988	5	For Dubai
	Netherlands	2	Goalkeeper	CIWS	1986			Arming two Type 62-001 corvettes
	Singapore	(2)	LC 40M	Landing craft	(1986)	1988	(2)	
	UK	2	Fieldmaster	Utility plane	1988	1988	2	
	USA	3	AN/TPS-70	Air defence radar	1987	1987-88	(3)	
		(25)	AGM-65C	ASM	(1987)			For Bahrain; version uncertain
		(108)	AIM-9P	Air-to-air missile	1983			Arming Mirage-2000 fighters
		(108)	AIM-9P	Air-to-air missile	(1985)			Arming second batch of 18 Mirage-2000s
<hr/>								
15 Uruguay	France	1	Riviere Class	Frigate	1988			For delivery early 1989; possible follow-on order for 2 more
	USA	2	A-37B Dragonfly	Fighter/COIN	(1983)	1988	2	
<hr/>								
15 Venezuela	Brazil	1	EMB-312 Tucano	Trainer	1988	1988	1	Attrition replacement
		100	EE-11 Urutu	APC	1988			
	France	8	AS-332	Helicopter	1988			Deal worth \$80 m
		1	Falcon-50	Transport	1987	1988	1	
		(12)	Mirage-50	Fighter/bomber	1988			Deal incl modernization of existing Mirage fleet
		.	Rassur	Surveillance radar	1988			
		(100)	Magic-2	Air-to-air missile	1988			Arming Mirage fighters; deal worth approx \$30 m

Region code/ Recipient	Supplier	No. ordered	Weapon designation	Weapon description	Year of order	Year(s) of deliveries	No. delivered	Comments
	Indonesia	16	Model 412	Helicopter	1988			
	Spain	4	Cormoran Class	FAC	1987			
	UK	84	Scorpion 90	Light tank	1988			Deal worth \$85 m incl support equipment, ammunition and training
	USA	1	B-707-320C	Transport	1988	1988	1	For aerial refueling
		1	C-130H Hercules	Transport	1988	1988	1	
		101	Dragoon 300	APC	(1987)	1988	101	
		18	RGM-84A Harpoon	ShShM	1988			Deal worth \$50 m; arming Constitution Class FACs
8 Yemen, North	USSR	(4)	SS-21 Launcher	Mobile SSM system	(1988)	1988	(4)	Unconfirmed
		(12)	SS-21 Scarab	SSM	(1988)	1988	(12)	Unconfirmed
8 Yemen, South	USSR	6	An-26 Curl	Transport	(1987)	1988	6	For Palestine Liberation Organisation; supplier uncertain
		20	MiG-21bis	Fighter	(1987)	1988	20	For Palestine Liberation Organisation; supplier uncertain
		(4)	SS-21 Launcher	Mobile SSM system	1987	1988	(4)	
		(12)	SS-21 Scarab	SSM	1987	1988	(12)	
13 Zaire	Egypt	4	Fahd	APC	1985	1988	4	
13 Zimbabwe	France	6	Alouette-3	Helicopter	1987	1988	6	
	Spain	6	C-212-200	Transport	1987	1987-88	(5)	Second order

Appendix 6C. Register of licensed production of major conventional weapons in industrialized and Third World countries, 1988

This appendix lists licensed production of major weapons for which either the licence was bought, production was under way, or production was completed during 1988. The column 'Year(s) of deliveries' includes aggregates of all licensed production since the beginning of the contract. The sources and methods for the data collection, and the conventions, abbreviations and acronyms used, are explained in appendix 6D. The entries are made alphabetically, by recipient and licensor.

Region code/ Country	Licensor	No. ordered	Weapon designation	Weapon description	Year of licence	Year(s) of deliveries	No. produced	Comments
I. Industrialized countries								
7 Australia	Sweden	6	Type-471	Submarine	1987			Work divided 25/25/50 between Sweden, USA and Australia
	Switzerland	65	PC-9	Trainer	1986	1987-88	10	In addition to 2 delivered directly; 17 for assembly and 48 for production
	UK	105	Hamel 105mm	Towed gun	(1982)	1988	(4)	Deal worth \$112 m; 46 for Army Reserve
	USA	73	F/A-18 Hornet	Fighter	1981	1985-88	54	In addition to 2 delivered directly; total cost incl 18 F/A-18B trainers: A \$3396 m; for delivery 1985-90
		2	FFG-7 Class	Frigate	1983			Delivery early 1989
4 Belgium	USA	44	F-16A	Fighter	1983	1988	(11)	Follows 116 F-16s previously ordered; deal worth \$625 m; offsets worth 80%
		514	AIFV	MICV	1980	1982-88	(514)	Total number ordered: 1189 incl 525 M-113s; unit cost: \$100 000; for production 1982-88
		525	M-113-A1	APC	1979	1982-88	(525)	
5 Bulgaria	USSR	..	MT-LB	APC	(1980)	1982-88	(130)	May be 2S1 chassis
4 Canada	Germany, FR	..	BK-117	Helicopter	(1986)			Civilian and military versions
		..	Bo-105LS	Helicopter	(1981)	1987-88	(10)	

Region code/ Country	Licensor	No. ordered	Weapon designation	Weapon description	Year of licence	Year(s) of deliveries	No. produced	Comments
3 China	France	50 (10)	AS-365N Super Frelon	Helicopter Helicopter	1980 (1981)	1984-88 1986-88	45 (6)	Prototypes flew Dec 1985; possibly reverse-engineered
5 Czechoslovakia	USSR	. . . . . . . .	BMP-1 BMP-1 Spigot BMP-2 T-72	MICV TD(M) MICV MBT	1971 1979 1978 1978	1971-88 1980-88 1983-88 1981-88	(8 700) (216) (240) (660)	70% exported back to USSR Many exported to USSR and GDR; small quantities in service in Czechoslovakia
4 Denmark	USA	12	F-16A	Fighter	1988			
4 France	USA	80	MLRS 227mm	MRL	1985			
4 Germany, FR	USA	200 10 000 (10 000)	MLRS 227mm AIM-120A AMRAAM AIM-9L NATO Stinger RAM	MRL Air-to-air missile Air-to-air missile Portable SAM ShAM/PDM	1985 (1987) 1978 1983 1985	1980-88	(14 200) (20)	Deliveries from 1989 For delivery 1981-89; NATO co-production programme Dornier/Diehl (FRG) main contractor for FRG, Belgium, Greece, Italy, Netherlands and Turkey MoU signed between USA, FRG and Denmark
4 Greece	Austria	292	Steyr-4K 7FA	APC	1986	1987-88	(200)	Leonidas-2 APCs and MICVs; follows 300 ordered 1981
	Denmark	324 2	Steyr-4K 7FA PC-55 Class	APC Patrol craft	1987 1988			Third order signed Dec 1987 First of projected 10 to be built in Greek yards
	Germany, FR	3	Meko-200 Type	Frigate	1988			In addition to 1 frigate directly from FRG; deal worth \$1.2 b; financial aid from FRG and USA
4 Italy	France	. . 23 000 5 000	Aster Milan Mistral	SAM Anti-tank missile SAM	1988 1984 (1988)	1985-88	5 349	To be built by Italmissile consortium
	Switzerland	. .	Fledermaus II	Mobile radar	(1970)	1973-88	(64)	

USA		. .	AB-205	Helicopter	(1963)	1977-88	(600)	Production of spares continues
		. .	AB-206B	Helicopter	1972	1978-88	(550)	Jetranger-3 version available from 1984
		. .	AB-212	Helicopter	1970	1971-88	(165)	In production 1971-92
		. .	AB-212ASW	Helicopter	1975	1975-88	(140)	
		. .	AB-412 Griffon	Helicopter	1980	1982-88	(49)	Military version of Bell Model 412;
								Italy holds marketing rights
		. .	CH-47C Chinook	Helicopter	1968	1972-88	(172)	Licensed production began 1970
		50	Model 500E	Helicopter	1987	1987-88	(11)	Helicopter trainers
		. .	SH-3D Sea King	Helicopter	1965	1969-88	(94)	In production since 1969
		20	Patriot battery	Mobile SAM system	1988			Part of \$2.9 b deal incl 1280 missiles;
		(15 000)	AGM-65D	ASM	(1983)	1988	450	USA to buy Italian equipment as offset
		(1 280)	MIM-104 Patriot	SAM	1988			Produced with European consortium
								Arming 20 Patriot btys; part of \$2.9 b
								deal; USA to buy Selenia Spada missile
								system as offset
7 Japan	UK USA	(375)	FH-70 155mm	Towed howitzer	1984			Following direct delivery of 197
		. .	CH-47D Chinook	Helicopter	(1984)	1988	7	At least 21 planned for production at 1
								per month; total deliveries may reach
								100
		1	EP-3C Orion	Elint	1988			Follow-on orders expected
		14	F-15DJ	Fighter/trainer	1987	1988	(2)	
		55	F-15J Eagle	Fighter/interceptor	1985	1988	12	MoU signed Dec 1984; in addition to 100
								on order
		(130)	F-16C	Fighter	1988			Selected as basis for SX-3 (FX-3) close
								support fighter; US firms guaranteed 35-
								45% of work
		. .	KV-107/2A	Helicopter	(1982)	1984-88	(19)	In addition to 61 produced earlier;
								improved version
		. .	Model 205 UH-1H	Helicopter	1972	1973-88	(114)	
		(73)	Model 209 AH-1S	Helicopter	1982	1984-88	(38)	AH-1S Cobra; following direct delivery
								of 2 in 1977-78
		100	OH-6D	Helicopter	1977	1982-88	(77)	
		30	P-3C Orion	Mar patrol/ASW	1985	1987-88	17	MoU signed Oct 1985; in addition to 45
								previously ordered
		83	SH-3B	Helicopter	1979	1981-88	(76)	Production will end 1990 with completion
								of 167 Sea Kings in all versions
		(80)	SH-60J Seahawk	Helicopter	(1986)			
		40	UH-60J	Helicopter	(1987)	1988	3	
		(195)	M-110-A2 203mm	SPH	(1981)	1983-88	(195)	Following direct delivery of 6
		25	Patriot battery	Mobile SAM system	(1984)			Part of \$2800 m deal incl 980 licence
								produced missiles
								Arming F-15s
		1 350	AIM-7F Sparrow	Air-to-air missile	(1979)	1980-88	(1 350)	

Region code/ Country	Licensor	No. ordered	Weapon designation	Weapon description	Year of licence	Year(s) of deliveries	No. produced	Comments
		. .	AIM-9L	Air-to-air missile	(1982)	1983-88	(3 336)	Total requirement: up to 10 000
		. .	BGM-71C I-TOW	Anti-tank missile	(1983)	1985-88	1 523	
		980	MIM-104 Patriot	Landmob SAM	1984			
		. .	MIM-23B Hawk	Landmob SAM	1978	1978-88	(2 673)	
4 Netherlands	USA	53	F-16A	Fighter	1983	1987-88	(21)	Fourth order; total requirement may be reduced after cut in Netherlands Air Force Budget
		14	F-16B	Fighter/trainer	1983			To follow production of 213 previously ordered; deliveries to begin 1992
5 Poland	USSR	. .	An-2	Lightplane	1960	1960-88	(1 450)	In production since 1960; over 11 000 built; most for civilian use
		. .	MI-2 Hoplite	Helicopter	1965	1965-88	(2 880)	In production since 1965; most for export
		. .	2S1 122mm	SPH	(1980)	1982-88	(420)	Some built for export
		. .	MT-LB	APC	(1980)	1980-88	(170)	
		(1 900)	T-72	MBT	(1978)	1981-88	(660)	
4 Portugal	France	18	TB-30 Epsilon	Trainer	(1987)			Deal worth \$17 m; assembly to begin in 1989
5 Romania	France	. .	SA-316B	Helicopter	1971	1977-88	(265)	Initial order of 180; more than 185 produced by spring 1985
		. .	SA-330 Puma	Helicopter	1977	1978-88	(165)	Initial order of 100; 112 delivered by spring 1985
	USSR	. .	Yak-52	Trainer	(1979)	1980-88	(650)	Two-seat piston-engined primary trainer
		. .	TAB-77	APC	(1975)	1976-87	(1 380)	Romanian version of Soviet BTR-70
4 Spain	France	18	AS-332	Helicopter	1987	1988	(5)	In exchange for French C-212 order; 6 to be built in France; rest under licence at CASA in Spain
		18	AMX-30R	AAV(M)	1984	1988	(6)	In addition to 10 purchased directly
	Germany, FR	. .	Bo-105CB	Helicopter	(1978)	1981-88	(62)	
	USA	3	FFG-7 Class	Frigate	1977	1986-88	3	
		1	FFG-7 Class	Frigate	1986			Based on FFG-7 design; in addition to 3 previously built

6	Switzerland	Germany, FR	345	Leopard-2	MBT	1983	1987-88	(74)	Deal worth \$1400 m incl 35 delivered directly; final deliveries due 1993
		UK	19	Hawk-60	Trainer	1987			Deal worth \$150 m incl training and logistics; deliveries expected from 1989
		USA	(2 500)	FIM-92A Stinger	Portable SAM	1988			2500-3000 missiles to be produced pending parliamentary approval in 1989
4	Turkey	Germany, FR	2	Meko-200 Type	Frigate	1983	1988	1	In addition to 2 built in FRG Built under licence in addition to 3 delivered from FRG; second batch of 4 cancelled in favour of a new class of 1400t vessels Follow-on order of 4 more likely Unspecified mix of C and D versions; part of deal worth \$4 b incl direct delivery of 8 F-16C/D Total cost \$1.076 b; offsets worth \$700 m; initial production order for 150 \$1 b deal for 180 MLRS; 168 co-produced; 12 delivered direct
			8	Type-209/1	Submarine	1974	1981-88	3	
	USA		2	Type-209/3	Submarine	1987			
			152	F-16C	Fighter	1984	1987-88	(7)	
			1 698	AIFV	MICV	1988			
			168	MLRS 227mm	MRL	1988			
4	UK	Brazil	130	EMB-312 Tucano	Trainer	1985	1987-88	(26)	Deal worth \$145-150 m; option on 17 more UK requirement: 50 000; also produced for export
		France	. .	Milan	Anti-tank missile	1976	1977-88	(3 499)	
	USA		67	MLRS 227mm	MRL	1985			Licensed production by Euraam (BAe, MBB, AEG and Marconi)
			223	AIM-120A AMRAAM	Air-to-air missile	1988			
			. .	BGM-71A TOW	Anti-tank missile	1980	1982-88	(17 970)	
1	USA	Israel	. .	EL/2106	Point defence radar	(1983)			US designation AN/UPS-3; in production but quantities unknown For co-production with Martin Marietta Enlarged version of Italian Lerici Class; funding incl \$197.2 m in FY1989 Eventual requirement may reach 562; US version to be mounted on M2 Bradley chassis Arming US Light Divisions; follows direct purchase of 53; UK designation is L-119
			. .	Have Nap	ASM	1987			
	Italy		17	Lerici Plus	MCM	1986			
			160	ADATS	SAM system	1987			
	UK		302	T-45 Hawk	Jet trainer	1981	1988	2	
			489	M-119 105mm	Towed gun	1987			

Region code/ Country	Licensor	No. ordered	Weapon designation	Weapon description	Year of licence	Year(s) of deliveries	No. produced	Comments
6 Yugoslavia	France	(100)	SA-342 Gazelle	Helicopter	1982	1983-88	(86)	Second co-production order; in addition to 152 produced previously
	USSR	240	T-74	MBT	1977	1983-88	200	Yugoslavian designation M-84; includes local modifications

II. Third World countries

12 Algeria	UK	3	Kebir Class	Patrol craft	1986			
15 Argentina	Germany, FR	6	Meko-140 Type	Frigate	1980	1985-88	4	Armed with MM-40 Exocet ShShMs; last 2 will be available for export
	Italy	4	Type TR-1700	Submarine	1977			In addition to 2 delivered directly
		. .	A-109 Hirundo	Helicopter	1988			Co-production of civil and military versions expected to begin 1992; deal worth \$120 m
15 Brazil	Austria	. .	GHN-45 155mm	Towed howitzer	(1985)			Production expected from early 1990s
	France	10	HB-365F	Helicopter	1988			Part of \$249 m deal
		16	HB-350M Esquilo	Helicopter	1988			In addition to 39 previously produced
	Germany, FR	(3)	Type-209/3	Submarine	1982			In addition to 1 delivered directly
	Singapore	(2)	Type 45	OPV	1988			
15 Chile	Spain	23	C-101 Aviojet	Jet trainer	1984	1986-88	(23)	No production 1987; recontinued 1988
	Switzerland	. .	Piranha	APC	1980	1981-88	(161)	
	USA	. .	T-35 Pillan	Trainer	1980	1985-88	(154)	
8 Egypt	Brazil	170	EMB-312 Tucano	Trainer	1983	1985-88	(85)	Order for 110 raised on option to 170; 100 for Iraq
	France	15	Alpha Jet	Jet trainer	1985			Second order; status uncertain
		18	SA-342L Gazelle	Helicopter	1985	1986-88	(18)	Fourth order; currently built for export to Iraq
		. .	Sinai 23	Mobile SAM system	1988	1988	(2)	Integration of Egyptian weapon systems with French fire control system
	UK	. .	Swingfire	Anti-tank missile	1977	1979-88	(4 425)	Following delivery of 15; deal worth \$2 b
	USA	540	M-1 Abrams	MBT	1988			
		34	AN/TPS-63	Surveillance radar	1985	1988	1	Deal worth \$190 m

9 India	France	. .	SA-316B Chetak	Helicopter	(1962)	1964-88	(272)	Also for civilian use
	Germany, FR	(42 000)	Milan	Anti-tank missile	1982	1985-88	(18 325)	First missile completed 1985
		50	Do-228	Transport	1983	1987-88	(6)	For civil and military use; initial deliveries to civil airline began 1986
		2	Type-1500	Submarine	1981			In addition to 2 directly delivered; first delivery due 1990
	Netherlands UK	212	Flycatcher	Mobile radar	(1987)	1988	(2)	In addition to direct deliveries
		46	Jaguar	Fighter	1982	1988	(8)	Plans for complete local manufacture abandoned
	USSR	15	Jaguar	Fighter	1988			Brings total Indian Jaguar orders to 131
(165)		MiG-27	Fighter/grd attack	1983	1987-88	(40)	First flight 1987 after lengthy delays	
. .		BMP-2	APC/ICV	1983	1987-88	(16)	Production under way 1987	
(1 000)		T-72	MBT	(1980)	1987-88	(22)	Production under way 1987; initially 10% Indian content	
. .		AA-8 Aphid	Air-to-air missile	(1986)			Unconfirmed	
10 Indonesia	France	6	AS-332	Helicopter	1983	1985-88	7	Production switched from Puma to Superpuma 1983; requirement for 12; others for civilian users; 1 for export to Malaysia
	Germany, FR	. .	Super Etendard	Fighter	(1988)			French offer under consideration
(100)		BK-117	Helicopter	1982	1986-88	4	Total production schedule: 100; 2 pre-production aircraft delivered 1984	
		(80)	NBo-105	Helicopter	1987			Follow-on licensed production of 80-100 to include export orders
	Netherlands Spain	(2)	Alkmaar Class	Minehunter	(1988)			Up to 10 may eventually be built
(80)		CN-212	Transport	1976	1978-88	(24)	18 delivered to military customers by early 1986; others for civilian customers	
	USA	(20)	Model 412	Helicopter	1982	1986-88	(10)	Others for civilian customers
8 Iran	China	. .	Oghab	SSM	1985	1986-88	(500)	Chinese Type-83 rocket; used in 1988 "War of the Cities"
10 Korea, North	USSR	. .	BMP-1	MICV	(1984)	1985-88	(62)	Locally modified design
		. .	T-62	MBT	(1978)	1980-88	(542)	Including production for export
		. .	Scud-B	SSM	(1980)			Possibly reverse-engineered without Soviet approval
10 Korea, South	Germany, FR	2	Type-209/3	Submarine	1987			In addition to 1 purchased directly from HDW
	Italy	3	Lerici Class	Minehunter	(1986)	1988	1	Class may ultimately be of 10 ships
	USA	. .	H-76 Eagle	Helicopter	1986	1987-88	(5)	To replace Model-500MD co-production

Region code/ Country	Licensor	No. ordered	Weapon designation	Weapon description	Year of licence	Year(s) of deliveries	No. produced	Comments
		. .	Model 500MD	Helicopter	1976	1978-88	(155)	Over 400 civilian versions produced as well
		. .	M-101-A1 105mm	Towed howitzer	(1971)	1977-88	(120)	Possibly without US consent
		272	M-109-A2 155mm	SPH	1983			Status uncertain
		. .	M-114-A1	Towed howitzer	(1971)	1978-88	(110)	
10 Malaysia	UK	. .	Harimau	Scout car	1988			Version of Ferret scout car
14 Mexico	UK	5	Azteca Class	Patrol craft	1983	1987-88	5	In addition to 31 in service
	USA	. .	DN-3 Caballo	Scout car	(1985)	1988	(17)	
13 Nigeria	Austria	(200)	Steyr-4K 7FA	APC	(1981)			Various versions to be built; status uncertain due to financial problems
	USA	. .	Air Beetle	Trainer	1988			Version of US RV-6 produced with US project management and engineering
9 Pakistan	Sweden	(180)	Supporter	Trainer	1974	1977-88	(170)	Assembly from imported kits began 1976; production transferred to Kamra 1981
10 Philippines	Germany, FR	. .	Bo-105C	Helicopter	1974	1976-81	(9)	Approx 12 in service incl 5 from FRG; others built for civilian customers
	UK	. .	BN-2A Islander	Lightplane	1974	1974-88	(28)	Others built for civilian customers
10 Singapore	Germany, FR	5	Type 62-001	Corvette	1985	1988	1	600t corvettes of Luerssen design
16 South Africa	Israel	(96)	Gabriel-2	ShShM	(1984)	1986-88	(36)	Unclear whether licence produced, reverse-engineered or imported directly; South African designation Skorpion
		(12)	Reshef Class	FAC	1974	1978-88	(9)	In addition to 3 delivered directly
10 Taiwan	Israel	. .	Gabriel Launch	ShShM/SShM launcher	(1978)	1980-88	(72)	
		. .	Gabriel-2	ShShM/SShM	(1978)	1980-88	(450)	Taiwanese designation Hsiung Feng
	Singapore	(22)	Suikiang Class	FAC	(1983)	1986-88	(9)	Armed with Hsiung Feng ShShMs
	USA	. .	Bromon BR-2000	Transport	(1988)			Unconfirmed
		470	M-60-H	MBT	1984	1985-88	(400)	M-60 chassis, M-48 turret, advanced fire control system
		8	FFG-7 Class	Frigate	(1988)			

Appendix 6D. Sources and methods

I. The SIPRI sources

The sources of the data presented in the SIPRI arms trade registers are of six general types. Five of these are published sources, available to the general public: newspapers; periodicals and journals; books, monographs and annual reference works; official national documents; and documents issued by international and intergovernmental organizations. The total number of sources regularly searched for arms trade data is about 200. It is from these that the overwhelming bulk of the arms trade registers are compiled. The sources listed below represent a selection of the first-priority sources of arms trade and arms production data. Reliance on publicly available information provides superior accuracy, independence and accountability. However, total dependence on the use of open sources makes it impossible to report arms transfers where inadequate published material would lead to the omission of significant transactions. A formal estimating procedure was introduced in 1987 in an effort to rectify this deficiency in the comprehensiveness of the data. This estimating procedure is explained in appendix 7D of the *SIPRI Yearbook 1988*.

The arms trade is not fully reported in the open literature. Published reports often omit essential facts. There can also be substantial disagreement among reports. Therefore estimation and the exercise of judgement have always been important elements in compiling the SIPRI arms trade data base. Both the order dates and the delivery dates for arms transactions are continuously revised in the light of new information, but where they are not disclosed the dates are estimated. The exact number of weapons ordered as well as the number of weapons delivered may not always be known and are sometimes estimated, particularly with respect to missiles. It is common for reports of arms deals involving large platforms—whether ships, aircraft or armoured vehicles—to ignore missile armaments classified as major weapons by SIPRI. Unless there is explicit evidence that platforms were disarmed or altered before delivery, it is assumed that a weapons fit specified in one of the major reference works such as the *Jane's* or *Interavia* series is carried.

II. Selection criteria

The SIPRI arms trade data cover five categories of major weapons: aircraft, armour and artillery, guidance and radar systems, missiles and warships. The statistics presented refer to the value of the trade in these five categories only. The registers and statistics do not include the trade in small arms, artillery under 100-mm calibre, ammunition, support items, services and components or component technology, except for specific items. In general, publicly available information is not sufficient to track these other categories satisfactorily.

There are two criteria for the selection of major weapon transfers for the registers. The first is that of military application. The aircraft category excludes aerobatic aeroplanes, remotely piloted vehicles, drones and gliders. Transport aircraft and VIP transports are included only if they bear military insignia or are otherwise confirmed as military registered.

The armour and artillery category includes all types of tanks, tank destroyers, armoured cars, armoured personnel carriers, armoured support vehicles, infantry combat vehicles as well as multiple rocket launchers, self-propelled and towed guns and

howitzers with a calibre equal to or above 100 mm. Military lorries, jeeps and other unarmoured support vehicles are not included.

The category of guidance and radar systems is a residual category for electronic tracking, target-acquisition, fire-control, launch and guidance systems that are either (a) deployed independently of a weapon system listed under another weapon category (e.g., certain ground-based SAM launch systems) or (b) shipborne missile launch or point defence (CIWS) systems. The values of acquisition, fire-control, launch and guidance systems on aircraft and armoured vehicles are included in the value of the respective aircraft or armoured vehicle. The reason for treating shipborne systems separately is that a given type of ship is often equipped with numerous combinations of different acquisition, launch and guidance systems.

The missile category includes only guided missiles. Unguided rockets such as light anti-armour weapons are excluded. Free-fall aerial munitions (such as 'iron bombs') are also excluded. In the naval sphere, anti-submarine rockets and all torpedoes are also excluded.

The ship category excludes some types of ship, such as small patrol craft (with a displacement of less than 100 t, unless they carry cannon, missiles or torpedoes), research vessels, tugs and ice-breakers. Naval combat support vessels such as fleet replenishment ships are included.

The second criterion for selection of items is the identity of the buyer. The items must be destined for export to the armed forces of another country. Transfers to paramilitary forces or police are included if they involve major weapons. Major weapons received by intelligence agencies are also included. Arms supplied to guerrilla forces pose a problem. For example, if weapons are delivered to the Contra rebels they are listed as imports to Nicaragua with a comment in the arms trade register indicating the local recipient. The entry of any arms transfer is made corresponding to the five weapon categories listed above. This means that missiles and their guidance/launch vehicles are often entered separately under their respective category in the arms trade register.

III. The value of the arms trade

The SIPRI system for evaluating the arms trade was designed as a *trend-measuring device*, to enable the measurement of changes in the total flow of major weapons and its geographic pattern. Expressing the evaluation in monetary terms reflects both the quantity and the quality of the weapons transferred. Aggregate values and shares are based only on *actual deliveries* during the year or years covered in the relevant tables and figures.

The SIPRI valuation system is not comparable to official economic statistics such as gross domestic product, public expenditure and export/import figures. The monetary values chosen do not correspond to the actual prices paid, which vary considerably depending on different pricing methods, the length of production runs and the terms involved in individual transactions. For instance, a deal may or may not cover spare parts, training, support equipment, compensation, offset arrangements for the local industries in the buying country, and so on. Furthermore, to use only actual sales prices—even assuming that the information were available for all deals, which it is not—military aid and grants would be excluded, and the total flow of arms would therefore not be measured.

Production under licence is included in the arms trade statistics in such a way that it should reflect the import share embodied in the weapon. In reality, this share is normally high in the beginning, and then it gradually decreases over time. SIPRI has attempted to estimate an average import share for each weapon produced under licence.

IV. Priority sources

Journals and periodicals

AAS Milavnews Air Letter (Romford, UK)
AAS Milavnews News Letter (Romford, UK)
Aerospace Daily (Washington, DC)
Africa Confidential (London)
African Business (London)
Afrique Défense (Paris)
Air & Cosmos (Paris)
Air Force (Washington, DC)
Air International (Kent, UK)
Antimilitarismus Information (Berlin)
Armada International (Zürich)
Armed Forces and Society (London)
Armed Forces Journal International (Washington, DC)
Arms Control Today (Washington, DC)
Asian Defence Journal (Kuala Lumpur)
Atlantic News (Brussels)
Aviation Week & Space Technology (New York)
Bulletin of the Atomic Scientists (Chicago)
Campaign Against Arms Trade (London)
Congressional Quarterly, Weekly Report (Washington, DC)
Current News (Washington, DC)
Defence (Redhill, UK)
Defence Attaché (London)
Defence Intelligence Bulletin (Gutenswil, Switzerland)
Defence Journal (Karachi)
Defence Today (Rome)
Defensa (Madrid)
Defense Daily (Washington, DC)
Defense & Armament Héraclès International (Paris)
Defense & Economy World Report (Washington, DC)
Defense Electronics (Palo Alto, California)
Defense & Foreign Affairs (Alexandria, Virginia)
Defense & Foreign Affairs Weekly (Alexandria, Virginia)
Defense Economy World Report (Washington, DC)
Defense Monitor (Washington, DC)
Défense nationale (Paris)
Defense News (Springfield, Virginia)
Der Spiegel (Hamburg)
Europa Archiv (Bonn)
Europäische Wehrkunde (Herford, Federal Republic of Germany)
Far Eastern Economic Review (Hong Kong)
Flight International (Sutton, UK)
Foreign Broadcast Information Service (Washington, DC)
IDSA Journal (Strategic Analysis) (New Delhi)
IDSA Strategic Digest (New Delhi)
Interavia (Geneva)
Interavia Air Letter (Geneva)

International Defense Intelligence (Alexandria, Virginia)
International Defense Review (Geneva)
Israeli Defence Force Journal (Tel Aviv)
JP4 Mensile di Aeronautica (Florence)
Jane's NATO Report (Coulsdon, UK)
Jane's Defence Weekly (Coulsdon, UK)
Japan Monitor (Tokyo)
Jeune Afrique (Paris)
Journal of Defence & Diplomacy (McLean, Virginia)
L'Express international (Paris)
Le Monde diplomatique (Paris)
Latin American Economic Report (London)
Latin American Regional Report (London)
Latin American Weekly Report (London)
Marine Corps Gazette (Quantico, Virginia)
Marine-Rundschau (Stuttgart)
Med News (Paris)
Military Technology (Bonn)
NATO's Sixteen Nations (Brussels)
National Defense (Washington, DC)
Naval Forces (Farnborough, UK)
Navy International (Haslemere, UK)
Newsweek (New York)
Österreichische Militärische Zeitschrift (Vienna)
Pacific Defence Reporter (Kunyang, Victoria, Australia)
Panorama Difesa (Florence)
Proceedings (USNI) (Annapolis, Maryland)
Soldat und Technik (Frankfurt)
Soviet Military Review (Moscow)
Strategic Digest (New Delhi)
Technología Militar (Bonn)
Time Magazine (New York)
US News & World Report (Washington, DC)
Wehrtechnik (Bonn)
Wireless File (Washington)
World Weapon Review (Newtown, Connecticut)

Newspapers

Anti-Apartheid News (London)
Dagens Nyheter (Stockholm)
El País (Madrid)
Financial Times (Europe) (Frankfurt)
Frankfurter Allgemeine Zeitung (Frankfurt)
Frankfurter Rundschau (Frankfurt)
International Herald Tribune (Paris)
Japan Times (Tokyo)
Jerusalem Post Weekly (Jerusalem)
Le Monde (Paris)
Moscow News (Moscow)
Neue Zürcher Zeitung (Zürich)

Süddeutsche Zeitung (Munich)
Sunday Times (London)
Svenska Dagbladet (Stockholm)
The Guardian (London)
The Independent (London)
The Times (London)
Times of India (New Delhi/Bombay)
Wall Street Journal (New York)

Annual reference publications

'Aerospace Forecast and Inventory', annually in *Aviation Week & Space Technology* (New York)
Asian Recorder (Recorder Press: New Delhi)
Defense and Foreign Affairs Handbook (Perth: Washington, DC)
Interavia Air Forces World (Interavia: Geneva)
Interavia Aircraft Armament (Interavia: Geneva)
Interavia Aircraft Production (Interavia: Geneva)
Interavia Helicopter Systems (Interavia: Geneva)
Jane's Aircraft (Jane's: Coulsdon, UK)
Jane's Armour and Artillery (Jane's: Coulsdon, UK)
Jane's Fighting Ships (Jane's: Coulsdon, UK)
Jane's Infantry Weapons (Jane's: Coulsdon, UK)
Jane's Military Vehicles & Ground Support Equipment (Jane's: Coulsdon, UK)
Jane's Weapon Systems (Jane's: Coulsdon, UK)
Keesing's Contemporary Archives (Longman: Harlow, UK)
The Middle East Military Balance (Jaffee Center for Strategic Studies: Tel Aviv)
Military Balance (International Institute for Strategic Studies: London)
'Military Aircraft of the World' and 'Missile Forces of the World', annually in *Flight International* (Sutton, UK)
Soviet Military Power (US Government Printing Office: Washington, DC)
Trends in Conventional Arms Transfers to the Third World (Congressional Research Service: Washington, DC)
Weyers Flotten Taschenbuch 1988/89 (Bernard & Graefe: Koblenz)
World Fighting Vehicles & Ordnance Forecast (Forecast International: Newtown, Connecticut)
World Military Expenditures and Arms Transfers (US Government Printing Office: Washington, DC)
World Missile Forecast (Forecast International: Newtown, Connecticut)

Other reference books

Conway's All the World's Fighting Ships 1922–1946 (Conway Maritime Press: London, 1980)
Conway's All the World's Fighting Ships 1947–1982 (Conway Maritime Press: London, 1983)
Gervasi, T., *Arsenal of Democracy* (Grove Press Inc.: New York, 1978)
Green, W. and Fricker, J., *Air Forces of the World* (Macdonald & Co.: London, 1958)
Hewish, M. et al., *Air Forces of the World* (Salamander Books: London, 1979)
Keegan, J. (ed.), *World Armies*, 2nd edn (Macmillan: London, 1983)

Labayle Couhat, J. and Baker, A. D. (eds), *Combat Fleets of the World* (Naval Institute Press: Annapolis, Maryland, 1984).

V. Conventions

The following conventions are used in appendices 6B and 6C:

..	Data not available or not applicable
—	Negligible figure (<0.5) or none
()	Uncertain data or SIPRI estimate

Abbreviations and acronyms

AA	Anti-aircraft
AAG	Anti-aircraft gun
AAM	Air-to-air missile
AAV	Anti-aircraft vehicle
AAV(G)	Anti-aircraft vehicle (gun-armed)
AAV(M)	Anti-aircraft vehicle (missile-armed)
AC	Armoured car
Acc to	According to
ADV	Air defence version
Adv	Advanced
AEV	Armoured engineering vehicle
AEW	Airborne early-warning (system)
AEW&C	Airborne early warning and control
AF	Air Force
AFSV	Armoured fire support vehicle
Amph	Amphibious/amphibian
APC	Armoured personnel carrier
Approx	Approximately
ARM	Anti-radar missile
ARV	Armoured recovery vehicle
AShM	Air-to-ship missile
ASM	Air-to-surface missile
ASV	Anti-surface vessel
ASW	Anti-submarine warfare
ATGM	Anti-tank guided missile
ATM	Anti-tank missile
AV	Armoured vehicle
AWACS	Airborne early warning and control system
BL	Bridge-layer
Bty	Battery
CIWS	Close-in weapon system
CG	Coastal gun
COIN	Counter-insurgency
CP	Coastal patrol
CPC	Command post carrier
CS	Coastal surveillance
DoD	Department of Defense (USA)

ECM	Electronic countermeasure
Elint	Electronic intelligence
EW	Early warning
Excl	Excluding/excludes
FAC	Fast attack craft (missile/torpedo-armed)
FMS	Foreign Military Sales (USA)
FY	Fiscal year
Grd	Ground
ICV	Infantry combat vehicle
IDS	Interdictor/strike version
Incl	Including/includes
IRBM	Intermediate-range ballistic missile
Landmob	Land-mobile (missile)
LC	Landing craft (<600t displacement)
LS	Landing ship (>600t displacement)
LT	Light tank
LOA	Letter of Offer and Acceptance (USA)
LoO	Letter of Offer (USA)
MAP	Military Assistance Program
Mar patrol	Maritime patrol aircraft
MBT	Main battle tank
MCM	Mine countermeasure (ship)
MICV	Mechanized infantry combat vehicle
Mk	Mark
MoU	Memorandum of Understanding
MR	Maritime reconnaissance
MRCA	Multi-role combat aircraft
MRL	Multiple rocket launcher
MRS	Multiple rocket system
MSC	Minesweeper, coastal
MSO	Minesweeper, ocean
MT	Medium tank
OPV	Offshore patrol vessel
PAR	Precision approach radar
PC	Patrol craft (gun-armed/unarmed)
PDM	Point defence missile
Port	Portable
RAAF	Royal Australian Air Force
Recce	Reconnaissance (aircraft/vehicle)
RN	Royal Navy (UK)
SAM	Surface-to-air missile
SAR	Search and rescue
SC	Scout car
ShAM	Ship-to-air missile
ShShM	Ship-to-ship missile
ShSuM	Ship-to-submarine missile
SLBM	Submarine-launched ballistic missile
SPAAG	Self-propelled anti-aircraft gun
SPG	Self-propelled gun
SPH	Self-propelled howitzer
SPM	Self-propelled mortar

SShM	Surface-to-ship missile
SSM	Surface-to-surface missile
SSN	Nuclear-powered submarine
SuShM	Submarine-to-ship missile
SY	Shipyard
TD	Tank destroyer (gun-armed)
TD(M)	Tank destroyer (missile-armed)
TG	Towed gun
TH	Towed howitzer
Trpt	Transport
UNITA	National Union for the Total Independence of Angola

Region codes

- 1 USA
- 2 USSR
- 3 China
- 4 NATO, excluding the USA
- 5 WTO, excluding the USSR
- 6 Other Europe, neutral
- 7 Industrialized, Pacific
- 8 Middle East
- 9 South Asia
- 10 Far East & Oceania
- 12 North Africa
- 13 Sub-Saharan Africa (excluding South Africa)
- 14 Central America
- 15 South America
- 16 South Africa

7. Ballistic missile proliferation in the Third World

AARON KARP

I. Introduction

At their 1988 summit meeting in Moscow, Soviet General Secretary Mikhail Gorbachev and US President Ronald Reagan expressed the growing international concern over the dangers of the spread of ballistic missiles. In the summit Joint Statement they agreed to initiate bilateral discussions on how to cope with the problem. The first of these meetings was held in Washington on 26 September 1988.¹ Two weeks before, US Secretary of Defense Frank Carlucci travelled to Beijing where he pressed Chinese leaders to cease missile exports.² In addition, the seven nations adhering to the Missile Technology Control Regime (MTCR) restrictions on missile technology exports met in Rome to discuss specific Third World missile programmes and the transfer of missile technologies.³

These events illustrate that ballistic missile proliferation has risen dramatically on the international agenda. Although the problem dates back to the 1950s, never before has it caused such widespread concern. This chapter reviews Third World ballistic missile programmes in order to gauge the seriousness of the problem. What kinds of ballistic missile are Third World countries trying to acquire, and how many nations are trying to acquire them? How are they procuring them? What can they do with them? And how are other nations responding?

The answers to these questions vary from case to case, and they are not always easy to find. Third World missile programmes are cloaked in secrecy and ambiguity. Reports are rife with incomplete information, inferences, rumours and outright speculation.⁴ Rarely if ever since the late 1950s has the international community faced a major arms control and security issue with so little reliable information.

In order to assess the status of Third World ballistic missile programmes, this chapter first outlines six basic issues relevant to most if not all of the countries involved. This is followed by a nation-by-nation survey of 24 Third World nations believed to have acquired or to be trying to acquire ballistic missiles. Each national survey outlines the country's ballistic missile programme and assesses its essential aspects as far as publicly available information permits.

Third World nations are not the only recipients of missile technology. Several Soviet and US allies in Europe as well as Australia and Japan have received ballistic missiles, space rockets or relevant technology,⁵ but the case of Third World ballistic missiles differs in several respects. Many of these nations are not party to the 1968 Non-Proliferation Treaty (NPT), some have used their missiles in conflict, and most are accelerating their

programmes just as NATO and the Warsaw Treaty Organization are destroying some of their ballistic missiles under the 1987 US-Soviet INF Treaty.

II. Six basic issues

It is a measure of the novelty of the issue of missile proliferation that many basic concepts are poorly defined, key processes are difficult to identify, and the implications remain elusive. Outside observers know no more about many Third World programmes today than was known about Soviet ballistic missiles in 1957, the year Sputnik was launched. Just as ignorance made it difficult for other governments to react appropriately to early Soviet ballistic missiles, lack of knowledge about Third World missiles hinders judgement today. The uncertainties and ambiguities fall into six rough categories that cover the basic aspects of a Third World ballistic missile programme:

1. The definition of a ballistic missile. Despite its universal acceptance, the term 'ballistic missile' is not easily defined. When assessing a problem involving dozens of programmes in many nations, a clear definition is needed to set the boundaries of the problem and to determine whether a particular programme is a source of concern.

Existing treaties and provisions of international law offer scant help. The first treaty to restrict ballistic missiles, the 1972 SALT I Agreement, defines intercontinental ballistic missiles (ICBMs) as ballistic missiles with a range of over 5500 km.⁶ The unratified 1979 SALT II Treaty defines cruise missiles but adds nothing to the definition of a ballistic missile.⁷ The first general definition established in an agreement is in the 1987 INF Treaty.⁸ This states in article II, paragraph 1, that 'the term "ballistic missile" means a missile that has a ballistic trajectory over most of its flight path', meaning that the trajectory is arched by gravitational forces. This is similar to the US Department of Defense definition,⁹ but it is too broad for general use since it includes even the smallest rockets and some artillery shells. The 1987 Missile Technology Control Regime is intended 'to limit the proliferation of ballistic missiles capable of delivering nuclear weapons'. These are defined as missiles 'capable of delivering at least a 500 kg payload to a range of 300 km'.¹⁰ The MTCR does not offer a general definition of a ballistic missile, nor does it define the characteristics of smaller ballistic missiles armed with conventional explosives or chemical or biological weapons (CBW).

These legal definitions also beg crucial questions such as flight altitude, range and guidance. Ordinary dictionary definitions are more helpful. The *Oxford English Dictionary's* attempt is typical, stressing the importance of corrective guidance in flight.¹¹ However, this characteristic is drawn from the example of US ICBMs of the 1950s; its wider applicability is questionable. Definitions based on flight altitude or range can exclude important short-range systems. For example, long-range missiles pass through outer space, above an altitude of approximately 84 km (52 miles or 275 000 ft).¹² Missiles with ranges of less than

300 km, including most Third World ballistic missiles, stay within the atmosphere.¹³ Missiles with a range of less than 40 km are usually considered artillery rockets. However, at least one ballistic system, the US Honest John, has a maximum range of 37 km, while large artillery rockets currently go as far as 80 km,¹⁴ far enough to reach major cities in many possible regional conflicts.

Until the definitional muddle is resolved, general analysis of ballistic missile proliferation must be imprecise, and arms control and disarmament, which rely on clear and mutually acceptable definitions, cannot live up to their potential. For the purposes of this chapter, *a ballistic missile is any unmanned, self-propelled weapon delivery vehicle that can be used in a surface-to-surface role and which sustains a ballistic trajectory through most of its flight without relying on aerodynamic lift.* Most fly through outer space, but not all. Most have ranges over 40 km, but not all. Most are guided, but not all.

2. Acquisition methods. There are four basic ways in which a country can acquire ballistic missiles.¹⁵ Sometimes missiles can simply be purchased or are given 'off the shelf' by foreign suppliers. Second, some large tactical missiles such as surface-to-air missiles can be modified for surface-to-surface roles. Short-range ballistic missiles can be modified for greater range. Third, growing numbers of countries are trying to develop and manufacture their own ballistic missiles. Fourth, a few of these countries are developing sub-orbital sounding rockets or space launch vehicles (SLVs) which can potentially be used as ballistic missiles.¹⁶ As shown below, some countries are trying several methods simultaneously in different programmes.

3. Access to foreign technology. Experience shows that all Third World ballistic missiles rely on key foreign technologies. These range from whole missiles to designs, technical know-how or key component technologies such as engines, guidance systems or nose cones. Restricting the flow of this technology is the goal of the MTCR.¹⁷ The Regime can be circumvented, however, through the ambiguity of dual-use technologies, unlicensed exports or outright theft. The two biggest missile suppliers, China and the Soviet Union, do not belong to the Regime. Nor do many smaller suppliers and potential suppliers such as Argentina, Belgium, Brazil, Egypt, Israel, the Netherlands, North Korea, Sweden or the countries of Eastern Europe.

4. Missile armament and accuracy. Borrowing from superpower precedents, Third World ballistic missiles are feared primarily as potential nuclear weapon delivery vehicles. Assuming that a country has the ability to fabricate nuclear weapons, these must be made small enough to fit the payload capacity of the missile system, typically 500–1000 kg.¹⁸ CBW agents or conventional explosives can also be used, but they increase the need for greater missile accuracy or numbers. To be effective against military targets, a conventionally armed missile must usually have a circular error probable (CEP) of less than 20 metres, while most extant Third World missiles have CEPs of about 1000 metres.¹⁹ To compensate for inaccuracy, conventionally armed missiles can be used in great numbers or launched against such large targets as cities. Special warheads using cluster munitions or fuel-air explosives (concussion bombs) can also enhance conventional destructiveness.

5. Alternative delivery systems. No country relies exclusively on ballistic

missiles for long-range attack. Artillery is usually more destructive within its range while aircraft compete with missiles for longer-range missions. Most Third World countries continue to rely on these traditional weapon systems. In a growing number of cases ballistic missiles appear to be gaining importance as they surpass the range of aircraft and as aircraft lose their ability to penetrate enemy air defences. Air forces, meanwhile, are not standing still. With specialized attack fighters, aerial tankers and electronic countermeasure escorts they can reassert their traditional advantages of greater payload, versatility and reusability.²⁰

6. Responses by other nations. Foreign reactions to Third World ballistic missile programmes can vary considerably. A single programme may incite other nations to prepare military countermeasures, diplomatic confrontation or embargoes on relevant technology, or they may not react at all or even lend encouragement and support. These reactions can have a direct bearing on the future of a nation's missile procurement, preventing or hindering progress in some cases, accelerating it in others.

The nation-by-nation survey that follows reviews how Third World nations deal with these six aspects in their ballistic missile programmes. Each case study asks what ballistic missiles are present or being developed, how they are acquired, the role of foreign assistance, missile armament and accuracy, what their role is *vis-à-vis* available alternatives, and how other countries are reacting. In some cases there is little or no information about some aspects of a country's missile proliferation, as is noted.

III. Ballistic missile programmes in the Third World

Afghanistan

In the autumn of 1988, Soviet-made Scud-B missiles were publicly displayed in Kabul. According to Soviet press reports, the 280-km range missiles belonged not to Soviet forces but to the Afghan Army.²¹ Starting in November, the missiles were fired at Mujahideen positions, about 15 in the first week and 32 in the second.²² There have been no official allegations that the missiles were armed with anything but conventional explosives. This is the fourth time ballistic missiles have been fired in hostilities since 1945: Egypt and Syria fired FROG and Scud missiles at Israel in 1973, Libya fired Scud missiles at a US installation in Italy in 1986, and Iran and Iraq fought missile warfare in 1980–88.²³ There are no reliable reports on their effect in Afghanistan, but since the Scud has a CEP of about 1000 metres and guerrilla bases are usually smaller, it is unlikely that the destruction was militarily decisive.²⁴

The political consequences may be greater. The Scuds represent an apparent breach of the 14 April 1988 Geneva Accords prohibiting new arms transfers to either the Kabul Government or the Mujahideen.²⁵ Moscow alleged that the Mujahideen were the first to violate the agreement by receiving additional arms through Pakistan.²⁶ Continuing a pattern initiated by the Afghan Air Force, at least one missile exploded in Pakistan, reportedly causing 10 deaths.²⁷ Air

combat in the Afghan–Pakistani border region remains more common, however. If the missiles remain in Afghanistan after the final Soviet withdrawal they will continue to pose a threat to neighbouring countries.

Algeria

Algeria received Soviet FROG-7 missiles (70-km range) in the mid-1970s, a time when some other Soviet clients such as Iraq and Libya also received their first shipments.²⁸ Algeria does not have an advanced nuclear research programme, although chemical armament might be feasible. For air attack, Algeria relies on its air force of 346 combat aircraft, including 60 MiG-23 Flogger and 18 Su-22 Fitter fighter-bombers which can carry much larger payloads to considerably greater distances.²⁹ According to one source, Algeria's FROGs have been withdrawn from active service.³⁰

Argentina

In the 1960s and early 1970s Argentina was the most advanced Third World nation in the field of rocket research, developing with US support sub-orbital sounding rockets able to reach altitudes of up to 500 km.³¹ After almost a decade in abeyance, the programme was revived in 1982, the year of Argentina's disastrous war for the Falkland/Malvinas islands, and has become very controversial.³²

At least three domestic ballistic missile designs have been made public, although none is known to be operational. The Condor I (or Condor C1-A3) is a solid-fuel, single-stage rocket with a range of 100–150 km. First displayed in 1985, it is said to be a dual-purpose system with civil and military applications.³³ The Condor I is apparently also the first stage of a two-stage missile, the Alacran, about which little is known.³⁴ In late 1987, news reports revealed the existence of the Condor II programme, a collaborative venture with Egypt (where it is called the Badr-2000), reportedly financed in part by Iraq.³⁵ Descriptions of the Condor II vary wildly. One widely noticed report claimed that it has a range of 6720–9920 km.³⁶ A growing consensus puts its range at 800 km. It, too, is described by Argentine officials as a multi-purpose vehicle, intended as a civil space launch vehicle and for 'peaceful' military purposes.³⁷

The Argentine programme has acquired technology and support from diverse sources. Building upon a foundation of US assistance from the 1960s, Argentina compensated for the later US restrictiveness by turning to firms in FR Germany, France and Italy. In 1984–86, the Italian firm SNIA (a Fiat subsidiary) allegedly provided propellant technology.³⁸ There is evidence that European co-operation continued even after the MTCR went into effect in 1985, although the firms accused steadfastly deny the accusations.³⁹ Egyptian co-operation started in the mid-1980s. In June 1988, Egyptian nationals and military officers were charged in the USA with espionage for trying to smuggle carbon-carbon nose-cone technology for the Condor II.⁴⁰ China may be supplying technical assistance as well, although Beijing and Buenos Aires both deny it.⁴¹

Early revelations of the Condor programme came from the UK, where it was seen as a threat to the Falkland/Malvinas islands.⁴² Now that Argentina's conflicts with Brazil and Chile are receding, this is the only obvious strategic justification. Given the expense and inherent inaccuracy of a missile with the range of the Condor II, it is extremely likely that it is designed as a potential nuclear weapon delivery vehicle, although other roles including conventional weapon delivery, space launch and symbolism cannot be excluded. Argentina is not party to the NPT. It is believed to have conducted nuclear weapon research and may be able to manufacture enough fissile material for nuclear weapons in a few years.⁴³

Commercial prospects also appear to be involved. Argentina aggressively markets its military products.⁴⁴ A mock-up of the Condor I was displayed at the 1985 Paris Air Show, and there have been reports that the missiles will be exported. Egypt may already have received some Condor IIs. Both Iran and Iraq may be possible buyers as well. Argentine spokesmen deny these reports but keep open the option of selling the same missiles for use as civilian SLVs.⁴⁵

Besides its ballistic missile programme, Argentina is developing a family of remotely piloted vehicles, the MQ-1 through MQ-4, which may lay a foundation for future work on cruise missiles.⁴⁶ Today, Argentina relies on 18 Mirage-IIICJ, 29 A-4 Skyhawk and 14 Etendard attack aircraft and 6 ageing Canberra bombers for long-range aerial attack. Their capability is enhanced by possession of 2 KC-130H aerial refuelling tankers.⁴⁷

Argentina's neighbours have not reacted vigorously to the missile programme, although they remain attentive. National leaders in Brasilia and Buenos Aires do not speak of a regional arms race or publicly justify their ballistic missile programmes in terms of each other. The UK and the USA lead international efforts to control the Argentine programme. On 8-9 September 1988, representatives of the seven nations of the MTCR meeting in Rome reportedly stressed responses to Argentine missile proliferation.⁴⁸ According to one study, the MTCR may already have hindered Argentine missile progress.⁴⁹ At a meeting in late September, US officials discussed their concerns with Argentine Defence Minister José Horacio Jaunerena.⁵⁰ They emphasized the question of Condor missile exports to other countries and renewed an invitation for Argentina to join the MTCR.

Brazil

Over 30 years after beginning rocket research, Brazil has several ballistic missile and space launch programmes in progress. Brazil's initial concentration on civilian, sub-orbital rockets led to the development of progressively larger types. In the mid-1970s, planning began for indigenous space launch vehicles, but this programme has been seriously delayed. In the mid-1980s, ballistic missile programmes gained prominence, but these have not yet led to actual deployments.

Brazilian space policy is centralized under a joint civilian-military committee, the Brazilian Space Activities Commission (COBAE), chaired by the Armed Forces Chief of Staff.⁵¹ Missile research is conducted by two centres,

the Space Activities Institute (IEA) and the Space Technical Center (CTA).⁵² Missile production is undertaken by two firms, Avibras and Orbita, co-ordinated by a Joint Command of the Armed Forces.⁵³

The most successful Brazilian missile programme is an outgrowth of its civil sounding rockets, the Sonda series. Starting with small sounding rockets for atmospheric research in the 1960s, this gradually grew into the current Sonda-4, a seven-tonne rocket with a surface-to-surface range of about 940 km that first flew in 1984.⁵⁴ The Sondas were developed with extensive West German assistance.⁵⁵ France supplied guidance technology, and China is involved as well.⁵⁶ Avibras used the Sonda series as a basis for its Astros-2 family of artillery rockets which has been exported widely. According to Avibras, total Astros-2 sales exceed \$1 billion, including large orders from Iraq, Libya and Saudi Arabia. The largest Astros rocket available today has a range of 68 km.⁵⁷

In the early 1980s, Avibras began work on the SS-300, a 300-km ballistic missile. Similar in many respects to the Soviet Scud-B, it uses an indigenous Avibras guidance system. Flight-tests beginning in 1986 were largely unsuccessful, but the project continues to receive heavy emphasis. It reportedly receives financial support from Iraq. Avibras is planning another project, the SS-1000, with a range of over 1000 km, but full-scale development will require a political decision.⁵⁸

A rival ballistic missile series is being developed by Orbita, a consortium formed in 1987 by Brazil's two largest arms manufacturers, Embraer and Engesa, and the Government. Its current project is the 150-km MB/EE-150. Plans call for a family of missiles with ranges of up to 600 km.⁵⁹ In January 1988, a Libyan mission offered \$2 billion over five years to support Orbita's research and guarantee Libyan access to the results. It is not clear what came of the offer.⁶⁰

Brazil has also invested heavily in its civilian All-Brazilian Space Programme (MECB).⁶¹ This centres around the VLS booster rocket, a 40-tonne, four-stage civilian satellite launcher. Originally intended to fly in 1987, it has suffered from technical problems, especially since the MTCR went into effect in 1985.⁶² Chinese assistance may compensate for this, but the VLS is still not expected to be operational for several years. If it is perfected, Brazil will have a potential 3000-km intermediate-range ballistic missile (IRBM), although official spokesmen routinely deny that military applications are planned.⁶³

Brazil is not party to the NPT and is building facilities necessary for fabrication of nuclear weapons.⁶⁴ On the other hand, Brasilia is negotiating nuclear restraints with Argentina, its only potential external security threat.⁶⁵ A more immediate danger is the possibility that its long-range missiles could be sold to other nations actively pursuing nuclear or chemical munitions programmes. Brazil sells weapons with few inhibitions and consistently refuses to consider export restraints.⁶⁶

Alternative long-range delivery systems are also under development. The SM-70 Barracuda cruise missile is potentially large enough to carry a nuclear warhead. It could be ready in the early 1990s.⁶⁷ The Brazilian Navy has spent over \$81 million developing a nuclear-powered submarine, often mentioned in

the Brazilian press as a potential ballistic or cruise missile carrier.⁶⁸ The Brazilian Air Force is in the process of acquiring 79 AMX attack aircraft which, combined with its three aerial refuelling tankers, will give it substantial reach in the 1990s.⁶⁹

Little is known of foreign reactions to the Brazilian ballistic missile and space launch programme, except for inquiries from potential buyers.

Cuba

The first shipment of Soviet FROG-4 missiles (40-km range) to Cuba came in 1960–62 as part of the first Soviet military aid package following the Cuban revolution. More arrived over 20 years later in the mid-1980s, this time 70-km range FROG-7s. This gave Cuba a total force of about 65 FROG missiles. Cuba also has about 50 launchers for SCC-2B Samlet cruise missiles with a range of 60–90 km and payload of about 500 kg. These coastal defence missiles could easily be used against targets on land, although they are vulnerable to modern air defences.⁷⁰

Cuba is not party to the NPT, but it is not usually considered a nuclear threshold country.⁷¹ Owing to their limited range and Cuba's island geography, Cuban FROG missiles could only be used against targets on its own soil unless transported elsewhere. For long-range attack Cuba relies on its Air Force, which includes about 30 MiG-23BM attack fighters.⁷²

Egypt

In the early 1960s, Egyptian President Nasser commissioned a team of German engineers to develop an Egyptian missile force. Led by veterans of the World War II V-2 programme, they designed three ballistic missiles with maximum ranges of 275–600 km before the Bonn Government forced an end to the operation in 1966.⁷³ Egypt did not acquire a fully functional missile force until 1968, when it received Soviet FROG-4 missiles. They were followed by FROG-7s in 1971 and Scud-B missiles in 1973. Egypt received a total of about 20–30 ballistic missile launchers and perhaps three times as many missiles. A few were fired at Israel in the 1973 war, with no appreciable effect.⁷⁴

Following the collapse of relations with the USSR in 1973, Cairo re-oriented its foreign policy towards the West. After signing the 1979 Camp David Accords, Egypt was able to acquire the most advanced US military equipment, with the notable exception of ballistic missiles. For these, Egypt turned to domestic research and development (R&D). An incremental programme of missile development started around this time. The only Arab nation with large military industries, Egypt started by reverse-engineering Soviet BM-21 short-range artillery rockets for mass production, including large-scale exports to Iraq.⁷⁵ This was followed by the Sakr-80, a replacement for its FROG missiles. Work on the Sakr-80 began in 1983 in collaboration with a French firm, SNPE (Société Nationale des Poudres et Explosifs). After an R&D investment of \$100 million, it was unveiled in 1987. With a range of 80 km, the Sakr-80 is unguided, like the FROG, but armed with a variety of conventional munitions. Mass production is expected.⁷⁶ Egypt may also have collaborated with North

Korea and possibly with Iraq to upgrade its Scud missile force. Some reports claim that Egypt now manufactures Scuds, a difficult task considering the weakness of its aerospace industry.⁷⁷ It is more likely that Egypt has bought more Scuds from North Korea and is modifying them as Iraq has.

In December 1987 it was reported that Egypt had been involved with Argentina on the 800-km range Condor II, known as the Badr-2000 in Egypt.⁷⁸ In Buenos Aires, government officials insist that the two countries only exchange satellite data.⁷⁹ Reports of missile co-operation became more persistent after Egyptian nationals and military officers were charged with trying to smuggle carbon-carbon nose-cone technology out of the USA in June 1988.⁸⁰ The US Government maintains that the smuggling was 'authorized by high officials of the Egyptian Government'. Prosecution documents state that Defence Minister Lt Gen. Abdel Halim abu Ghazala was involved personally.⁸¹

Egypt is a signatory of the NPT, lacking the infrastructure for nuclear warhead fabrication.⁸² It is widely believed to have used chemical weapons (mustard gas) during the 1963–67 war in Yemen and may retain a stockpile.⁸³ French sources explicitly deny that the Sakr-80 will carry chemical armaments; in sufficient quantities its cluster munitions alone could make it an important weapon.⁸⁴ For chemical or conventional attack, Egypt could use its F-4 Phantom, F-16 Falcon, Mirage-2000 or other attack aircraft supported by the E-2C Hawkeye AWACS (Airborne Warning and Control System) and electronic countermeasure escorts to defeat an enemy's air defences, but concern with the strong air defences of Israel and Libya reduce confidence in the Air Force.⁸⁵ Iraqi and Saudi financing may create commercial incentives for missiles as well.

Reactions to the Egyptian programme vary. Israeli officials appear to be more concerned with Syria's missile force.⁸⁶ The USA, the leading advocate of the MTCR, is inhibited from pressuring Egypt by strong bilateral relations. Instead, Washington is trying to start talks with Egypt and Israel to explore ways to limit the development and use of ballistic missiles in the region.⁸⁷ Although the aforementioned smuggling affair is being prosecuted, pressure on the Condor II programme is directed primarily at Argentina.⁸⁸ French collaboration on the Sakr-80 may clash with the spirit of the MTCR, but it is legal since the Regime only restricts missiles of over 300-km range.

Greece

In 1959 the Hellenic Army received two US Honest John battalions with about 8 launchers and 24 of the 37-km range missiles. An unguided system originally designed for nuclear weapon delivery, the Greek Honest John remains in service.⁸⁹ Greece has no other surface-to-surface missiles, although its Nike-Hercules surface-to-air missiles could be modified for ground attack.⁹⁰ Greece's accession to the NPT and anti-nuclear policies rule out nuclear armament for these weapons. For long-range attack with conventional weapons, the Hellenic Air Force can marshal about 400 combat aircraft including F-104G Starfighters, F-4 Phantoms, F-16 Falcons and Mirage-2000s with much greater range, payload and versatility than the missile force.⁹¹

India

Indian rocket research traditionally focused on SLVs—potential ballistic missiles. More recently India created a parallel programme to develop purely military missiles. Both programmes are well-financed by Third World standards and have accomplished important objectives. Yet major hurdles remain to be overcome before long-range ballistic missiles can be deployed.

By launching a satellite into orbit on a domestic SLV-3 space launch vehicle on 18 July 1980, India became the sixth country to do so. Satish Dhawan, then chairman of the Indian Space Research Organization (ISRO), declared that any nation able to put a satellite in orbit could develop an IRBM.⁹² Although Indian officials usually insist that the SLV-3 is entirely civilian, some sources maintain that it can be converted to a ballistic missile with a range of 800 km or more.⁹³ The SLV-3 was the first of a series of progressively larger rockets. After only four flights (two successful), the programme shifted to the Augmented SLV (ASLV), a modified SLV-3 with two 10-tonne strap-on booster rockets. Its first two flights ended in crashes, the last on 13 July 1988, apparently due to engine problems.⁹⁴ Planning continues for a Polar SLV (PSLV) designed to carry a 1000-kg payload in 1989 and the Geostationary SLV (GSLV) for lifting 3000-kg payloads to an altitude of 36 000 km in the late 1990s. The GSLV would give India a potential ICBM capability.⁹⁵ The ISRO annually spends over \$200 million on these projects,⁹⁶ but recent failures and technical problems have dampened the optimism of the early 1980s. Launch schedules are being postponed by several years. The SLV series increasingly seems too complex and unreliable to be used as ballistic missiles.

The inspiration and much of the technology for India's civilian space launch programme came from the USA and Europe. The SLV-3 closely resembles the US Scout rocket, a 1950s design.⁹⁷ Much of the engine technology came from the French firm SNPE.⁹⁸ Guidance, specialty metals and metallurgical techniques also came from abroad.⁹⁹ There is no evidence that the Soviet Union has contributed to the programme, despite Moscow's record for strongly supporting other industrial and military projects in India.¹⁰⁰ After 1985, the MTCR cut India's space launch programme off from Western technology. Indian leaders insist that the MTCR will not compromise their planning,¹⁰¹ but the Regime is credited by Western analysts with slowing Indian progress.

In 1983 a purely military missile programme started under the Defence Research and Development Organization (DRDO). Its Integrated Guided Missile Development Program (IGMDP) includes several tactical missiles and two ballistic missiles. The Prithvi, a 250-km range ballistic missile with a payload of about 1000 kg, was successfully tested on 25 February 1988. It is a liquid-fuel, single-stage vehicle similar in performance and shape to the Soviet Scud-B. Published reports indicate that foreign technology is kept to a minimum. The guidance system appears to rely on pre-set commands and radio instructions, not a more accurate inertial platform which might necessitate foreign help. The Prithvi could be in service in 1993. A larger ballistic missile, the Agni, is also in development.¹⁰² The cost of the programme is not public information, but \$92 million has been spent on a missile R&D centre

in Hyderabad and \$250 million is going into a new test range at Baliapal, Orissa.¹⁰³

A non-signatory of the NPT, India tested a nuclear device in 1974 and is believed to have accumulated enough fissile material to build 20–50 nuclear weapons.¹⁰⁴ In an emergency, a possible Indian nuclear weapon would have to be delivered by aircraft since no Indian ballistic missiles are operational yet. The Indian Air Force is the world's fifth largest with over 700 combat aircraft. Its attack element alone includes over 250 Jaguar, MiG-23BN and MiG-27 aircraft suitable for nuclear missions.¹⁰⁵ Before Indian ballistic missiles can assume a similar role, considerable work must be done to enhance reliability and accuracy and to reduce the vulnerability of the liquid-fuelled prototypes. One option to reduce vulnerability is basing the missiles on large submarines, possibly nuclear-powered, which are being debated.¹⁰⁶

The Indian SLV programme was one of the factors that made Western governments aware of the missile proliferation problem. Just as India's 1974 nuclear test helped lead to the London Nuclear Suppliers Group, the SLV-3 launch in 1980 helped galvanize Western thinking that eventually led to the MTCR.¹⁰⁷ India's principal military rival, Pakistan, has responded by accelerating its own missile programme (discussed below).

Indonesia

Since the late 1970s, Indonesia has tested a series of progressively larger solid-fuel sounding rockets. The rockets are indigenously developed by the Indonesian Aeronautics and Space Agency, possibly with foreign technical assistance in view of the country's weak technical infrastructure. The largest of these, the RX-250, was first launched in 1987.¹⁰⁸ It might be a useful design for a small ballistic missile. Foreign support for such a project is permissible under the MTCR if the missile has a surface-to-surface range under 300 km with a payload of less than 500 kg. Such a missile is probably too small to carry an early-generation nuclear weapon, so it would have to be used with conventional explosives or CBW.

Iran

At the start of the war with Iraq in 1980, Iran had no surface-to-surface missiles. As the war stalemated into a static battle of attrition by 1983, aerial attack became increasingly important. With its air force reduced to a handful of serviceable aircraft, ballistic missiles became increasingly attractive as a way to carry the war to Iraqi cities.¹⁰⁹ Iraq had used Soviet-made FROG and Scud missiles from the start of the war, putting additional pressure on Tehran to respond in kind.

Iran turned to several suppliers, and from these contacts a two-track missile procurement policy emerged.¹¹⁰ First, Scud-B missiles were acquired from Libya in 1985 and possibly from Syria in 1986. Together they furnished approximately 4 Scud launchers and 54 missiles. There are unconfirmed reports of Soviet deliveries of Scuds in 1986 as well. In 1987–88 Iran received at least

100 Scuds from North Korea. These Scuds were Iran's most potent weapon in the February–April 1988 'war of the cities'.¹¹¹

The second missile procurement track involved co-production with Chinese assistance. As part of a large arms deal in 1985, China agreed to help Iran manufacture a 40-km range artillery rocket similar to the Chinese Type-83 and called the Oghab (Eagle) by Iran. Iran claims that the missile is entirely indigenous and that it is built in large quantities. About 100–250 were fired at Iraq during the war of the cities. Iran is developing another missile, the 130-km range Iran-130, a guided system developed with Chinese help. Used in small quantities in 1988, it has reportedly not lived up to its expected performance, although the production rate may already exceed 20 per day.¹¹²

Iran is party to the NPT, and its nuclear programme is many years away from manufacturing weapon-grade fissile material.¹¹³ All the missiles fired at Iraq were conventionally armed, although chemical armament may be feasible.¹¹⁴ With no more than a few dozen operational aircraft, Iran's missiles assumed an important role in the fighting. Owing to their inaccuracy, they were used mainly against cities, but they had no visible impact on Iraqi willingness to fight.

Iraq

When it launched the war with Iran on 22 September 1980, Iraq already possessed a Soviet-supplied ballistic missile force, including about 30 FROG-7 missile launchers, 12–36 Scud-B launchers and at least three times as many missiles of both types.¹¹⁵ The 70-km range FROG missiles were used in the first years of the war against Iranian cities.¹¹⁶ In 1984 rumours circulated alleging that Iraq had received Soviet SS-12 Scaleboard missiles (900-km range).¹¹⁷ Moscow is destroying its own SS-12s under the terms of the INF Treaty and the existence of others in the hands of a Third World ally could have repercussions for the Treaty, but the allegations of Iraqi SS-12s have not been substantiated.¹¹⁸

Large quantities of Brazilian Astros-2 artillery rockets (40–68-km range) did join the Iraqi arsenal around 1984.¹¹⁹ In 1984–86 Iraq began receiving massive quantities of additional Scud missiles from the Soviet Union, at least 300 by the spring of 1988. Additional Scuds may have arrived from Egypt or North Korea.¹²⁰

By the end of 1985, Iraq had fired at least 100 Scud missiles into Iran.¹²¹ In 1985–87 the missile war abated while both sides built up their missile stocks. Iraq used the hiatus to develop two new ballistic missiles, generally believed to be modified Scuds. On 4 August 1987 Baghdad announced the test of a missile called the al-Husayen, probably a Scud-B with its warhead reduced from the original 1000 kg to 135–250 kg.¹²² This enables the missile to fly about 600 km, over twice its original range and sufficient to reach Tehran, about 530 km from the Iraqi border. About 190 of these missiles were fired during the 1988 war of the cities.¹²³ Iraq claims to have developed a second missile, the 900-km range al-Abbas. Test-fired on 25 April 1988, this appears to be constructed by adding fuel tanks cannibalized from another Scud.¹²⁴

In late 1988 Iraq announced that it had successfully tested an anti-tactical

ballistic missile (ATBM), the Faw-1. Given the great complexity of such technology—even the superpowers have yet to perfect it—this claim warrants grave scepticism, although it clearly indicates the direction of Iraqi security thinking. The system is ostensibly intended to counter possible *Israeli* missile attack.¹²⁵

While the Soviet Union admits supplying the Scud missiles to Iraq, it is not clear how Iraq acquired the technical wherewithal to modify them.¹²⁶ Lacking even a rudimentary aerospace industry, it cannot do the job itself. The most likely sources of technical assistance are the Soviet Union, the German Democratic Republic and Egypt.¹²⁷ All these countries are known to be furnishing either ballistic missiles, artillery rockets or technical assistance. Iraq appears to be investing in either or both the Argentine Condor II and the Brazilian SS-300 ballistic missiles. (See the above sections on Argentina and Brazil.) These countries could be assisting in Scud modification as well.

Iraq's nuclear programme has yet to recover from Israel's destruction of the Osiraq reactor complex in 1981.¹²⁸ Iraqi use of chemical weapons is much better known, but there is no evidence that Iraq has used chemically armed ballistic missiles.¹²⁹ All the missiles that hit Iran were conventionally armed.

With an air force of over 500 combat aircraft including 9 supersonic Tu-22 Blinder bombers, 80 Su-20 Fitter, 70 MiG-23BN Flogger and over 135 Mirage F-1 fighter-bombers, Iraq is not dependent on its ballistic missiles.¹³⁰ A division of labour emerged during the war. The missiles were used primarily against cities, while aircraft were mostly used against military and economic targets such as ships in the Persian Gulf. One exception was the Tu-22 bomber squadron which raided major cities until 1986, when it apparently was deterred by Iranian Hawk surface-to-air missiles furnished by the USA.¹³¹

Little is known about diplomatic reactions to Iraqi missile use. Iran denounced the Soviet Union for supplying Iraq with the Scud and found its own sources for missiles.¹³² The Soviet Union does not deny that it supplied the missiles, nor has it publicly criticized Iraqi modification of its Scuds into missiles of the kind that Moscow itself is destroying under the INF Treaty.

Israel

Israel has the most advanced ballistic missile force outside of the five major nuclear powers. While other nations such as Brazil, India and Japan devote considerable effort to civilian space launch programmes, Israel focuses mostly on military applications. Through a variety of procurement methods, Israel has acquired a diversified missile force including several types of tactical missile (not discussed here) and ballistic missiles ranging from the largest artillery rocket in service anywhere to IRBMs possibly able to reach Soviet territory.

Israeli rocket research started in the 1950s, leading to the first launch of a French-supplied sounding rocket in 1961.¹³³ A rocket race with Egypt in the 1960s resulted in the Jericho I, a ballistic missile with a range of 450–550 km, disclosed in 1968. Developed largely by Avions Marcel Dassault in France, it reportedly is a mobile, single-stage, solid-fuel system with strap-down inertial guidance. After the 1967 French arms embargo, production took place in

Israel. It was deployed by the beginning of the 1973 war and is widely believed to remain in service today.¹³⁴

After the 1973 war, Israel tried to buy US Pershing 1A missiles superior to the Jericho I in mobility, range and accuracy.¹³⁵ Washington refused and supplied about 160 short-range (120-km) Lance missiles instead.¹³⁶ Unable to purchase a missile that suited its military requirements, Israel developed a new missile of its own. Israeli documents released by the Islamic Government of Iran show that the project began by 1977 with financial support from the Shah.¹³⁷ The existence of the missile, known as the Jericho II, was disclosed in 1985.¹³⁸ In 1987 it was reported that the missile had been test-fired a distance of 820 km and that it would eventually fly 1450 km.¹³⁹ The Jericho II was reportedly operational in 1981, deployed aboard mobile launchers based in rock caves. Other reports claim that the missile uses an inertial guidance system and other components based on US technology acquired in circumvention of US export controls.¹⁴⁰ A version of this IRBM, called the Shavit, was used to lift Israel's first domestically launched satellite into orbit on 19 September 1988.¹⁴¹

Starting in the mid-1960s, Israel also developed a series of large artillery rockets. The largest and most recent is the MAR-350, a 75-km unguided rocket weighing 800 kg.¹⁴²

Ballistic missiles are believed to be Israel's principal nuclear delivery system.¹⁴³ With a large clandestine nuclear weapon programme since the 1960s, Israel may have 50–100 undeclared nuclear warheads.¹⁴⁴ The country almost certainly has the technical expertise to design nuclear warheads small enough for delivery on missiles such as the Jericho I and II. Several years of public discussion have also made Israeli decision-makers attentive to the dangers of chemical warfare, but little is known about Israel's own chemical weapon potential or whether its missiles can be so armed. Israel is one of the few countries that might be able to make its ballistic missiles sufficiently accurate to be militarily decisive with conventional warheads alone. This requires inertial and terminal guidance to reduce the CEP to below 20 metres.¹⁴⁵ Israel has mastered related guidance technologies in other programmes such as the cancelled Lavi fighter plane and the Popeye/Have Nap air-to-surface guided weapon being bought by the US Air Force.¹⁴⁶ Whether it has highly accurate conventionally armed Jericho missiles today is a matter for speculation.

Israel may rely on nuclear-armed missiles, but it has a wide choice of alternative weapons. Israel can deliver nuclear munitions with a renowned air force that includes about 300 F-15, F-4 and Kfir fighter-bombers. With eight aerial refuelling tankers and the largest electronic warfare fleet in the Third World, its ability to penetrate enemy airspace seems secure.¹⁴⁷ The raid on Osiraq (1000 km away) in 1981 and the overwhelmingly successful 1982 Beka'a Valley air battles against Syria support this view. But Israeli leaders remember their experiences in 1973, when unanticipated improvement in Arab air defences rendered air attack excessively costly,¹⁴⁸ a situation that could reoccur and force recourse to ballistic missiles. Ballistic missiles also serve as a compelling symbol of the nation's determination not to be defeated in war.

Another military alternative is an ATBM system. Israel is the only country besides Iraq, Japan, the Soviet Union and the USA known to be engaged in

full-scale ATBM research.¹⁴⁹ Under a Memorandum of Understanding signed in June 1988, the USA is funding 80 per cent of the R&D costs for Israel's Arrow ATBM project, or about \$128 million over 30 months.¹⁵⁰ ATBMs remain controversial, vigorously advocated by some as a promising response to the problem of missile proliferation. Others point to theoretical problems, high costs and inherent weaknesses in any defence against ballistic missiles.¹⁵¹ Israeli leaders, it should be noted, see the Arrow not as an alternative to Israel's ballistic missiles, but as a complementary system.¹⁵²

International reactions to Israel's ballistic missile programme vary from country to country. Israel is caught in a missile race with Syria and to a lesser extent with Egypt, Iraq and Libya. The Soviet Union strongly denounced Israel's Jericho II programme after the 1987 test shot, criticizing it as a threat to Baku and Soviet Black Sea military bases and threatening 'defensive and political steps' if the programme were continued.¹⁵³ There is no evidence of continued European participation in Israeli missile work. The USA displays ambivalence, refusing to aid any Third World ballistic missile activity and encouraging Israel to discuss regional arms control, but supporting Israeli R&D in related research in ATBMs and tactical missiles.¹⁵⁴

North Korea

In the early 1970s, North Korea received a large number of FROG missiles from the Soviet Union including some 39 launch vehicles. About 10 years later, Scud-B missiles and 12–24 launchers arrived, probably from the Soviet Union although one study argues that the source was Egypt.¹⁵⁵ A stock of over 100 Scud missiles was accumulated, either directly from the Soviet Union, through licensed co-production, or through reverse-engineering and subsequent production based on Scuds from Egypt.¹⁵⁶

The Scud programme appears to serve commercial interests. North Korea sold over 100 Scuds to Iran in 1987–88 and may have sold smaller quantities to Iraq as well.¹⁵⁴ There are reports that North Korea has extended the range of its Scuds and is helping Egypt to do the same. North Korea may be helping Egypt to manufacture the missiles as well.¹⁵⁸

Large quantities of Scud missiles are reserved for possible use on the Korean peninsula.¹⁵⁹ They help North Korea to offset the weaknesses of its air force. This is the world's fourth largest with 840 aircraft, but most are of 1950s design.¹⁶⁰ Against South Korean F-16 Falcon and F-4 Phantom fighters, AWACS and an extensive surface-to-air missile network, only North Korean Scud missiles are relatively invulnerable.

North Korea is an NPT signatory, at least several years away from nuclear weapon capability. There is a greater—but unconfirmed—possibility that its missiles could carry chemical warheads.¹⁶¹

Nothing could be learned about international reactions to the North Korean missile programme in the course of this research. The Soviet Union has not publicly criticized Pyongyang's Scud exports.

South Korea

There are two types of ballistic missile known to be deployed by South Korea. One is the US-supplied Honest John, first delivered in 1959 and built up to two battalions with seven launchers and about 36 missiles by 1978.¹⁶² In that year, South Korea test-fired a new ballistic missile based on modifications to its US-supplied Nike-Hercules surface-to-air missiles.¹⁶³ This system, with a range of 100–160 km, apparently was reverse-engineered for domestic production.¹⁶⁴

Concern about Nike-Hercules upgrading led the USA to seek assurances in the late 1970s that ballistic missiles were not being made. The assurances provided by Seoul were not unequivocal and Nike-Hercules development is believed to have continued.¹⁶⁵

Periodically there are reports of other projects involving ballistic missiles with ranges of 500 km or more, but these cannot be substantiated.¹⁶⁶ In 1987 South Korea announced its intention to launch satellites into orbit by 1996, presumably using a domestic space launcher that could provide a firm basis for a long-range ballistic missile.¹⁶⁷

An NPT signatory, South Korea is not known to be developing nuclear weapons. Nuclear warheads for its Honest Johns are stored in the country under US control.¹⁶⁸ For conventional weapon delivery, it has a potent air force with 450 combat aircraft of 1960s and 1970s vintage and a requirement for 120 advanced multi-role fighters.¹⁶⁹ In 1988, Pyongyang received Soviet MiG-29 interceptors and SA-5 Gammon surface-to-surface missiles, helping to show that the Korean military balance is flexible and that ballistic missiles may have a greater role to play for both sides.¹⁷⁰

Kuwait

Although it is known as a moderate, Western-oriented Arab nation, Kuwait occasionally turns to the Soviet Union for weapons unavailable from its traditional Western arms suppliers. In 1980 Kuwait received a number of FROG-7 missiles.¹⁷¹ These 70-km range missiles can reach major population centres in Iran and Iraq. Conventionally armed, the missiles lack much military effectiveness. For engaging military targets, Kuwait is more likely to rely on its 32 Mirage F-1 or recently ordered 42 F/A-18 Hornet multi-role fighters, which are equipped with a variety of air-to-surface missiles, rockets and bombs.¹⁷²

Libya

The \$12 billion worth of arms purchased by Libyan leader Muammar al-Qaddafi in the mid-1970s included the largest inventory of Soviet FROG-7 and Scud-B missiles in the Third World up to that time. This includes about 39 FROG launchers and 75 Scud launchers with at least three times as many missiles of both types.¹⁷³ Since then Libya has tried without success to buy other Soviet ballistic missiles—such as the 900-km range SS-12 Scaleboard and the accurate 120-km range SS-21 Scarab.¹⁷⁴ Simultaneously, Qaddafi tried to open new channels for missile procurement.

The most famous of these was also the most quixotic. A West German firm, Otrag, moved to Libya in 1979 to develop a 300- to 500-km range rocket ostensibly as a space launch vehicle. Outside observers noted that Libya had no plans for satellites and that the Otrag rockets were only usable in military roles. In 1981 the firm left the country under pressure from Bonn.¹⁷⁵ Otrag—or a corporate spin-off—returned to Libya again in the mid-1980s. In November 1987 flight-tests of a prototype rocket started again. The design remains crude, but it cannot be dismissed casually.¹⁷⁶

Libya is also trying to buy missiles from new suppliers. In January 1988, a Libyan Army mission toured Brazilian missile research centres. The delegation reportedly offered \$2 billion to the Brazilian firm Orbita to finance development of ballistic missiles in exchange for guaranteed Libyan access to the technology.¹⁷⁷ It is not clear if the offer was accepted or if Libya has the ability to pay. Libya has tried to buy Chinese missiles, including the DF-3 IRBM sold to Saudi Arabia and the M-series missile offered to Syria. North Korea may be selling Libya more Scuds.¹⁷⁸

Although it is an NPT signatory, Libya has allegedly tried to buy nuclear weapons.¹⁷⁹ Since 1987, there have been widespread reports of Libyan efforts to acquire chemical weapons.¹⁸⁰ In 1985 Libya supplied Scud missiles to Iran, possibly in exchange for chemical weapon technology.¹⁸¹

The Libyan Air Force expanded in the 1970s as swiftly as the Army's ballistic missile force. Although the Air Force was weakened by the Chadian fighting of 1986–87, it still fields about six supersonic Tu-22 Blinder bombers, over 100 Soviet-made multi-role fighters and 75 French Mirages.¹⁸² In Chad, Libya relied on its air force to the exclusion of its ballistic missiles, possibly for want of appropriate targets.¹⁸³ The USA alleges that a West German firm is helping Libya to acquire air-to-air refuelling capabilities which will greatly enhance the striking power of the Libyan Air Force.¹⁸⁴ Scud missiles were fired at the US Coast Guard station on the Italian island of Lampedusea, in retaliation for the US raid on Libya, on 15 April 1986.¹⁸⁵

The USA has lobbied for restraints on further sales of missile technology to Libya. US Deputy Secretary of State John Whitehead interceded to prevent missile co-operation with Brazil in 1988.¹⁸⁶ Secretary of Defense Frank Carlucci sought assurances during his visit to Beijing that China would not supply Libya with missiles.¹⁸⁷ Italian officials are also concerned that Lampedusea, 270 km off Libyan shores and potentially within Scud missile range, could be a target again or that Sicily could be threatened if Qaddafi acquired missiles of over 420-km range.¹⁸⁸ Crete, 280 km from Libya, has also expressed fear of attack.¹⁸⁹

Pakistan

On 25 April 1988 Pakistan announced that it had tested two types of ballistic missile.¹⁹⁰ The announcement came as a surprise to outside observers, some of whom questioned the accuracy of the claim. Pakistan has a limited technical base and no modern aerospace manufacturing, so any indigenous missile would have to consist almost entirely of foreign components assembled under foreign supervision. The characteristics of the two missiles closely resemble the

configuration, range and payload of the Soviet FROG-7 and Scud-B, which they may actually be. Yet Pakistan maintains they are of indigenous design.

Pakistan has a civilian rocket research programme that began experimenting with US-supplied sounding rockets in 1964.¹⁹¹ Between 1979 and 1981, Pakistan made contact with Otrag in Libya, but there is no evidence that any technology transfer resulted.¹⁹² In 1981, one year after India's first successful space launch, Pakistan upgraded its small Space and Upper Atmospheric Research Committee (SUPARCO) into an Autonomous Commission chaired by the late President Zia-ul-Haq. In 1985 Pakistan unveiled its own 10-year, \$100 million Space Launch Programme. This project appears to be receiving technical support from China, but has displayed no accomplishments to date.¹⁹³

As a possible nuclear weapon state—probably possessing nuclear weapons or ready to assemble components—any potential Pakistani nuclear delivery system must be considered very seriously.¹⁹⁴ In the near future aircraft will be the country's only proven long-range delivery option. Pakistan Air Force fighter-bombers such as its 40 F-16 Falcons and 70 Mirage-III/Vs have over twice the range and payload of the larger of the two missiles tested in 1988.¹⁹⁵ Should Indian air defences be significantly strengthened through the acquisition of AWACS, ground radars, long-range surface-to-air missiles and additional MiG-29 interceptors, Pakistan might compensate by acquiring foreign-made ballistic missiles, probably from China, its least inhibited supplier, or from a Muslim ally.

Indian commentators express concern about secret Pakistani missile plans, especially regarding the possibility that a Muslim ally could supply ballistic missiles which Pakistan could turn against India.¹⁹⁶ The USA has not singled out Pakistan's missile programme for diplomatic attention; rather it emphasizes restraints on Pakistani nuclear proliferation.¹⁹⁷

Saudi Arabia

It is indicative of the rapid spread of ballistic missiles that the international community knew nothing of Saudi Arabia's missile programme before the arrival of Chinese DF-3 (NATO designation CSS-2) IRBMs was disclosed on 18 March 1988.¹⁹⁸ Previously, Saudi Arabia's only surface-to-surface missiles were Brazilian Astros-2 artillery rockets.¹⁹⁹ Now it has the most powerful missiles to be found in the Third World.

The deal reportedly started with the US refusal to supply additional F-15 multi-role fighters in 1985.²⁰⁰ Saudi Arabia responded by purchasing Tornado fighters from Britain and initiated talks with China for long-range missiles. In 1986 a Saudi request to buy US Lance missiles was turned down. Soon thereafter a contract was signed with China for about 50–60 DF-3 missiles, support and launch facilities, training and assistance, for a total price reported to be \$1–3.25 billion.²⁰¹

The first shipment of DF-3s arrived in the winter of 1987–88. Although these were second-hand missiles, originally deployed by China in the early 1970s, their characteristics are in dispute.²⁰² They are probably installed in fixed, semi-hardened shelters that are vulnerable to attack. The range is estimated at

2200–3500 km. The lowest estimate is sufficient to reach potential targets in India, Iran, Israel or the Soviet Union. The payload is usually described as 2200 kg. Accuracy is estimated at a CEP of 2 km.²⁰³ Allegations that Israeli technicians improved the DF-3's performance appear to be erroneous; the Israelis in question worked for the North China Industries Corporation, a manufacturer of armoured vehicles and artillery, not for the national missile manufacturer, China Precision Industries.²⁰⁴

Saudi spokesmen insist that the missiles are exclusively to deter Iran.²⁰⁵ To allay the concerns of others within range of the DF-3s, several self-imposed restrictions have been announced. Saudi Arabia agreed to sign the NPT to reduce fears that the missiles might carry nuclear warheads. It has also promised that the missiles will not be armed with chemical weapons. The missiles are not to be retransferred to third countries. Moreover, they are said to be purely defensive, not for first use.²⁰⁶

As a conventional delivery system, the DF-3 complements Saudi Arabia's fleet of 60 multi-role F-15s and 132 Tornados fighter-bombers delivered or on order. This is the strongest long-range interdiction air force outside of NATO and the Soviet Union. Each aircraft has a payload greater than the DF-3 and a combat radius of over 1500 km. Their range can be extended by Saudi Arabia's fleet of KC-10, KC-130 and KC-135 aerial tankers. The aircraft are equipped to defeat all but the very newest and strongest air defences.²⁰⁷ While the aircraft are accurate enough to destroy military targets, the inaccuracy of the DF-3 dictates that it can only be effective against city-sized targets, unless armed with the nuclear weapons Saudi Arabia has forsworn.

The DF-3 sale initially provoked threats of pre-emptive attack from Israel. Fearing an incident similar to the 1981 Osiraq reactor raid, several Arab governments declared that they would regard such a raid as an attack on themselves. Washington cautioned Israeli leaders as well.²⁰⁸ Later, Israeli Defence Forces Chief of Staff, General Dan Shomron, derided the dangers posed by the Saudi missiles.²⁰⁹ News of the missile sale led to angry exchanges between Riyadh and Washington, culminating in the departure of the US Ambassador.²¹⁰ Saudi Arabia helped to defuse the situation by offering the restrictions previously noted. US diplomatic efforts have concentrated on convincing China to cease selling ballistic missiles.²¹¹ The Soviet Union, a potential target, has refrained from direct criticism. India, also within range, has voiced concern.²¹²

South Africa

Unique among nuclear threshold states, South Africa has no known ballistic missile programme. Unconfirmed reports of a long-range South African missile probably refer to a cruise missile project, since the missile is said to be powered by a gas turbine (jet) engine.²¹³

A recent study maintains that South Africa has 10–20 nuclear weapons.²¹⁴ Manned aircraft are the most likely means of delivery for the foreseeable future. Rumours that Israel is supplying Jericho II missiles cannot be substantiated.²¹⁵ Gabriel ship-to-ship missiles supplied by Israel (called

Skerpioen in South Africa) are too small to carry an early-model nuclear weapon.²¹⁶

Syria

Syria has been a leading importer of Soviet-made ballistic missiles since 1973, when its first 70-km range FROG-7s arrived.²¹⁷ About 24 were fired at Israeli cities and military installations during the 1973 war.²¹⁸ More powerful Scud-B missiles arrived after the war. Additional FROGs and possibly more Scuds were delivered in 1980–81. In 1983, one year after its air force was crushed by Israel over the Beka'a Valley, Syria became the first foreign recipient of the Soviet SS-21 Scarab, a more accurate replacement for the FROG with a range of 120 km.²¹⁹

In 1986–87 Damascus tried to buy the Soviet SS-23, a 500-km range missile, but Moscow refused.²²⁰ The refusal may have reflected Gorbachev's fear of compromising the INF Treaty, which obligates the Soviet Union to destroy its SS-23s. A general decline in Soviet arms shipments to Syria also seems to have been a factor. Instead, Syria was promised additional SS-21s and new aircraft in 1988.²²¹

Syria has tried to cultivate other sources for ballistic missiles. In 1981 the Israeli newspaper *Ma'ariv* printed purported Syrian contracts with Otrag in Libya for the supply of missiles with ranges of 500–2000 km.²²² Shortly thereafter Otrag was forced to leave the Middle East. Syria lacks a significant arms industry and must import all its missiles, but it possibly exported missiles in 1986 when it reportedly supplied a few dozen Scud missiles to Iran.²²³ In June 1988 it was reported that Damascus was negotiating with China for M-9 missiles with an estimated range of up to 600 km. Although the M-series is not fully developed, the deal was directly criticized by US Secretary of State Shultz.²²⁴ In response the Syrian Government defended its prerogative to buy the weapon. When US Secretary of Defense Carlucci met with Chinese leaders in September, he was assured privately that the missiles would not be sold to any Middle Eastern nation.²²⁵

Syria is not a leading nuclear proliferation prospect. There is growing concern, however, that its SS-21 missiles may be chemically armed.²²⁶ Syria is suspected of producing chemical weapons, possibly to deter the presumed Israeli nuclear arsenal. This visit in spring 1988 of the Commander of Soviet Chemical Troops, Col. Gen. Vladimir Pikalov, raised concern that Syria was developing a special chemical warhead for its SS-21s.²²⁷ The SS-21 is unusually suitable for such delivery. Guided by an advanced strap-down inertial navigation system, its CEP is estimated at 100–300 metres, compared with 1000 metres for the FROG-7 or Scud-B.²²⁸ Armed with a nerve agent like Tabun, the small SS-21 force could effectively suppress activity at Israeli air bases and other military facilities, temporarily causing serious weaknesses in Israeli defences which could be exploited in carefully timed manifold attacks.

Syria has a large air force with much greater range, payload and versatility than its ballistic missiles, but after the 1982 air battles in which Israel destroyed 82 Syrian fighters without a single loss, Syrian confidence in its air arm cannot

be high. New defences with Soviet-manned SA-5 Gammon surface-to-surface missiles and MiG-29 interceptors may improve Syrian control of its own airspace,²²⁹ but its ability to project power into Israel remains low. Missiles such as the SS-21 fill an important gap in Syrian military capabilities. The arrival of Su-24 Fencer interdiction bombers may ease this imbalance somewhat.

The threat of chemically armed SS-21s raises great concern in Israel. While Syria denies that it has chemical weapons, Israel has modernized its passive defences such as protective and decontamination equipment.²³⁰ It has also indicated that if relations with Damascus deteriorate, a pre-emptive attack on suspected chemical weapons production and storage sites cannot be ruled out. Fear of chemical-armed missiles also helped to justify Israel's Arrow ATBM project.²³¹

Taiwan

Like other close US allies of the time, Taiwan received Honest John missiles in 1961.²³² A domestic missile programme did not begin to show results until the mid-1970s, coinciding with changing US relations. Since then Taiwan has developed several tactical missiles, but the status of its ballistic missile research is more obscure.

In 1976 a Taiwanese programme to train missile engineers at the Massachusetts Institute of Technology in the USA was discovered by the US Government and cancelled.²³³ Soon thereafter evidence of indigenous Taiwanese ballistic missiles began to appear. In the late 1970s a ballistic missile called the Ching Feng (Green Bee) was displayed in Taipei. Closely resembling the 120-km range US Lance, it is commonly described as a copy based on assistance from Israel, a recipient of the Lance. The project appears to have been completed by the early 1980s.²³⁴ Other reports from the late 1970s describe a 1000-km range missile project at the Defence Ministry's Chungshan Institute of Science and Technology. Little is known about the project, which appears to have ended by the early 1980s without leading to deployment.²³⁵

Taiwan is an NPT signatory and it lacks facilities to extract weapon-grade nuclear material. A secret laboratory for plutonium separation was dismantled in 1988 under US pressure.²³⁶ But a large nuclear research programme continues.²³⁷

Conventionally armed long-range missiles could extend the striking power of the Taiwanese Air Force, which consists mostly of F-104 Starfighters and F-5 Freedom Fighters with limited range and payload. Instead of emphasizing ballistic missiles, Taiwan is developing an Indigenous Defense Fighter (IDF), a \$5 billion project with General Dynamics intended to lead to local production of an aircraft superior to the F-16 Falcon. Expected to fly in 1989, the IDF could reduce the need for alternatives such as ballistic missiles.²³⁸

Turkey

In 1960 Turkey received two battalions of Honest John missiles (37-km range) from the USA. When US forces in Turkey decommissioned their own Honest

Johns in 1978, they were passed on to the Turkish Army, giving it a total of four battalions with 18 launchers. Turkey has no indigenously developed missiles.²³⁹ It plans to co-produce the US MLRS artillery rocket with a range of 40 km.²⁴⁰ Its air force also has about 124 Nike-Hercules surface-to-air missiles which could be modified for surface-to-surface roles as South Korea has done.²⁴¹

Turkey is an NPT signatory with no known programme to produce weapon-grade fissionable material. Nuclear warheads for its Honest Johns are stored under US control.²⁴² For long-range attack, the Turkish Air Force has about 190 F-104 Starfighters, 130 F-4 Phantoms and some 200 other attack aircraft.²⁴³

North Yemen

Unconfirmed reports indicate that North Yemen received its first ballistic missiles—Soviet SS-21 Scarabs—in 1988.²⁴⁴ Its air force consists mostly of short-range interceptors except for a single squadron of Su-22 Fitter attack fighters.²⁴⁵ A force of about one dozen conventionally armed SS-21s would represent a substantial increase in accurate firepower. There is nothing to suggest that the missiles could be armed with anything but conventional explosives.

South Yemen

Following its 1979 border war with North Yemen, South Yemen received large quantities of Soviet arms, including FROG-7 missiles (about 12 launchers) and Scud-Bs (about 6 launchers).²⁴⁶ In 1988 it was reported that SS-21 Scarab missiles were delivered as well (about 4 launchers).²⁴⁷ The Scud missiles can reach North Yemen's capital city, Sana'a. Compared with an air force inventory including 30 Su-20 Fitter and 25 MiG-23BN Flogger attack fighters and eight ageing Il-28 Beagle bombers, the missile force appears to be largely symbolic.²⁴⁸ In view of the extreme weaknesses of North Yemen's air defences, however, South Yemen's attack fighters probably can deliver any available munition just as efficiently.

IV. Conclusion

In 1988 a series of events focused world attention on Third World missile proliferation. Several countries acquired ballistic missiles for the first time. Others announced the launch of long-range missiles of their own. Still others proved that their missile capabilities were stronger than previously thought. Ballistic missiles were used in two wars in 1988, including some 500 fired by Iran and Iraq. International diplomacy accelerated as governments in East and West grappled with the problem.

At least 22 developing countries have active ballistic missile programmes. They have either acquired or are trying to acquire ballistic missiles or civilian rockets that can be used as ballistic missiles. In one case—North Yemen—the existence of a ballistic missile programme is especially difficult to judge.

Another nation sometimes listed as a proliferating country—South Africa—does not appear to have a ballistic missile programme today. Rather, South Africa belongs to the ranks of those countries that could initiate such a programme in the near future. Others not examined here include Chile and Thailand, where there are growing aerospace industries, and Mexico, Peru and the Philippines, where experiments with sub-orbital sounding rockets were conducted in the past.²⁴⁹ Still other countries may try to buy ballistic missiles in the near future, gaining the technology overnight.

The most reliable source of ballistic missiles for most developing countries is a foreign supplier. Of the 17 Third World countries that have *deployed* ballistic missiles as of this writing (January 1989), all but four rely exclusively on imported missiles. The exceptions are Iran, Israel, South Korea and Taiwan, where missiles are procured by varying degrees of domestic production. While this might suggest that the significance of domestic missile programmes has been exaggerated, it has not discouraged the many other Third World nations at work on domestic ballistic missile programmes.

All missile proliferation relies on foreign technology whether for whole missile systems, for components and manufacturing processes, for technical know-how or merely for inspiration. This reliance makes such export restrictions as the MTCR potent instruments for influencing Third World programmes. However, reliance is not the same as complete dependence; while the MTCR and similar technology transfer restrictions appear to be slowing many Third World missile and space launch programmes, there is no evidence that any country has abandoned its missile programmes due to foreign pressure. Countries with missile programmes are trying to circumvent export restrictions by turning to more accommodating suppliers, especially China and the Soviet Union, by pooling missile technology among themselves, and by starting new domestic programmes.

Armament remains a vital question in evaluating the significance of any country's missile force. Ballistic missiles are widely feared as probable nuclear weapon delivery vehicles, but only in the case of Israel and possibly India and Pakistan does it appear that nuclear warheads are available for missile delivery. In other countries the combination of ballistic missiles and nuclear warheads is years away because one or both of the two technologies is not yet fully developed. Chemical armaments are receiving new scrutiny, especially in the Middle East and the Korean peninsula. All ballistic missiles fired in hostilities, however, have been conventionally armed.

While ballistic missiles are becoming increasingly common, they do not dominate the arsenal of any Third World country. Most of these countries will continue to rely more on artillery and aircraft for long-range attack. In many cases, technical improvements such as aerial refuelling will shift the balance even more in favour of manned aircraft. For a few countries such as North Korea and Syria, ballistic missiles could become the preferred instruments of long-range attack due to their special ability to penetrate enemy air defences. In the case of countries like North Yemen with exiguous fighter-bomber forces, ballistic missiles could serve as an important adjunct.

International responses to missile proliferation betray no clear sense of

direction. Some nations try to restrict transfers of missile technology. Other governments license missile exports with seeming abandon. Even some restrictive governments overlook missile programmes involving major firms or important regional clients. These inconsistencies reflect a fundamental uncertainty about the risks to international security and the prospects for negotiated solutions, problems compounded by the difficulties of definition. Until there is an international consensus on the dangers of missile proliferation and the best way to cope, the outlook for international control is poor indeed. 1988 may have been the year in which the world became aware of missile proliferation, but it has only just begun to address it.

Notes and references

¹ *Joint Statement on the Moscow Summit*, 29 May–2 June, 1988, p. 7; Gordon, M. R., 'U.S. and Soviets discuss curbing missile exports', *New York Times*, 27 Sep. 1988, p. 1.

² Southerland, D., 'China assures Carlucci on Mideast arms sales', *Washington Post*, 8 Sep. 1988, p. 31.

³ Thomas, C., 'UK joins bid to halt flight of Argentina's Condor', *The Guardian*, 20 Sep. 1988, p. 8.

⁴ Because of the nature of the information, as many references as possible have been given in the notes.

⁵ The United States supplied Honest John and Lance ballistic missiles to several NATO allies and Pershing 1A missiles to FR Germany. The Soviet Union armed China (before 1960) and its East European allies with FROG and Scud ballistic missiles. Czechoslovakia and the GDR also own SS-21 ballistic missiles. Moreover, both superpowers have large numbers of ballistic missiles under their direct control stationed on the territory of their European allies. See International Institute for Strategic Studies (IISS), *The Military Balance 1988–89* (IISS: London, 1988); and Blake, B., *Jane's Weapon Systems 1988–89* (Jane's Information Group: London, 1988). On sales of space launch vehicles to Australia and Japan, see Smith, M. S. and Sheldon II, C. S., *Space Launch Activities of the United States, Soviet Union and Other Launching Countries/Organizations: 1957–1982*, Report 83–124 SPR (Congressional Research Service: Washington, DC, 15 Mar. 1983).

⁶ *Interim Agreement Between the USA and the USSR on Certain Measures with Respect to the Limitation of Strategic Offensive Arms* (SALT I), Agreed Interpretation 1, section A, paragraph (a). The Agreement was signed in Moscow on 26 May 1972, and entered into force on 3 Oct. 1972.

⁷ *Treaty Between the USA and the USSR on the Limitation of Strategic Offensive Arms* (SALT II), article II, para. 8. The Treaty was signed in Vienna on 18 June 1979, but it never entered into force.

⁸ *Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Elimination of Their Intermediate-Range and Shorter-Range Missiles* (INF Treaty). The Treaty was signed in Washington on 8 Dec. 1987 and entered into force on 1 June 1988.

⁹ 'Ballistic missiles . . . Any missile which does not rely on aerodynamic surfaces to produce lift and consequently follows a ballistic trajectory when thrust is terminated'. Joint Chiefs of Staff, *Dictionary of Military and Associated Terms*, JCS Pub. 1 (US Government Printing Office, Washington, DC, 3 Sep. 1974), p. 44.

¹⁰ Statement by the Assistant to the President for Press Relations (The White House: Santa Barbara, Calif., 16 Apr. 1987), p. 1; and the supplementary document 'Missile technology control regime: fact sheet to accompany public announcement', p. 3.

¹¹ *The Oxford English Dictionary: Supplement*, vol. 1 (Oxford University Press: Oxford, 1972), p. 191, 'Ballistic missile, rocket, a guided missile or rocket in which the guidance is effective only during the phase of propulsion; one that is powered only when ascending and then falls freely'. This definition, based on a description of 1950s vintage ICBMs, excludes unguided missiles, missiles with multiple independently guided re-entry vehicles, manoeuvring re-entry vehicles and terminally guided missiles, suggesting that guidance technology is not a definitive characteristic of a ballistic missile.

¹² This is the von Kármán Line, an approximate jurisdictional boundary defining outer space to begin where aerodynamic lift is theoretically ineffectual and Keplerian centrifugal forces are dominant. In practice there is no sharp distinction; only experimental aircraft can fly above 40 km

(25 miles or 100 000 ft) while traces of the earth's atmosphere extend to 960 km (600 miles). For a useful discussion of the issues, see Haley, A. G., *Space Law and Government* (Appleton-Century-Crofts: New York, 1963), ch. 4.

¹³ van Gool, H., van Houwelingen, D. and Schoten, E., *Assessing ATBM* (University of Twente, Center for the Study of Science and Society 'De Boerderij': Enschede, Netherlands, 1987), pp. 14, 204-7.

¹⁴ The Honest John is described in Cochran, T. B., Arkin, W. M. and Hoenig, M. H., *Nuclear Weapons Databook, Vol. I: U.S. Nuclear Forces and Capabilities* (Ballinger: Cambridge, Mass., 1984), pp. 282-83. The largest artillery rockets in service are the Brazilian 68-km Astros-2, Egypt's 80-km Sakr-80 and Israel's 75-km MAR-350. They are described in *Jane's Weapon Systems 1988-89* (note 5).

¹⁵ The author has developed these four acquisition methods more thoroughly in 'Ballistic missiles in the Third World', *International Security*, winter 1984/85, pp. 168-95.

¹⁶ Steinberg, G. M., 'Two missiles in every garage', *Bulletin of the Atomic Scientists*, Oct. 1983, pp. 43-48.

¹⁷ Hollinger, F. J., 'The missile technology control regime: a major new arms control achievement', *World Military Expenditures and Arms Transfers 1987* (US Arms Control and Disarmament Agency: Washington, DC, 1988), pp. 25-27; and von Welck, S. F., 'The export of space technology', *Space Policy*, Aug. 1987, pp. 221-23.

¹⁸ The first US nuclear weapons, by comparison, weighed about 4500 kg each; see Cochran, Arkin and Hoenig (note 14), pp. 31-32.

¹⁹ Morel, B. and Postal, T. A., 'Non-nuclear Soviet tactical ballistic missiles: a threat to NATO?', in Altmann, J. et al. (eds), *Anti-Tactical Missile Defenses and West European Security*, Report no. 4/1987 (Hessische-Stiftung Friedens- und Konfliktforschung: Frankfurt, 1987).

²⁰ Alberts, D. J., *Deterrence in the 1980s: Part II: The Role of Conventional Air Power*, Adelphi Paper no. 193 (International Institute for Strategic Studies: London, 1984) argues that manned aircraft will continue to dominate the battlefield. An opposite case is made by Canby, S. L., *The Alliance and Europe: Part IV: Military Doctrine and Technology*, Adelphi Paper no. 109 (International Institute for Strategic Studies: London, 1975).

²¹ Soviet Defence Minister Dmitry Yazon on Radio Moscow, quoted in *Current News*, 17 Nov. 1988, p. 9.

²² 'More distance from the client', *Times Magazine*, 28 Nov. 1988, p. 22.

²³ See the sections of this chapter on these countries.

²⁴ For various estimates of the CEP of the Soviet Scud-B, see Wright, B., *World Weapons Database: Vol. I: Soviet Missiles*, Institute for Defense and Disarmament Studies (Lexington Books: Brookline and Lexington, Mass., 1986), pp. 376-81.

²⁵ 'Key sections of accords on Afghanistan as signed in Geneva', *New York Times*, 15 Apr. 1988, p. 12, especially the Bilateral Agreement Between Afghanistan and Pakistan on the Principles of Mutual Relations, Article II, paras. 7-12; and 'State vs. the Scuds', *Wall Street Journal*, 9 Nov. 1988, p. 22.

²⁶ Soviet First Deputy Foreign Minister and Ambassador to Afghanistan Yuli Vorontsov, quoted in 'Losses: Soviets give toll', *International Herald Tribune*, 26 May 1988, p. 2.

²⁷ 'Scud fired into Pakistan', AFP report carried in *Current News*, 17 Nov. 1988, p. 9.

²⁸ SIPRI Arms Trade Registers.

²⁹ *The Military Balance 1988-89* (note 5); and SIPRI Arms Trade Registers.

³⁰ *International Air Forces and Military Aircraft Directory* (Aviation Advisory Services: Romsford, UK, Feb. 1987), pp. 5-6.

³¹ Taylor, J. W. R., *Jane's All the World's Aircraft, 1972-73* (Sampson Low, Marston: London, 1972), p. 604.

³² 'Falklands in range of new missile?', *International Combat Arms*, July 1985, p. 95; 'Brazil joins the rocket business', *Flight International*, 6 Aug. 1983, p. 383.

³³ 'Argentina develops Condor solid-propellant rocket', *Aviation Week & Space Technology*, 17 June 1985, p. 61; 'Flight of the Condor', *International Defense Review*, no. 8 (Aug. 1985), p. 1357.

³⁴ 'Argentina to sell MEKO 140 frigates', *Jane's Defence Weekly*, 17 Oct. 1987, p. 875.

³⁵ The first published report was Walker, T., 'Argentina, Egypt in long-range missile project', *Financial Times*, 21 Dec. 1987, p. 1; see also 'The missile trade in launch mode', *US News and World Report*, 25 July 1988, pp. 32-38; 'Argentina', *Milavnews*, Oct. 1988.

³⁶ Oberdorfer, D., 'US seeks to curb Argentine missile project', *Washington Post*, 19 Sep. 1988, p. 6.

³⁷ An illuminating survey of the confused reporting is 'Condor II rocket headlines again: Mid-East link highlighted; confusion on actual size', *Latin American Weekly Report*, 6 Oct. 1988, p. 2.

³⁸ Fitchett, J., 'Italian and German firms accused over sales of rocket technology', *International Herald Tribune*, 24–25 Sep. 1988, p. 2, based on a book by Friedman, A., *Agnelli and the Network of Italian Power* (1988); and Shelidan, M., 'Fiat denies missile aid to Egypt and Argentina', *The Independent*, 24 Sep. 1988, p. 26.

³⁹ Barth, K. G. and Lambrecht, R., 'Geheim-Project Condor', *Der Stern*, no. 35 (25 Apr. 1988), pp. 188–90. The MTCR went to effect in 1985—almost two years before it was announced—as participating governments began to co-ordinate export policies. See 'Industrial powers announce restrictions on missile exports', *Defense and Foreign Affairs Daily*, 17 Apr. 1987, p. 1.

⁴⁰ This ablative material is used to protect the warheads of long-range missiles that must re-enter the atmosphere, like the Condor II. The Argentine Government denies any connection to the Egyptian programme; 'Argentine denies missile development', *Jane's Defence Weekly*, 30 July 1988, p. 154. See also Almond, P., 'Argentine aide resists plea to stop missile project', *Washington Times*, 13 Oct. 1988, p. 8.

⁴¹ Branson, L., 'Argentina in missiles deal', *Sunday Times*, 22 May 1988, p. 19. The story is denied by the Argentine Government in 'Argentina/Chinese missiles', *Current News*, 24 May 1988, p. 14.

⁴² See *Latin American Weekly Report* (note 37).

⁴³ Spector, L. S., *The Undeclared Bomb* (Ballinger: Cambridge, Mass., 1988).

⁴⁴ Porth, J., 'Argentina', ed. J. E. Katz, *Arms Production in Developing Countries* (Lexington Books: Lexington, Mass., 1984).

⁴⁵ 'Argentine/Egypt/Iraq arms', *Current News*, 20 July 1988, p. 3, quoting a Reuters dispatch; 'Argentina/Iran', *Current News*, 7 Oct. 1988, p. 13, summarizing a report from the Italian newspaper *Corriere della Sera*.

⁴⁶ Argentina has debated the possibility of building a nuclear-powered submarine, possibly to be armed with a long-range delivery system. In the summer of 1988, President Raúl Alfonsín vetoed additional spending on the project for financial reasons. According to one report \$280 million already has been spent on nuclear propulsion for submarines. The same source quotes reports that the MQ-2 has a range of 500 km. 'Argentina', *Milavnews*, no. 323 (Sep. 1988).

⁴⁷ SIPRI Arms Trade Registers; and *International Air Forces* (note 30), pp. 9–16.

⁴⁸ Thomas (note 3).

⁴⁹ Shuey, R. et al., *Missile Proliferation: A Survey of Emerging Forces*, Report no. 88–642F (Congressional Research Service: Washington, DC, 3 Oct. 1988), p. 86.

⁵⁰ Almond (note 40).

⁵¹ 'Latin America: centralizing Brazil's missile production', *Defense and Foreign Affairs Weekly*, 16 June 1986; and *Defense and Foreign Affairs Daily*, 11 June 1986.

⁵² 'Brazil plans to launch its own satellites in 1990s', *Aviation Week & Space Technology*, 9 July 1984, p. 60; 'Brazil's space age begins', *Interavia*, no. 12 (Dec. 1984).

⁵³ Calton, A., 'Brazil's growing missile industry', *Jane's Defence Weekly*, 5 Mar. 1988, p. 401.

⁵⁴ Condom, P., 'Brazil aims for self-sufficiency in space', *Interavia*, no. 1 (Jan. 1984), pp. 99–101; 'Successful third launch for Brazil's Sonda IV', *Defense and Foreign Affairs Daily*, 21 Oct. 1987.

⁵⁵ Campbell, D., 'Germany helps Brazil to nuclear supremacy', *New Statesman*, 5 Aug. 1983, p. 4.

⁵⁶ 'China/Brazil space talks', *Aerospace Daily*, 10 Aug. 1987, p. 219; 'CTA Director discusses space accord with PRC', *Tecnologia & Defesa* (São Paulo), no. 22 (1985), pp. 21–24.

⁵⁷ 'Avibras emerges as major exporter for Brazilian aerospace industry', *Aviation Week & Space Technology*, 17 Aug. 1987.

⁵⁸ 'Prototype of Brazilian launch vehicle fails', *Defense Daily*, 8 Jan. 1986, p. 37; 'Brazil: aiming for self-sufficiency in orbit', *Space World*, Oct. 1985, p. 29; 'Brazil', *Milavnews*, Mar. 1987.

⁵⁹ Foss, C. F., 'New family of Brazilian missiles in production', *Jane's Defence Weekly*, 17 Jan. 1987, p. 53; and Foss, C. F., 'Brazil set to enter missile market', *Jane's Defence Weekly*, 7 Feb. 1987.

⁶⁰ See the Libyan section of this chapter.

⁶¹ House, R., 'Brazil pursues dream in space', *Washington Post*, 13 Dec. 1984, p. F1; and Condom (note 54).

⁶² 'Brazil's space program remains dynamic despite fiscal woes', *Aviation Week & Space Technology*, 24 Aug. 1987, pp. 75–79.

⁶³ Conversations with US Government officials, 17 June 1988.

⁶⁴ Kepp, M., 'Brazil on verge of the atomic bomb; next step in the hands of the military', *Baltimore Sun*, 21 Oct. 1987, p. 2.

⁶⁵ Spector (note 43), p. 262.

⁶⁶ Brazil's permissive arms export regulations are discussed in Graham, B., 'Brazil arms industry competes worldwide', *Washington Post*, 2 Nov. 1986.

⁶⁷ The Barracuda is an anti-ship, coastal defence missile designed to carry a 170-kg payload to a range of 70 km. Godoy, R., quoted in Shuey (note 49), p. 94.

⁶⁸ 'Brazil's SSN: more details', *Jane's Defence Weekly*, 30 Apr. 1988, p. 837.

⁶⁹ SIPRI Arms Trade Registers.

⁷⁰ SIPRI Arms Trade Registers. Steven Zaloga has called attention to the potential significance of coastal defence missiles for ground attack in 'Before INF Treaty is signed, US must consider the forgotten missiles', *Armed Forces Journal*, May 1988, pp. 36–38.

⁷¹ See annexe A, 'Major multilateral arms control agreements', in this *Yearbook*.

⁷² Note 30, pp. 61–62.

⁷³ Frank, L. A., 'Nasser's missile program', *Orbis*, fall 1967.

⁷⁴ SIPRI Arms Trade Registers; Note 30, pp. 73–76A; Carus, W. S., *Missiles in the Middle East: A New Threat to Stability*, Research Memorandum no. 6 (The Washington Institute for Near East Policy: Washington, DC, June 1988); Zaloga, S., 'Ballistic missiles in the Third World: Scud and beyond', *International Defense Review*, no. 11 (Nov. 1988), pp. 1423–27.

⁷⁵ *Jane's Weapon Systems 1988–89* (note 5); SIPRI Arms Trade Registers.

⁷⁶ 'France, Egypt sign joint venture on missiles', *Mednews*, 21 Mar. 1988, p. 2; 'More details of the Egyptian Sakr 80 rocket system', *Jane's Defence Weekly*, 12 Mar. 1988, pp. 462–63; Turbé, G., 'Egyptian rockets and the French connection', *International Defense Review*, no. 2 (Feb. 1988), p. 202.

⁷⁷ 'Egypt', *Milavnews*, no. 322 (Aug. 1988).

⁷⁸ Walker (note 35).

⁷⁹ 'Argentina denies missile development', *Jane's Defence Weekly*, 30 July 1988, p. 154.

⁸⁰ Marcus, R. and Ottaway, D. B., 'Egyptian officer tied to smuggling effort', *Washington Post*, 25 June 1988, p. 1; O'Lone, R. G., 'Four charged in bid to ship missile material to Egypt', *Aviation Week & Space Technology*, 4 July 1988, p. 22.

⁸¹ Lait, M., 'Egyptian aide implicated in spy case', *Washington Post*, 1 Nov. 1988, p. 22; Stevenson, R. W., 'Egyptian official is accused of role in smuggling', *New York Times*, 25 Oct. 1988, p. 25.

⁸² Kats, G. H., 'Egypt', ed. J. Goldblat, SIPRI, *Non-Proliferation: The Why and the Wherefore* (Taylor & Francis: London, 1985), ch. 11.

⁸³ SIPRI, *The Problem of Chemical and Biological Warfare: Vol. 1: The Rise of CB Weapons*, SIPRI (Almqvist & Wiksell: Stockholm, Sweden, 1971), pp. 159–61.

⁸⁴ Turbé (note 76).

⁸⁵ Note 30, pp. 73–76A.

⁸⁶ In the process of researching this chapter, the author encountered no explicit Israeli criticism of Egyptian missile progress, while the Syrian ballistic missile force is widely debated and labelled as a major threat to Israeli security. The latter debate is summarized by Cushman, Jr., J. H., 'New arms, new fear in Mideast', *New York Times*, 25 May 1986, p. 3.

⁸⁷ Gordon, M. R., 'US seeking to limit missiles in Mideast', *International Herald Tribune*, 28 Dec. 1988, p. 3.

⁸⁸ Almond (note 40).

⁸⁹ Note 30, pp. 125–128A.

⁹⁰ This option is described in the South Korean section of this chapter.

⁹¹ *The Military Balance 1988–89* (note 5).

⁹² Ghosh, S. K., 'India's space program and its military implications', *Asian Defence Journal*, Sep. 1981; 'India reported to develop missile capability', *Patriot* (New Delhi), 13 Dec. 1980, p. 1; Subramanian, R. R., 'SLV-3 a giant step into the missile age', *The Hindu* (Madras), 15 Aug. 1980, p. 18.

⁹³ In 1979, Dhawan himself declared, perhaps optimistically, that the SLV-3 can be converted to an IRBM with a range of 1500 km. Subramanian (note 92).

⁹⁴ Weintraub, R., 'Heavy Indian rocket fails test', *International Herald Tribune*, 25 Mar. 1987, p. 1; Weisman, S. R., 'Launching of a satellite rocket fails in India', *New York Times*, 14 July 1988, p. 5.

⁹⁵ von Welck, S. F., 'India's space policy', *Space Policy*, Nov. 1987, pp. 326–34; 'India faces rising pressure for arms race with Pakistan', *Christian Science Monitor*, 9 Mar. 1987, p. 1.

⁹⁶ Wilson, A., 'Non-US launcher systems for the next decade', *Interavia*, no. 7 (July 1988), p. 687.

⁹⁷ Eisenstein, M., 'Third World missiles and nuclear proliferation', *Washington Quarterly*, summer 1982, pp. 112–15.

⁹⁸ Eisenstein (note 97); 'Satellite launcher directory', *Flight International*, 11 Jan. 1986, p. 32.

⁹⁹ The ISRO is trying to do more of its own specialty metal fabrication. 'ISRO received PSLV casing', *Interavia Air Letter*, no. 11364 (30 Oct. 1987), p. 5.

¹⁰⁰ The Soviet Union prefers to offer subsidized use of its own space launch vehicles. See Bhatia, A., 'India's space program: cause for concern?', *Asian Survey*, Oct. 1985, p. 1017.

¹⁰¹ See the statement by Rao, U. R., current head of the ISRO, in *Space Business News*, 1 June 1987, p. 1.

¹⁰² Joshi, M., 'The missile edge', *Frontline* (New Delhi), 2–15 Apr. 1988, pp. 35–39; 'Surface-to-surface missile test-fired', *The Hindu* (Madras), 26 Feb. 1988.

¹⁰³ 'Indigenous missile', *Asian Defense Journal*, Sept. 1985; 'Missiles and rockets', *International Defense Review*, Apr. 1986, p. 440; 'India will go ahead with test range', *Jane's Defence Weekly*, 15 Oct. 1988, p. 933.

¹⁰⁴ Spector (note 43); Weisman, S. R., 'India's nuclear energy policy raises new doubts on arms', *New York Times*, 7 May 1988, p. 1.

¹⁰⁵ Note 30, pp. 136–42; *The Military Balance 1988–89* (note 5); SIPRI Arms Trade Registers.

¹⁰⁶ See Anthony, I., chapter 6 in this *Yearbook*.

¹⁰⁷ Discussions with US Government officials, winter 1980–81.

¹⁰⁸ 'Indonesian rocket', *Defense and Foreign Affairs Weekly*, 14–20 Dec. 1987; 'Indonesia advances toward space race', *Washington Times*, 31 Mar. 1988, p. 2.

¹⁰⁹ The swift erosion of the Iranian Air Force is described by Cordesman, A. H., *The Iran–Iraq War and Western Security, 1980–87* (Jane's Publishing Co.: London, 1987), pp. 114–16.

¹¹⁰ This and the following paragraph rely principally on Carus, W. S. and Bermudez, J. S., 'Iran's growing missile forces', *Jane's Defence Weekly*, 23 July 1988, pp. 126–31.

¹¹¹ 'Iran buys more SS-1s', *Flight International*, 25 Apr. 1987, p. 13, reports that the Soviet Union supplied 200 Scud-B missiles to Iran. Carus and Bermudez, in their study (see note 110), argue that this report was unfounded and that no Scuds went directly from the USSR to Iran.

¹¹² Carus and Bermudez (note 110). For an account of the number of missiles fired see Stützel, W., '1987—the turning-point?', SIPRI, *SIPRI Yearbook 1988: World Armaments and Disarmament* (Oxford University Press: Oxford, 1988), p. 1; and note 3, p. 15.

¹¹³ There have been several reports that Iran is working with engineers from Argentina, FR Germany and Spain to restart its moribund nuclear energy programme. Maurus, V., 'Outside help boosts Iran's nuclear ambitions', *The Guardian*, 25 Oct. 1988, p. 11.

¹¹⁴ See Lundin, chapter 4 in this *Yearbook*.

¹¹⁵ SIPRI Arms Trade Registers; Zaloga (note 74).

¹¹⁶ Zaloga (note 74).

¹¹⁷ For example, see Heller, M. *et al.* (eds), *The Middle East Military Balance 1984* (Jaffe Center for Strategic Studies: Tel Aviv, 1985), p. 104.

¹¹⁸ *Milavnews*, no. 311 (Sep. 1987), reports US Government sources denying that the SS-12 was ever transferred outside the Warsaw Pact.

¹¹⁹ SIPRI Arms Trade Registers.

¹²⁰ Timmerman, K. R., 'Iraqi arms—from Russia with love', *Wall Street Journal*, 31 Mar. 1988, p. 22.

¹²¹ Zaloga (note 74).

¹²² Originally announced on Voice of the Masses Radio (Baghdad), 4 Aug. 1987. See *Current News*, 5 Aug. 1987. The relatively simple technique Iraq used to extend the Scud's range is described in 'Iraq increases Scud's range', *Flight International*, 21 May 1988, p. 18.

¹²³ Carus (note 74).

¹²⁴ Reported by the official Iraqi News Agency and carried by Reuters, 26 Apr. 1988. The modification techniques for the al-Abbas are suggested by Zaloga (note 74).

¹²⁵ 'Iraq killer missile', Reuters report in *Current News*, 1 Dec. 1988, p. 8; and 'Iraqi FAW-1 response to Israel', *Jane's Defence Weekly*, 17 Dec. 1988, p. 1542; Ottaway, D. B., 'Iraq reports successful test of antitactical ballistic missile', *Washington Post*, 19 Dec. 1988, p. 4.

¹²⁶ Walker, W., 'Russia admits supplying missiles to Iraq', *The Guardian*, 10 Mar. 1988, p. 10; and 'Soviets defend sending Iraq short-range arms', *International Herald Tribune*, 10 Mar. 1988, p. 2.

¹²⁷ Pejman, P., 'Egyptians update Iraqi missiles', *Chicago Tribune*, 5 May 1988, p. 28. Iranian leader Hashemi Rafsanjani charged France or the USA with responsibility for the Scud modifications—Radio Tehran quoted in *Current News*, 9 Mar. 1988, p. 14.

¹²⁸ Hoagland, J., 'Iraq is one place sanctions might work', *Washington Post*, 13 Sep. 1988, p. A25.

¹²⁹ Lundin, S. J., chapter 4 in this *Yearbook*.

¹³⁰ Note 30, pp. 151–53.

¹³¹ US House of Representatives Select Committee to Investigate Covert Arms Transactions with Iran, US Senate Select Committee on Secret Military Assistance to Iran and the Nicaraguan Opposition, *Report of the Congressional Committees Investigating the Iran–Contra Affair*, 100th

Congress, 1st Session (US Government Printing Office: Washington, DC, Nov. 1987), chaps. 12–14.

¹³² 'Tehran riot against Soviet missiles', *The Independent*, 7 Mar. 1988, p. 12; and 'Iran charges Moscow gave Iraq missiles', *International Herald Tribune*, 2 Mar. 1988, p. 3.

¹³³ 'Israel's launching . . .', *Aviation Week*, 31 July 1961, p. 21; and 'Israeli rocket stirs controversy', *Aviation Week*, 24 July 1961, p. 65.

¹³⁴ 'Fifty tests for Israel's rocket', *The Economist*, 4 May 1968, p. 67; and 'Israel: Jericho II and the nuclear arsenal', *Defense and Foreign Affairs Daily*, 9 May 1985, p. 1.

¹³⁵ Middleton, D., 'Israel is seeking first-strike arms', *New York Times*, 9 Nov. 1975, p. 5; and Middleton, D., 'Israel again asks Pershing missile', *New York Times*, 7 Mar. 1976, p. 11.

¹³⁶ Kemp, G., 'Mideast missile madness: a bazaar for doomsday', *Washington Post*, 27 Mar. 1988, p. C1.

¹³⁷ Sciolino, E., 'Documents detail Israeli missile deal with the Shah', *New York Times*, 1 Apr. 1986.

¹³⁸ The first published report was 'Israel said to deploy improved Jericho missile', *Aerospace Daily*, 1 May 1985, p. 5.

¹³⁹ 'Israel's Jericho IRBM completes long range test', *International Defense Review*, no. 7 (July 1987), p. 857.

¹⁴⁰ Shuey (note 49), p. 57.

¹⁴¹ 'Israel is 8th nation to launch a satellite', *International Herald Tribune*, 20 Sep. 1988, p. 1; Kifner, J., 'Israel launches space program and a satellite', *New York Times*, 20 Sep. 1988, p. 1; 'Israeli satellite launch sparks concerns about Middle East missile buildup', *Aviation Week & Space Technology*, 26 Sep. 1988, p. 21.

¹⁴² Foss, C. F. (ed.), *Jane's Armour and Artillery 1988–89* (Jane's Information Group: London, 1988), p. 710.

¹⁴³ Spector, L. S., argues that Israel's missile force may have had this role as early as 1973. See his *Going Nuclear* (Ballinger: Cambridge, Mass., 1987), p. 131. A US State Department spokesman has said, however, 'We are aware of no such Israeli plans to configure their launch vehicle as a missile'; Ottaway, G., *International Herald Tribune*, 30 Dec. 1988, p. 1. It is not clear if he meant all Israeli missiles or only the Shavit space launcher.

¹⁴⁴ This estimate is from the revelations of Mordechai Vanunu. See 'Revealed: the secrets of Israel's nuclear arsenal', *Sunday Times*, 5 Oct. 1986.

¹⁴⁵ Morel and Postal (note 19).

¹⁴⁶ The Popeye/Have Nap programme is reviewed in Amouyal, B., 'Conventional standoff missiles are envisioned as dual role weapons with nuclear missions', *Defense News*, 22 Aug. 1988, p. 3.

¹⁴⁷ Note 30, pp. 155–57.

¹⁴⁸ Nordeen, L. O., Jr, *Air Warfare in the Missile Age* (Smithsonian Institution: Washington, DC, 1987), ch. 7.

¹⁴⁹ National attitudes towards ATBMs and specific national programmes are summarized by Soofer, R. M., 'Development of a multiregional anti-tactical ballistic missile (ATBM) defense system', *Global Affairs*, fall 1987, pp. 20–39; and Cuthbertson, I. M., *The Anti-Tactical Ballistic Missile Issue and European Security*, Occasional paper no. 7 (Institute for East–West Security Studies: New York, 1988).

¹⁵⁰ 'USA/Israel R&D agreement', *Interavia Air Letter*, no. 11531, 1 July 1988, p. 5; Ottaway, D., 'U.S. Israel to develop new missile', *Washington Post*, 29 June 1988, p. 1; Whitley, A., 'Israel and US to sign missile defence accord', *Financial Times*, 9 June 1988, p. 4.

¹⁵¹ The ATBM debate has generated a large literature that cannot be reviewed here. A well-known advocate is Wörner, M., 'A missile defense for NATO Europe', *Strategic Review*, winter 1986, pp. 13–20. A more critical perspective is Cuthbertson (note 149).

¹⁵² Ropelewski, R. R., 'Israel wary of high technology weapons buildup in Middle East', *Aviation Week & Space Technology*, 25 July 1988, pp. 44–45.

¹⁵³ Richards, C., 'Moscow warning on Israel missile', *The Independent*, 23 Sep. 1987, p. 12; Friedman, T. L., 'Soviet cautions Israel against a new missile', *New York Times*, 29 July 1987, p. 10; and Waxman, S. I., 'Soviets assail testing of Israeli missile', *Washington Post*, 1 Aug. 1988, p. 15.

¹⁵⁴ Gold, D., *SDI: The US Strategic Defense Initiative and the Implications of Israel's Participation*, Memorandum no. 16 (Jaffe Center for Strategic Studies: Tel Aviv, Dec. 1985).

¹⁵⁵ SIPRI Arms Trade Registers; Zaloga (note 74).

¹⁵⁶ On the possibility of North Korean production of Scud missiles, see Carus and Bermudez (note 110).

¹⁵⁷ Carus and Bermudez (note 110).

- ¹⁵⁸ 'Egypt', *Milavnews*, no. 322 (Aug. 1988), p. 9.
- ¹⁵⁹ While North Korea exports Scud missiles and technical assistance, it does not appear to be willing to sell its Scud launch vehicles, which it needs to ensure the usefulness of its own Scud missiles.
- ¹⁶⁰ Note 30, pp. 181–82.
- ¹⁶¹ Bermudez, J. S., 'CW: North Korea's growing capabilities . . .', *Jane's Defence Weekly*, 14 Jan. 1989.
- ¹⁶² SIPRI Arms Trade Registers.
- ¹⁶³ 'ROK-produced missiles prove highly effective', *Korea Herald*, 27 Sep. 1978, p. 1; and Smith, B. A., 'Koreans seek new military air challenge', *Aviation Week & Space Technology*, 22 Oct. 1979, pp. 185–86.
- ¹⁶⁴ *Jane's Weapon Systems* (note 5), pp. 190–91.
- ¹⁶⁵ Conversations with US Government officials, 17 June 1988.
- ¹⁶⁶ Steinberg (note 16), p. 47; 'Aircraft industry—major developments', *Armada International*, Dec. 1985, p. 20.
- ¹⁶⁷ Shuey (note 49), p. 82.
- ¹⁶⁸ Arkin, W. M. and Fieldhouse, R. W., *Nuclear Battlefields* (Ballinger: Cambridge, Mass., 1987), pp. 38, 61, 231–32.
- ¹⁶⁹ Note 30; and Anthony, I., chapter 6 in this *Yearbook*.
- ¹⁷⁰ Bermudez, J., 'North Korea's air defence expansion', *Jane's Defence Weekly*, 25 June 1988, p. 1289.
- ¹⁷¹ Raj, C. S., 'Kuwait buys Soviet arms', *Strategic Analysis*, Oct. 1984, pp. 640–46.
- ¹⁷² Anthony, Chapter 6 of this *Yearbook*.
- ¹⁷³ Carus (note 74); and Zaloga (note 74).
- ¹⁷⁴ 'Libya is developing SSM', *Flight International*, 23 May 1987, p. 10; 'Syria', *Milavnews*, no. 311 (Sep. 1987), p. 23.
- ¹⁷⁵ Leitenberg, M., 'Satellite launchers—and potential ballistic missiles—on the commercial market', *Current Research on Peace and Violence*, no. 2 (1981), pp. 115–28; Miller, J., 'U.S. uneasy over military potential of commercially produced rockets', *New York Times*, 12 Sep. 1981, p. 4; and 'West German concern ends Libyan rocket project', *New York Times*, 27 Dec. 1981, p. 7.
- ¹⁷⁶ 'Libya tests Otrag missile', *Mednews*, 30 Nov. 1987.
- ¹⁷⁷ 'Libya offers to finance Brazilian missile project', *Jane's Defence Weekly*, 6 Feb. 1988, p. 201; Margolis, M., 'Brazil plans to resume weapons sales to Libya', *Washington Post*, 28 Jan. 1988.
- ¹⁷⁸ 'Libya wants CSS-2', *Flight International*, 14 May 1988, p. 6; 'Renegade missiles worry Carlucci', *Washington Times*, 11 May 1988.
- ¹⁷⁹ Spector, L. S. chronicles Libyan efforts to buy nuclear weapons or finance nuclear weapon development in other countries in his book *Nuclear Proliferation Today* (Vintage: New York, 1984), pp. 149–64.
- ¹⁸⁰ Lundin, chapter 4 in this *Yearbook*.
- ¹⁸¹ Haeri, S., 'Iran and Libya in chemical arms for missiles deal', *The Independent*, 30 Dec. 1987, p. 1.
- ¹⁸² Note 30, pp. 190–92.
- ¹⁸³ The tactics of the war are described in Brooke, J., 'Chadians describe victory in desert', *New York Times*, 13 Aug. 1987, p. 1; Gibour, J., 'Au Tchad', *Afrique Defense*, Aug. 1987, pp. 40–47.
- ¹⁸⁴ Engelberg, S. and Gordon, M. R., 'US presses Bonn on Libyan gas factory', *International Herald Tribune*, 2 Jan. 1984, p. 1.
- ¹⁸⁵ Weintraub, B., 'U.S. calls Libya raid a success . . .', *New York Times*, 16 Apr. 1986, p. 1.
- ¹⁸⁶ Barham, J., 'Brazil ignores US protest over arms for Libya', *Sunday Times*, 31 Jan. 1988, p. 16; 'Brazil warned by US on arms sales to Gadafi', *Financial Times*, 27 Jan. 1988.
- ¹⁸⁷ Southerland, D., 'China assures Carlucci on Mideast arms sales', *Washington Post*, 8 Sep. 1988, p. 31.
- ¹⁸⁸ Halloran, R., 'U.S. on world alert; security tightened at bases, embassies', *New York Times*, 16 Apr. 1986, p. 1.
- ¹⁸⁹ Kamm, H., 'Libya's raid did not escape Crete's notice', *New York Times*, 21 Apr. 1986, p. 7.
- ¹⁹⁰ Trainor, B. E., 'Pakistan accused of a nuclear move', *New York Times*, 24 May 1988, p. 1; 'U.S. asks Soviets, China to cease ballistic missile sales in the Middle East', *Washington Post*, 26 May 1988, p. A19.
- ¹⁹¹ 'Pakistani effort keyed to poverty battle', *Aviation Week & Space Technology*, 6 July 1964, pp. 271–72.
- ¹⁹² Steinberg (note 16), pp. 44–45.
- ¹⁹³ 'Pakistan's space ambitions: a military option?', *Nature*, 10 Dec. 1981; 'Pakistan steps up its space program', *Space World*, May 1985, p. 33.

¹⁹⁴ Albright, D., 'Pakistan's bomb-making capacity', *Bulletin of the Atomic Scientists*, June 1987; Haass, R. N., 'South Asia: too late to remove the bomb?', *Orbis*, winter 1988, pp. 107–18; Spector argues in *The Undeclared Bomb* (note 43) that Pakistan has the materials for at least two to four nuclear weapons.

¹⁹⁵ Note 30, pp. 215–18.

¹⁹⁶ Shastri, R., 'The spread of ballistic missiles and its implications', *Strategic Analysis* (New Delhi), May 1988, pp. 157–68.

¹⁹⁷ Spector (note 43).

¹⁹⁸ The first public report was Goshko, J. M. and Oberdorfer, D., 'Saudis buy medium-range missiles from China', *International Herald Tribune*, 19–20 Mar. 1988, p. 1.

¹⁹⁹ 'Avibras emerges' (note 57); SIPRI Arms Trade Registers.

²⁰⁰ The diplomatic background to the deal is explored by Ottaway, D. B., 'Saudis hid acquisition of missiles', *Washington Post*, 29 Mar. 1988, p. 1.

²⁰¹ The number of DF-3 missiles was confirmed by Space Media Network in Sweden using photographs from the French SPOT satellite. See Foyen, L., 'Swedes say satellite reveals secret Saudi Arabian missile base', Reuters, 19 Sep. 1988. A price of \$3.25 billion is given in *Sunday Times*, 23 May 1988; and Freedman, L., 'East wind missiles chill US–Saudi relations', *The Independent*, 2 May 1988, p. 12.

²⁰² The capabilities of Saudi Arabian DF-3s are discussed by Richardson, D., 'Upgrades and downgrades—modified missiles in the Middle East', *National Defense*, Sep. 1988, pp. 17–18.

²⁰³ Cook, N., 'Ironies of Saudi's IRBM purchase', *Jane's Defence Weekly*, 2 Apr. 1988, p. 627.

²⁰⁴ These allegations initially appeared in Swain, J., 'Israel in secret missile deal with China', *Sunday Times*, 12 Apr. 1988, p. 1; and Ottaway, D. B., 'Israelis aided China on missiles', *Washington Post*, 23 May 1988, p. 1.

²⁰⁵ Ibrahim, Y. M., 'Saudis warn Iran they may use Chinese missile', *New York Times*, 29 Apr. 1988, p. 1; Sale, R., 'Saudis said to aim missiles at Iran', *Philadelphia Inquirer*, 17 May 1988, p. 8.

²⁰⁶ Goshko, J. M., 'Saudis will forswear nuclear weapons', *International Herald Tribune*, 27 Apr. 1988, p. 1. On chemical warheads, see Shuey (note 49), p. 64. Chinese Foreign Minister Wu Xueqian said that Saudi Arabia has given assurances that the missiles will only be used for 'defensive purposes', in Xinhua News Agency report, *Current News*, 7 Apr. 1988, p. 11.

²⁰⁷ Note 30.

²⁰⁸ Radnif, D., 'Fallout from Saudi missiles', *Christian Science Monitor*, 30 Mar. 1988, p. 11; and Wilson, G. C. and Ottaway, D. B., 'Saudi–Israeli tensions worry U.S.', *Washington Post*, 25 Mar. 1988, p. 1.

²⁰⁹ Banks, T., 'Shomron's answer to Lebanon problem', *Jane's Defence Weekly*, 14 May 1988, p. 933.

²¹⁰ 'Saudis oust US ambassador', *Middle East Policy Survey*, 1 Apr. 1988, pp. 1–4.

²¹¹ Lewis, F., 'Arms sales: China ought to talk it over', *International Herald Tribune*, 25 Apr. 1988. Washington also sought reassurances from Saudi Arabia itself; 'Complaints fail to thwart new Saudi arms sales', *Congressional Quarterly Weekly Report*, 14 May 1988, pp. 1297–98.

²¹² Shastri (note 196).

²¹³ Such a project could benefit from the relatively inexpensive Viper gas turbine engine that Armscor builds in South Africa, a 1950s British design licensed in the early 1970s. Israeli aerospace engineers associated with South Africa's Mirage fighter update programme are a likely source of technical expertise: Goodman, H., 'Pretoria seeking to lure Lavi experts', *Jerusalem Post*, 21 Nov. 1987, p. 8; 'South Africa starts Lavi engineer recruitment drive', *Interavia Air Letter*, no. 11374 (13 Nov. 1987), p. 6. See also 'Israel', *Air et Cosmos*, 21 Feb. 1981, p. 5; and *Sunday Times* (Johannesburg), 20 July 1986, cited in Shuey (note 49), p. 66.

²¹⁴ Spector (note 43). See also Temko, N., 'South Africa signal on nuclear pact suggests it has the bomb', *Christian Science Monitor*, 29 Sep. 1987, p. 9. The South African Government denies having nuclear weapons but does claim to be nuclear capable. 'South Africa confirms nuclear capability', *Flight International*, 27 Aug. 1988, p. 14.

²¹⁵ Shuey (note 49), p. 66.

²¹⁶ According to *Jane's Weapon Systems 1988–89* (note 5), pp. 452–53, the Gabriel's maximum payload is about 150 kg.

²¹⁷ SIPRI Arms Trade Registers; Carus (note 74); and Zaloga (note 74).

²¹⁸ Herzog, C., *The Arab–Israeli Wars* (Vintage: New York, 1984), p. 299.

²¹⁹ *Jane's Weapon Systems* (note 5), p. 128.

²²⁰ Black, I., 'Moscow steps up pressure on Syria by blocking arms sales', *The Guardian*, 24 July 1987, p. 9; *Milavnews*, no. 311 (Sep. 1987), p. 23.

²²¹ Egozi, Z., 'Syria will receive Soviet Fencers', *Flight International*, 23 July 1988, p. 2; SIPRI Arms Trade Registers.

²²² 'Syria-Otrag contract for missiles', *Ma'ariv*, 2 Aug. 1981, in Foreign Broadcast Information Service, 3 Aug. 1981. Also see Steinberg (note 16), p. 44.

²²³ Zaloga (note 74).

²²⁴ Gordon, M., 'Syria is studying new missile deal', *New York Times*, 22 June 1988, p. 1; Mann, J., 'China-Syria missile deal concluded, officials say', *Los Angeles Times*, 14 July 1988, p. 1; Sciolino, E., 'Chinese missiles sold in Mideast worrying Shultz', *New York Times*, 16 July 1988, p. 1.

²²⁵ 'Syrians defend missile purchases', *International Herald Tribune*, 28 June 1988; Sutherland (note 2).

²²⁶ Lundin, S. J., chapter 4 of this *Yearbook*.

²²⁷ 'Soviet's chemical war chief alerts West with Syria visit', *Washington Times*, 8 Apr. 1988, p. 9.

²²⁸ *Jane's Weapon Systems* (note 5), p. 126; Wright (note 24), pp. 387-90.

²²⁹ Roberts, C. A., 'Soviet arms-transfers policy and the decision to upgrade Syrian air defences', *Survival*, July-Aug. 1983; 'Syria', *Air International*, Aug. 1988, p. 55.

²³⁰ 'Deterring the threat of chemical warfare', *IDF Journal*, spring 1987, pp. 47-53.

²³¹ Payne, K. B. and Berkowitz, M. J., 'Anti-tactical missile defense, allied security and the INF Treaty', *Strategic Review*, winter 1988, pp. 24-34.

²³² SIPRI Arms Trade Registers.

²³³ 'Taiwanese program at MIT ended', *Washington Post*, 16 July 1986, p. 5.

²³⁴ *Jane's Weapon Systems* (note 5).

²³⁵ 'Propping up a fading friendship', *Far Eastern Economic Review*, 27 Oct. 1978, p. 18.

²³⁶ Engelberg, S., and Gordon, M., 'Taipie halts work on secret plant to make nuclear bomb ingredient', *New York Times*, 23 Mar. 1988, p. 1.

²³⁷ Spector (note 43).

²³⁸ Note 30; 'More about Taiwan's IDF', *Interavia Air Letter*, no. 11653 (22 Dec. 1988), p. 3.

²³⁹ SIPRI Arms Trade Registers.

²⁴⁰ Foss, C. F. (ed.), *Jane's Armour and Artillery 1988-89* (Jane's Information Group: London, 1988).

²⁴¹ Note 30.

²⁴² Cochran, Arkin and Hoening (note 14).

²⁴³ Note 30.

²⁴⁴ These reports appear to have originated in the Abu Dhabi newspaper *al-Itihad*. For example, see 'Yemen/Soviet missiles', *Current News*, 24 Aug. 1988, p. 7.

²⁴⁵ Note 30.

²⁴⁶ Cordesman, A. H., 'The military forces of the DRY and the YAR', *Armed Forces*, July 1988, pp. 302-6.

²⁴⁷ Carus (note 74).

²⁴⁸ Cordesman (note 246).

²⁴⁹ US Congress, *World-wide Space Activities*, Sub-committee on Space Science Applications of the House Committee on Science and Technology (US Government Printing Office: Washington, DC, 1977), pp. 102-3, 106-7, 118, 128.

8. Arms trade regulations

AGNÈS COURADES ALLEBECK

I. Introduction

The arms scandals of the mid-1980s have put the effectiveness of existing arms trade regulations on national agendas. This chapter describes in detail some of the major export regulations that arms producers in the leading exporting countries are required to follow. The countries under scrutiny here are the United States, the Soviet Union, France, the United Kingdom and the Federal Republic of Germany. Together, these five countries account for an average of 80 per cent of the world's total yearly arms exports. For comparison, the chapter also includes a study of two medium suppliers, Sweden and Italy: the former chosen because its arms trade regulations are reputed to be very restrictive, the latter for the very opposite reason, and both because they in 1988 have reviewed and, in the case of Sweden, already to a large extent revised their respective regulations.

This chapter describes the decision-making process in these countries, with particular focus on the main legal restraints and the criteria for their implementation. Special attention is also given to recent changes in legislation.

In addition to legislative regulations there exists a large body of guidelines and speeches by senior politicians which are not laws but establish a framework within which civil administrators operate. These guidelines have a different character in different countries. In the United States, for example, incoming Presidents have laid down guidelines in presidential directives. In the United Kingdom, France and Italy, government ministers have put policy guidelines on public record in answer to questions put in their respective parliaments. Government policy as a factor regulating arms exports will be examined in detail in a forthcoming SIPRI monograph. However, in two of the cases examined in this chapter—the Federal Republic of Germany and Sweden—such guidelines, while not law, are of such status that they merit special attention here. In FR Germany there exists an executive decision¹ which requires no parliamentary approval, but which differs from guidelines in the countries mentioned above in that it is binding on future governments unless they choose to change it. In Sweden, guidelines for decisions on licences for weapons were laid down by the Government and approved by Parliament in 1971 and have been reconfirmed in 1983 and 1988.²

Arms were for a long time normally transferred from one country to another as freely as any civil goods.³ The first efforts on the part of governments to regulate what until then had mainly been the domain of private arms manufacturers were not made until the end of World War I. These early efforts sought to restrain the activities of private arms traders mainly through international agreements and by publicizing the international arms trade.⁴ Of the many attempts made in international forums during the inter-war period,

mention should be made of the Convention of St Germain of 1919 and the Geneva Arms Traffic Convention of 1925.⁵ While these multilateral attempts proved largely ineffective, individual countries (mainly in Western Europe and North America) began in the mid-1930s to pass laws regulating arms exports on a national basis.⁶ Such legislation was introduced in the United Kingdom in 1931; in Belgium in 1933; in the United States, Sweden and the Netherlands in 1935; in France in 1939; in Italy in 1956; and in the Federal Republic of Germany in 1961, based on provisions already laid down in the Federal Constitution of 1949. Other countries around the world have later followed suit.

While Western countries publicize their arms trade regulations and policies, the USSR, China, as well as most East European and Third World countries are still reluctant to release any such information.⁷ This limits the scope of a study such as this, which relies on published, publicly available data. This applies in particular to the USSR, which as the world's largest exporter of arms cannot be excluded from this analysis. For lack of official documentation, the presentation of the main features of Soviet arms transfer control included here does not provide a basis for comparison with other exporters.

The level of state control varies from country to country and, to an even greater extent, from one political system to another. That the decision-making processes in parliamentary democracies share many features is evident, however. Export licence applications are normally submitted to a ministry department (defence or foreign trade), which channels it to the appropriate authority for review. This process usually involves remittal to an advisory inter-ministerial committee for views. Politically sensitive cases are sometimes dealt with at cabinet level. The role of parliament varies from country to country, however, from being fully involved in the review and authorization process, to having limited advisory or veto rights, to not being involved at all in or even informed about ongoing deals.⁸

In most countries seeking to regulate their arms exports, the basic stipulation is that such exports are prohibited unless prior written approval is issued by the appropriate government authority. Export licences are normally checked at customs. In order to maintain control over purchased arms after they have been exported, an 'end-use certificate' is often required. This is a signed declaration by the purchaser that the specified arms are for its own use and will not be sold or transferred to a third country without the prior consent of the supplier country. Qualitative as well as quantitative restrictions may be applied on exports as means of control, as may stipulations limiting or prohibiting exports to specific countries. Not all suppliers specify explicit criteria for export approval in their legislation.

It has not always been possible to provide clear definitions of terms employed in specific national legislation, either because they are only used in reference to lists subject to periodic change, or because, as in references to unspecified 'security interests', the legislation itself remains unclear. To simplify matters somewhat, the term 'weapon(s)' is used throughout in place of the various designations for arms found in the texts, except in such cases where differentiation is necessary. This simplification itself points to the problem of

defining what constitutes 'arms' in an environment where an increasing number of the systems relevant to effective military capabilities also have civilian functions.

The state inevitably develops an organic relationship with its defence industry, although the nature of state involvement differs from country to country. In all countries it begins at the stage of research and development, well before the signing of any contract. Governments generally maintain very close control over not only the export but also the production of arms. These aspects of state control, however, are in this chapter discussed only to the extent that they have a direct bearing on the issue of arms trade regulations.

Despite many common features in the decision-making process, there is a great heterogeneity in the types of export criteria and means of control adopted by the supplier states. This is particularly striking in the case of the member states of the European Community (EC). While trade regulations and policies have been integrated as far as most other commodities are concerned, each member state retains full authority over its own arms trade.⁹ In light of the growing number of joint programmes involving the defence industries of the EC countries, the need for harmonization is becoming increasingly evident.

Furthermore, although tightened national legislation is necessary if control over national arms exports is to be maintained, it is not obvious that the impact on the international arms trade as a whole of such nationally oriented efforts can be said to be altogether positive. One reason for this is that the countries prepared to tighten their regulations as a rule already have comparatively restrictive laws. Any further restrictions would merely provide clients with the incentive to turn to less scrupulous suppliers, thus doing away with the limited control that until then had been maintained. The adoption of international rules seems to be the only means available of avoiding such developments, but very little has been achieved in this direction since the attempts of the inter-war period. Although many countries reiterated the necessity to regulate the international arms trade at the United Nations Third Special Session on Disarmament in 1988, they were again unable to agree on any concrete measures.¹⁰

II. The United States

Principal legislation

The Mutual Security Act of 1954.¹¹

The Foreign Assistance Act of 1961 (FAA).¹²

The International Security Assistance and Arms Export Control Act of 1976 (AECA) and its implementing International Traffic in Arms Regulations (ITAR).¹³

US arms transfers are regulated by the AECA and its implementing regulations (ITAR). Grant aid is regulated by the FAA.¹⁴

The decision-making process

In theory, all military export transactions are to be approved by the State Department, whether the request for approval comes directly from private firms or via the Defense Security Assistance Agency (DSAA), the FMS administration attached to the Department of Defense (DOD). In the State Department the arms transfers approval procedure is administrated by the Office of Munitions Control (OMC).¹⁵ The Secretary of State has in practice delegated its licensing authority to approve arms exports to the DOD for military sales to NATO countries (excluding Greece, Iceland, Portugal and Turkey), as well as to Australia, Japan and New Zealand, and for all sales of non-combat gear and spare parts to other friendly countries.¹⁶ For all other transactions, including all subsidized arms transfers, the authorization decision is made by the Department of State on the basis of submissions from other government agencies that may have an interest in the particular case, such as the DSAA, the Arms Control and Disarmament Agency (ACDA), the Central Intelligence Agency (CIA), and so on. Contested cases may be referred to an inter-agency group or ultimately to the National Security Council (NSC) which forwards a recommendation to the President, who makes the final decision.

All arms exports to a value of \$14 million or more for 'significant military equipment' (as defined below) and of \$50 million or more for other weapons and military services can be opposed by Congress within 30 days. Once formal executive approval has been given, therefore, a Letter of Offer, containing a detailed description of the deal, is presented to Congress.¹⁷ For a sale to be stopped, a resolution must be passed in both the House of Representatives and the Senate.¹⁸ This control power of the Congress has existed since 1974 for grant aid and since 1976 for other arms transfers.¹⁹ However, since 1983 the practice has changed, following a ruling of the Supreme Court.²⁰ Congress can have statutory impact only through the traditional procedure of enacting legislation—by passing bills with majorities in both houses and obtaining presidential approval—or by overriding presidential vetoes with two-thirds votes in both houses.

Since the mid-1980s the Office of Munitions Control receives about 45 000 applications yearly, of which 90–92 per cent are approved.²¹

An export licence is valid for two years and must be renewed if not all deliveries have been made by the end of this period. All used and unused licences must be returned to the OMC not later than their expiration date.²²

Legal conditions for arms transfer

According to 1988 AECA and ITAR amendments, only US citizens or firms can apply for arms transfer licences, with the exception of foreign citizens with legal residence and foreign governmental agencies registered in the USA.²³ These amendments also authorize the OMC to deny licences or other approvals to individuals who are under indictment or have been convicted for violations of various statutes.²⁴ Applicants may also be ruled ineligible for specific export

or import licences. The OMC has also recently drafted an 18-point list for identifying suspicious buyers.²⁵

Application for export licences of weapons cannot be submitted until the applicant has a firm order (i.e., a Letter of Intent) from the purchaser and is able to provide detailed information on the proposed sale. The failure to provide such information has since 1988 been sufficient ground for denying application.²⁶

The ITAR contains the US Munitions List (USML) which designates all weapons, military services and technical data, grouped in 21 regularly updated categories. With the concurrence of the Department of Defense, the Secretary of State determines which articles should be included in the USML.²⁷

A 'non-transfer and use certificate' is required to obtain a licence to export 'significant military equipment',²⁸ sometimes referred to as 'major defense equipment' for which special export controls are 'warranted because of their capacity for substantial military utility or capability'.²⁹ 'Significant military equipment' includes all classified articles and every article characterized by an asterisk in the USML. In addition, an Import Certificate/Delivery Verification (IC/DV) may be required for approval of proposed exports of weapons to non-governmental buyers in countries which have agreed on the IC/DV procedures.³⁰

All exports of military services (assistance, including training, in the design, manufacture, use, maintenance or reconstruction of weapons) and of classified technical data require the written approval of the OMC.³¹ The primary requisite for such approval is the existence of a manufacturing licence agreement or a technical assistance agreement between the exporter and the foreign purchaser.³² Once approved, the defence services described in the agreement may normally be provided without further licensing. Exempt from this procedure are services included in the basic operation and maintenance of weapons lawfully exported to the same recipient.³³

Both manufacturing licence agreements and technical assistance agreements must contain special end-use clauses.³⁴ Manufacturing licences must also contain a clause prohibiting the export of licence-produced weapons to a third country without the prior written approval of the US Government. The recipient must provide annual reports on sales or other transfers of the licensed weapons to the Department of State.³⁵

Some countries are not eligible to apply for export licences or other approvals regarding weapons and military services. These countries include, as listed in 1988, Albania, Bulgaria, Cuba, Czechoslovakia, the German Democratic Republic, Estonia, Hungary, Kampuchea, Latvia, Lithuania, North Korea, Mongolia, Poland, Romania, the USSR and Viet Nam.³⁶ Countries or area on which the USA maintains an embargo are also excluded.³⁷ In 1988 these were Angola, South Africa and Chile. The 1988 amendments furthermore provide that exports of defence articles and services to 'countries that have repeatedly provided support for acts of international terrorism are prohibited'.³⁸ This provision was in 1988 applied to Cuba, Iran, Libya, Syria, South Yemen and North Korea. This amendment also states that no proposal to sell or in any other fashion transfer weapons, military services or technical

data can be made to the countries mentioned above without first obtaining a licence or written approval from the OMC.³⁹

According to the 1988 amendments, any licence to export weapons or military services may be suspended whenever (a) the Department of State deems such action to be in furtherance of world peace, national security or the foreign policy of the USA or is otherwise advisable; and (b) whenever the Department of State believes that any regulation pursuant to the AECA has been violated or if any change in events implies a violation of the licence requirements.⁴⁰

III. The Soviet Union

Principal legislation

Despite recently stated aspirations for greater openness in military matters,⁴¹ legal documents on legislation regulating the Soviet arms trade are not available on request.⁴²

The decision-making process

The unavailability of documents and the secrecy which surrounds Soviet military matters in general make it impossible to describe the decision-making process of the Soviet arms trade to the extent possible for Western countries. Some main features can nevertheless be identified. The state monopoly on arms production and distribution implies that all arms deals must be government initiated. The agencies authorized to propose, negotiate and finalize deals probably retain greater autonomy than their Western counterparts, which are all subject to some degree of parliamentary control. This is a feature that the USSR shares with other East European as well as most Third World suppliers.

Conditions for arms transfer

While the decision-making process remains uncertain, some of the conditions that the Soviet Union requires its recipients to meet have been disclosed through publication in the West of specific arms trade agreements. The 1982 military aid training agreement between the USSR and Grenada, involving the delivery of unspecified 'special equipment', contains end-user and non-transfer clauses as well as general clauses on secrecy.⁴³

Sources indicate that, for Third World countries, the re-export of licence-produced weapons and other military items requires prior Soviet approval. Some kind of secrecy clause aimed at limiting technology spread is probably included in all agreements for foreign licensed production. SIPRI data indicate that, apart from the Warsaw Treaty Organization countries, only China (until 1960), India, North Korea and Yugoslavia had by the end of 1988 been granted licences to produce major weapons.⁴⁴ Other traditional Soviet clients such as Algeria, Cuba, Egypt, Iraq and Syria have not received significant Soviet support to develop national arms industries.⁴⁵

This broad outline of Soviet arms transfer control leaves many questions unanswered. Who initiates the deals? Who participates in the negotiations? On what criteria are decisions based? Opinions vary and will continue to do so until official documents on Soviet arms trade policy are made public.

IV. France

Principal legislation⁴⁶

Décret-loi du 18 avril 1939, fixant le régime des matériels de guerre, armes et munitions.

Arrêté du 2 avril 1971, fixant la liste des matériels de guerre et matériels assimilés soumis à une procédure spéciale d'exportation et les dérogations à cette procédure.

Décret No. 73-364 du 12 mars 1973, relatif à l'application du décret du 18 avril 1939.

The decision-making process

A general statute prohibits all export and foreign licensed production of weapons.⁴⁷ Applications for exemptions are sent to the International Affairs Directorate within the Délégation Générale pour l'Armement (DGA), which is answerable to the Minister of Defence.⁴⁸ All exemptions must be authorized by the Prime Minister, however.⁴⁹ He receives the advice of the Inter-ministerial Committee for the Study of War Equipment Exports (CIEEMG). This body includes the General Secretariat of National Defence (SGDN) and representatives of the Ministries of Foreign Affairs, Defence, Economy and Finance, as well as other interested ministries included on an *an hoc* basis.⁵⁰ The Committee meets every fortnight. Once an exemption is approved, all applications, except those sponsored by the Ministry of Defence,⁵¹ must follow a long and complicated administrative procedure which eventually results in an authorization to export.

Arms exports are the responsibility of the executive branch. The French constitution does not provide parliament with the power to approve or veto a governmental authorization of sale. Documents relating to sales are often classified. Since 1983, however, post-export bi-annual reports on arms sales have been sent to the National Assembly and to the Senate.⁵²

Each year the CIEEMG receives between 4200 and 4700 applications for exemption, of which an average of 85 per cent are approved.⁵³

Authorizations are given for specific items and are valid for six months to a year, after which period they must be renewed.⁵⁴ Once authorizations have expired, exporters must provide the Ministry of Defence with a report on the transaction.⁵⁵ If irregularities are evidenced, authorizations may be withdrawn at any moment.⁵⁶

Legal conditions for arms transfer

French arms export legislation requires that managers or, in the case of joint-stock operations, a majority of shareholders of exporting companies are French nationals. Exceptions can be made on national security grounds.⁵⁷

Final arrival at the authorized destination is guaranteed by a certification of receipt or an end-use certificate issued by the importing country's authorities. On receipt of this certificate, the French Customs pays back a sum retained in surety by the French Government. Direct transfers between the Ministry of Defence and foreign governments do not have to follow this procedure.⁵⁸

Most French sales are covered by inter-governmental agreements containing end-user as well as other clauses. Sometimes a so-called territory clause is added, listing countries to which further export is not limited by end-user restrictions, and stipulating that in the case of any resale to a country not listed, a new procedure of approval is necessary. In some cases a security protocol is added as well, listing the persons who are to have knowledge of the sale, in order to maintain control over the information, reproduction of data and the use of equipment.⁵⁹ The reciprocal guarantee of such protocols explains the preponderance of governmental agreements over private deals in France.

The French legislation lists weapons which may not be exported without special authorization from the Prime Minister. The classification distinguishes between weapons and weapons which can be used for war purposes.⁶⁰ The Minister of Defence has the authority to modify and interpret the frequently updated weapon lists.⁶¹

'Strategic equipment' is regulated by a special procedure linked to the COCOM regulations.⁶²

Authorization is needed for the following activities pertaining to weapons and other military-related equipment: (a) marketing, (b) acceptance of orders implying export of weapons, (c) selling or leasing of production licences, and (d) any kind of technology and information transfer.⁶³ Authorization is not needed for the export of military articles for the assembly or repair of weapons to other countries with which France has entered arms co-operation agreements, as long as these weapons are for the use of the contracting parties.⁶⁴

V. The United Kingdom

Principal legislation

The Import, Export and Customs Powers (Defence) Act of 1939.⁶⁵
The Export of Goods (Control) Order of 1987.⁶⁶

The decision-making process

The Defence Sales Organisation, recently renamed the Defence Export Services Organisation (DESO), was set up within the Ministry of Defence in 1966 to administer applications for export licences. It co-ordinates the

inter-ministerial review of arms sales, provides marketing advice and organizes promotional exhibitions.⁶⁷

Applications for weapon export licences are first submitted to the Ministry of Trade, which decides on approval after a review procedure within the Arms Working Party, co-chaired by the Ministry of Trade and the Foreign and Commonwealth Office. This body includes representatives of various ministries, including Defence and, if state financial or credit involvement is discussed, the Treasury. The most sensitive deals are sometimes referred by the Arms Working Party to the Defence and Overseas Policy Committee, which is chaired by the Prime Minister.⁶⁸

The British system does not confer to Parliament a formal role in the authorization process. The influence of the two parliamentary committees whose work has a bearing on arms sales issues (Public Accounts and Defence) is limited by their restricted access to information on ongoing arms deals.⁶⁹

Of the 6000–7000 licence applications received yearly by the Arms Working Party, an average of 97 per cent is approved.⁷⁰

Although legislation specifies no time limit to arms export licences, they are normally valid for 12 months, and can usually be renewed without much controversy.⁷¹

Legal conditions for arms transfer

Unlike the legislation of most other countries, British law does not specifically prohibit foreign citizens or firms from applying for arms export licences.

The British legislation does not specifically refer to end-use certificates. However, it states that 'any exporter or any shipper of goods . . . shall, if so required . . . , furnish within such time as they may allow proof . . . that the goods have reached either—(a) a destination to which they were authorized to be exported by a licence . . . , or (b) a destination to which their exportation was not prohibited . . .'.⁷² It is interesting to note that this provision relates to unauthorized transfers rather than to end-use or re-export. However, specific end-use or re-export restrictions are formulated and applied by the United Kingdom, although these have become less restrictive in the 1980s. The Government demands only to be consulted and informed of any retransfer of British equipment, and imposes end-use certificates only in certain sales contracts where danger of re-export is considered great.⁷³

The Export of Goods (Control) Order is applicable to the export of all used and unused weapons and includes a list of different categories of arms and dual-use equipment which require a licence for export to particular groups of countries. Almost all military equipment requires a licence for export to all countries. Some dual-use equipment requires a licence only for export to Iran and Iraq; some only for COCOM listed countries.⁷⁴ In addition, some categories require a licence only for exports to Libya, according to a 1986 EC ban, and some only to South Africa and Namibia in accordance with United Nations embargoes.⁷⁵ More specific criteria for export authorization are not provided in British legislation.

VI. The Federal Republic of Germany

Principal legislation

Grundgesetz für die Bundesrepublik Deutschland, of 23 May 1949.⁷⁶
Gesetz über die Kontrolle von Kriegswaffen (KWKG) of 20 April 1961⁷⁷ and subsequent amendments.

Außenwirtschaftsgesetz (AWG) of 28 April 1961 and subsequent amendments.⁷⁸

Politischen Grundsätze der Bundesregierung für den Export von Kriegswaffen und sonstigen Rüstungsgütern of 28 April 1982.⁷⁹

Article 26 §2 of the *Grundgesetz* states that weapons may not be manufactured or transported except with the permission of the Federal Government.⁸⁰

The decision-making process

The arms trade of the FRG is supervised by the Ministries of Economics, Defence and Foreign Affairs. As regulated by the KWKG, applications for export authorizations of weapons are submitted to the Ministry of Economics, which decides on authorization after consultation with the Ministry of Defence and in agreement with the Ministry of Foreign Affairs. The export of other industrial goods classified under the AWG is supervised directly by a Federal agency under the Ministry of Economics.⁸¹

Only when international co-operative projects are concerned are parliamentary committees informed and involved in the decision-making process. The necessary government-to-government agreements require parliamentary approval.⁸² In such cases the committees may request progress reports. Since 1981 the Minister of Defence has had to submit to the Federal Assembly all co-operative agreements or contracts by which obligations in excess of 50 million DM are incurred.⁸³ As for arms transfers which do not imply co-production, the Federal Assembly does not have the right of veto.

Politically sensitive commercial sales are referred to a Cabinet committee, the Federal Security Council, chaired by the Chancellor and which includes the Ministers of Defence, Foreign Affairs, Economic Affairs, Finance and Domestic Affairs.⁸⁴ Decisions made by the Federal Security Council are final.⁸⁵

Rejections of export licence applications pursuant to the KWKG cannot be appealed.⁸⁶ The AWG contains no provision against appeal.⁸⁷

Legal conditions for arms transfer

West German citizenship may be required to export weapons.⁸⁸ Furthermore, according to a 1978 amendment to the KWKG, West German citizens pursuing arms trade outside the Federal Republic must be registered, and their activities licensed by the state, even if the weapons are not produced or stored on West German territory.⁸⁹ This ruling requires that detailed information about the considered production, transfer or sale be provided to the licensing authority. The Federal Government has with this measure sought to maintain global

control over all arms transactions involving the FRG, including middlemen and subsidiaries, and to prevent third countries from receiving FRG-produced arms without the approval of the Federal Government. To this end 'credible end-destination certificates' are also required by law.⁹⁰

Weapons are defined in the KWKG and listed in an Annexe (*Kriegswaffenliste*).⁹¹ This list is revised periodically by one or all of the ministries involved in the decision-making process, in agreement with Parliament.⁹² Other industrial products with military use potential, including strategic material as defined in the COCOM agreement, are regulated by the AWG.⁹³ Attached to this act is a list of all goods that cannot be exported without licence, the weapons list being included.

Authorization may be refused: (a) if there is reason to believe that granting it would disturb friendly relations with other states, or (b) if the applicant is not a citizen of the Federal Republic of Germany.⁹⁴ It is to be refused: (a) if there is a risk that the weapons will be used in an action disturbing the peace, in particular in an offensive war, or (b) if there is reason to believe that the transaction could damage the Federal Republic's commitments under international law or threaten their fulfilment.⁹⁵

*Government guidelines*⁹⁶

Further criteria for arms export authorization were defined by the Federal Security Council in 1971.⁹⁷ These permitted the transfer of weapons to other NATO countries without restrictions, while all transfers to Communist countries must be in compliance with COCOM regulations. The Council also established the concept of 'areas of tensions', to which no weapons or strategic material may be exported. Far from being clear-cut, however, these criteria were subject to official interpretation by the Foreign Office.⁹⁸ Exports to all other countries were in principle prohibited, but exceptions could be granted within the pales of the stated legal provisions.

After considerable political debate, new arms export guidelines were issued in 1982 with the overall intention of maintaining a restrictive arms export policy.⁹⁹ These guidelines divide potential purchasers into NATO countries and non-NATO countries. With regard to the former, and more specifically to joint production ventures involving other NATO countries, two rules have been set out. First, when parts of weapons (or of any military-related article listed in the *Kriegswaffenliste*) are supplied to a co-producer, the latter is considered both buyer and end-user.¹⁰⁰ However, the guidelines specify that an inter-governmental consultation must take place in order to ensure that the Federal Government is informed whenever the export of a co-produced weapon is considered (a) to a country involved in an armed conflict or where the outbreak of war is imminent, (b) where such transfers would be contrary to West German security, or (c) which could severely harm relations with a third country.¹⁰¹ As for non-NATO countries, the same restrictions apply to Communist states as before 1982,¹⁰² while for other countries the new guidelines allow for somewhat wider margins. According to the new provisions, export licences may be granted if they are motivated by 'vital foreign policy and security interests of the Federal Republic of Germany'.¹⁰³

Two conditions apply, however: (a) the internal situation of the importing country must be 'positive', and (b) weapons may be delivered if there is no risk that their presence will exacerbate regional tensions. It is worth noting that the new concept of 'vital foreign policy and security interests of the Federal Republic of Germany' in principle allows arms to be exported even to countries that fall under the heading of 'areas of tension'.

VII. Sweden

Principal legislation

Lag om kontroll över tillverkningen av krigsmateriel, m.m., first issued in 1935, amended in 1983 and in 1988.¹⁰⁴

Förordning om kontroll över tillverkningen av krigsmateriel, m.m., first issued in 1983, amended in 1988.¹⁰⁵

Lag om förbud mot utförsel av krigsmateriel, m.m., first issued in 1982 and amended in 1988.¹⁰⁶

Förordning om förbud mot utförsel av krigsmateriel, m.m., issued in 1988.¹⁰⁷

The decision-making process

The sale of Swedish weapons and military services is administrated by the War Materials Inspectorate (KMI), attached to the trade department of the Ministry of Foreign Affairs.

Applications for export are usually preceded by a preliminary enquiry to the KMI. After consultations with representatives from the political department of the Ministry of Foreign Affairs and from the Ministry of Foreign Trade, the KMI offers the applicant a prognosis, to which, however, the government is not bound.¹⁰⁸

At a second stage, formal applications for authorization of production or sale are sent to the KMI, usually after deals have already been negotiated.¹⁰⁹ The KMI makes recommendations to the Government whereby all cases are presented to the responsible ministers.¹¹⁰ Controversial or otherwise significant deals are often referred to an Advisory Committee for War Materials Questions, established in 1984, chaired by the War Materials Inspector and composed of six members nominated by the parties to be represented on the Committee. This advisory committee, which meets once every month, was created specifically to include the legislative body in the review process.¹¹¹

For weapon exports of minor importance, the KMI presents the application to the Minister of Foreign Trade, who makes the final decision. Other ministers may be consulted if necessary. For major sales or sensitive cases, the decision is taken at Cabinet level. The Government then assumes responsibility for the decision.¹¹²

Out of an average of 2000 applications approved per year, fewer than 300 (constituting 95 per cent of the total value of arms exports) are approved by the Cabinet.¹¹³

Authorization refusals are rare as the procedure using preliminary enquiries

tends to eliminate impossible requests in the first round. All authorizations granted by the Government may be withdrawn, however, if regulations, conditions or control requirements have not been respected by the applicant or if for some other reason withdrawal is motivated.¹¹⁴

Legal conditions for arms transfer

The right to apply for Government authorization to produce weapons is restricted to Swedish citizens and firms.¹¹⁵ The right to apply for authorization to export is extended to foreigners residing permanently in the country.¹¹⁶ The 1988 arms export law includes provisions to the effect that Swedish state authorities now also must follow the regular authorization procedure.¹¹⁷

The legislation does not specifically refer to end-use certificates, but it has been Swedish practice to require them in most export authorizations. Since 1983 such end-use certificates contain a special non-reexport clause, while the previously imposed five-year limit has been abolished. Since 1985 end-use certificates are also required for exports of powders and explosives. An own production declaration (OPD) is required for the export of powders, explosives and standard elements for production purposes.¹¹⁸ The re-export ban applies here only to unaltered components, not to end-products. In a 1988 report the Government has stated that violation of Swedish non-reexport regulations would affect future arms deliveries to the country in question.¹¹⁹

Detailed information on weapon exports must be given to the Swedish Customs before and after the operation takes place, and additional reports are to be sent to the KMI every three months.¹²⁰

The Government determines what goods are to be defined as weapons.¹²¹

Both the export and licensed production abroad of Swedish weapons is prohibited by law unless exception is granted by the Government.¹²² Any amendments to agreements for foreign licensed production involving a change in the equipment, the re-export rights of weapons or know-how, or the period of validity or secrecy regulations of the agreement are prohibited unless prior authorization has been granted by the Government.¹²³ Authorization has also been required since 1983 for any kind of military-oriented training of foreign citizens in Sweden that is not organized by the state or is part of an already authorized deal.¹²⁴

Defence industries must keep accounts of their ongoing marketing operations and provide the KMI with quarterly reports on marketing activities of the preceding period, specifying clients, countries and *matériel* involved. The Government has the right to prohibit offers and agreements.¹²⁵ The 1988 law requires that Swedish arms companies inform the Government of deals involving the purchase of foreign capital.¹²⁶

*Government guidelines*¹²⁷

Guidelines for decisions on licences for weapon exports were laid down by Parliament in 1971 and have been reconfirmed in 1983 and again in 1988.¹²⁸ Though not binding on the Government, these guidelines constitute the framework for all export licence decisions.

The guidelines distinguish between unconditional and conditional restrictions. Unconditional restrictions refer to international agreements, resolutions by the UN Security Council or statutes of international law governing exports from a neutral country in wartime. The conditional restrictions are unilateral.¹²⁹

Exports may be granted only if the proposed deal is not in violation of any unconditional restriction. Exports cannot be granted to (a) states engaged in armed conflicts with other states, regardless of whether or not war has been officially declared; (b) states involved in international conflicts that may lead to armed conflicts; (c) states in which internal armed disturbances are taking place; and (d) states that as a result of declared intentions or of current political conditions can be expected to employ Swedish weapons to suppress human rights. The guidelines include special rules for delivery of spare parts and other components for systems already sold.¹³⁰

VIII. Italy

Principal legislation

Regio Decreto 18 giugno 1931, no. 773(1), testo unico delle legge di Pubblica Sicurezza.

*Decreto ministeriale 10 gennaio 1975, concernente la tabella "Esport". Disposizioni particolari in materia di esportazioni di merci, e successive modificazioni.*¹³¹

*Decreto ministeriale 4 dicembre 1986, concernente la disciplina relativa al rilascio delle autorizzazioni all'esportazione e al transito di materiale di armamento.*¹³²

*Decreto ministeriale 19 ottobre 1987, no. 444, concernente le indicazioni del vettore e delle modalità di spedizione per l'esportazione di materiale di armamento.*¹³³

A new law proposal for regulating the import, export and transit of arms was presented to Parliament in 1988.¹³⁴ Although parliamentary approval was still pending at the time of writing, a presentation of the main provisions of this proposed legislation is included below.

The decision-making process

Ministerial authorization is required for commercial negotiations involving the possible export of weapons and strategic materials as well as the transfer of relevant documents and information. Requests for such authorizations are to be submitted to the Defence General Staff. From there the request is passed on to the Office of the Minister of Defence which, after hearing the Ministry of Foreign Affairs and informing the Ministries of Foreign Trade and Industry, gives clearance on relevant political aspects. The Defence Service Staffs, the Office of the Secretary General for Defence/National Armaments Director and the Military Security Intelligence Service (SISMI) are heard for views on

technical and military aspects. Each body can deny authorization on grounds within its area of competence.¹³⁵ If the negotiations involve the export of classified materials, authorization from the National Security Authority of the Prime Minister's Office is required.¹³⁶

Export licences may only be issued for transactions resulting from authorized negotiations.¹³⁷ Export licence requests, submitted to the Ministry of Foreign Trade,¹³⁸ are vetted by a Committee for Examination of Questions concerning the Exports of Special Material and Products.¹³⁹ Export authorizations are given jointly by the Ministries of Foreign Trade and Finance.¹⁴⁰ For the actual export operation, a licence issued by the Ministry of Interior is required as well.¹⁴¹

Italian arms trade legislation does not provide for the direct involvement of Parliament in the decision-making process. However, the proposal before the Parliament in 1988 includes a provision that a detailed report on all arms deals be presented to Parliament once a year.¹⁴²

Legal conditions for arms transfer

An import and end-use certificate issued by the appropriate authority in the importing country is required. Confirmation is provided by the local Italian diplomatic service.¹⁴³ Since 1987 the transporter has had to present to the Italian Customs a detailed route and schedule to which he is then bound.¹⁴⁴ The Ministry of Foreign Trade may require that it also be handed the same information 30 days before the actual export.¹⁴⁵ In addition, the exporter must within 60 days of the expiration of the validity of the authorization present to the Ministry of Foreign Trade a 'verification certificate' issued by the authorities of the importing country, or any other valid document certifying that the exported goods have been received as specified.¹⁴⁶

A categorization of weapons is included in a general register, issued by the Ministry of Foreign Trade, listing all goods requiring ministerial approval for export. The last update of this register was made in May 1983.¹⁴⁷ The new law proposal includes a separate weapons list as well as a register of all arms producers and traders.¹⁴⁸

The legislation in force applies only to the transfer of hardware. It does not cover the export of military services or licensed production. If the new legislation is adopted by Parliament, the latter will be subject to regulation as well, however.¹⁴⁹

According to current legislation, the same terms apply to all countries. The new law proposal would facilitate negotiations with so-called 'friendly countries'¹⁵⁰ by only requiring that a notification of ongoing negotiations be sent to the Ministry of Foreign Trade. The proposed law would imply fewer restrictions for other countries as well, as negotiations would automatically be authorized if no refusal is given within 45 days after the receipt of the application.¹⁵¹ Authorization for export will still be required for all countries, however.¹⁵²

For the granting of export licences, current law simply requires that documentation is in order, that the operation is feasible in economic, political

and national security terms, and that the concrete utilization of the exported arms on the part of the importing country has been established.¹⁵³

According to the new law proposal, only sales to or with the full approval of other governments are to be authorized.¹⁵⁴ Arms exports inconsistent with Italian international engagements, national security, anti-terrorism efforts and the maintenance of friendly relations with other countries are to be prohibited, as are exports to countries at war and/or identified with human rights violations. However, the proposal includes provisions that allow the Government to override these criteria whenever it deems it necessary.¹⁵⁵

Notes and references

¹ *Politische Grundsätze der Bundesregierung für den Export von Kriegswaffen und sonstigen Rüstungsgütern*, published in *Bulletin*, Presse- und Informationsamt der Bundesregierung, 5 May 1982.

² These are included in *Regeringens proposition med förslag till lag om förbud mot utförsel av krigsmateriel, m.m.*, Bill no. 1971: 146 (Government Printer: Stockholm, 1971).

³ Though arms transfer control of some kind has occurred in some epochs, the period between 1870 and 1914 was one of complete *laissez-faire* (see note 5).

⁴ Ohlson, T. (ed.), SIPRI, *Arms Transfer Limitations and Third World Security* (Oxford University Press: Oxford, 1988), p. 2 (Introduction).

⁵ For a detailed history of these and other efforts, see Harkavy, R. E., *The Arms Trade and International Systems* (Ballinger: Cambridge, Mass., 1975), pp. 211–38; and Yakemtchouk, R., *Les transferts internationaux d'armes de guerre* (Pedone: Paris, 1980), pp. 24–120. Two Western organizations also deserve mention here, the Co-ordinating Committee for East–West Trade Policy (COCOM) created in 1949 to regulate trade with Warsaw Treaty Organization countries, and the China Trade co-ordinating Committee (CHINCOM) created in 1950 to regulate trade with China. These organizations prepared regularly updated lists of commodities banned for export to those countries. They introduced the Import Certificate/Delivery Unification (IC/DU) control system for granting import permits which is commonly integrated in national arms trade legislation.

⁶ See Stanley, J. and Pearton, M., IISS, *The International Trade in Arms* (Chatto & Windus: London, 1972), p. 5.

⁷ Information requests have been sent by SIPRI to all countries registered in the data base as major weapon exporters. Czechoslovakia, Kuwait and the USSR informed SIPRI that no information could be provided. China, Egypt, Greece, India, Indonesia, Jordan, Libya, North Korea, Poland, Romania, South Korea, Turkey and Yugoslavia have not replied. Replies from Brazil and Israel were received too late to be included in the study.

⁸ Sweden, the United States and the Federal Republic of Germany are the only countries in this study to involve their respective parliaments in the decision-making process.

⁹ Article 223 of the Treaty of Rome, signed on 25 March 1957, establishing the European Economic Community states that: 'Any Member State may take such measures as it considers necessary for the protection of the essential interests of its security which are connected with the production of or trade in arms, munitions and war material . . .'. *Treaties Establishing the European Communities* (Office for Official Publications of the European Communities: Luxembourg, 1973), pp. 329–30.

¹⁰ See chapter 6, section VI.

¹¹ The Mutual Security Act of 1954, *Legislation on Foreign Relations Through 1976*, US Senate, US House of Representatives, Joint Committee Print (US Government Printing Office: Washington, DC, 1977).

¹² The Foreign Assistance Act of 1961, *Legislation on Foreign Relations Through 1976*, US Senate, US House of Representatives, Joint Committee Print (US Government Printing Office: Washington, DC, 1977).

¹³ For International Traffic in Arms Regulations (ITAR), see *Code of Federal Regulations*, Foreign Relations, 22, arts 1 to 299, US National Archives (updated regularly).

¹⁴ See ITAR (note 13), §126.4 (a)(i).

¹⁵ See *Congressional Presentation for Security Assistance Programs, Fiscal Year 1988* (US Government Printing Office: Washington, DC, 1988), p. 344.

¹⁶ See Hammond, P. Y., Louscher, D. J., Salomone, M. D. and Graham, N. A., *The Reluctant*

Supplier: US Decision-Making for Arms Sales (Oelgeschlager, Gunn & Hain: Cambridge, Mass., 1983), p. 93.

¹⁷ See ITAR (note 13), §123.110 (e).

¹⁸ Congressional approval is required whenever funds have to be allocated for arms transfers.

¹⁹ Furthermore, as one of the legislative consequences of the Iran–Contras affair, a bill was passed by the Senate requiring the President to notify Congress of any covert action approvals within 48 hours. Reported in *Financial Times*, 18 Mar. 1988.

²⁰ The Supreme Court established a precedent on 23 June 1983 by overruling a legislative veto in the case of *Immigration and Naturalization Service v. Chadha*. The Chadha decision has rendered invalid specific congressional powers, especially the power under the AECA of 1976 to veto by concurrent resolution most major arms sales. See Destler, I. M., 'Life after the veto', *Foreign Policy*, no. 52 (fall 1983), p. 187.

²¹ From Smaldone, J. P., 'US commercial arms exports: policy, process, and patterns', in *Marketing Security Assistance: New Perspectives on Arms Sales*. (Lexington Books: Toronto, 1987), p. 193.

²² See ITAR (note 13), §123.22.

²³ See ITAR (note 13), §120.1 (b). This was general practice even before it was codified, however.

²⁴ See ITAR (note 13), §126.7 (a).

²⁵ See *Federal Register* (US Government Printing Office: Washington, DC, 1988), 26 Sep. 1988.

²⁶ See ITAR (note 13), §126.13.

²⁷ See ITAR (note 13), §120.2.

²⁸ See ITAR (note 13), §123.10 (110).

²⁹ See ITAR (note 13), §120.19 (a).

³⁰ This applies to Austria, Belgium, Denmark, France, the Federal Republic of Germany, Greece, Italy, Japan, Luxembourg, the Netherlands, Norway, Portugal, Turkey and the United Kingdom. See ITAR (note 13), §123.14 (a).

³¹ See ITAR (note 13), §24.1 (a).

³² See ITAR (note 13), §124.1 (a).

³³ See ITAR (note 13), §124.1 (b).

³⁴ See ITAR (note 13), §124.9.

³⁵ See ITAR (note 13), §124.10 (b).

³⁶ See ITAR (note 13), §126.1 (a).

³⁷ See ITAR (note 13), §126.1 (a) and (e).

³⁸ See ITAR (note 13), §126.1 (d).

³⁹ See ITAR (note 13), §126.1 (f).

⁴⁰ See ITAR (note 13), §126.7.

⁴¹ In a letter addressed to the United Nations Secretary-General and published in *Pravda* on 11 June 1988, Soviet Minister of Foreign Affairs Eduard Shevardnadze declared that '[t]he Soviet Union supports a call by the United Nations General Assembly for providing as much objective information as possible on the issues of the arms race and disarmament'.

⁴² SIPRI has requested the Embassy of the USSR in Stockholm to assist in making available official documents on legislation regulating the Soviet arms trade. The Embassy has replied that it was 'unable to get copies of the legal documents requested or any other details on that matter which could be of any practical use'.

⁴³ The agreement is reprinted in US Department of Defense, *Soviet Military Power 1984* (US Government Printing Office: Washington, DC, 1984), p. 130. See p. 98 for comments on the agreement.

⁴⁴ See registers on licensed production of weapons in previous *SIPRI Yearbooks*.

⁴⁵ See Krause, J., 'Soviet arms transfer restraint', in Ohlson (note 4), p. 103.

⁴⁶ All relevant French legislation is collected in *Opuscule 1074 du Journal Officiel, édition 1988; Journal Officiel de la République Française*.

⁴⁷ *Décret-loi du 18 avril 1939*, articles 12 & 13.

⁴⁸ *Arrêté du 12 mars 1973*, article 10.

⁴⁹ *Arrêté du 12 mars 1973*, article 7.

⁵⁰ *Décret No 55-965 du 16 juillet 1955*, articles 1 & 2.

⁵¹ *Arrêté du 12 mars 1973*, article 11.

⁵² See interview with Pascal Boniface, Socialist Party spokesman on defence and disarmament issues, in *Non-violence politique*, May 1984, p. 12.

⁵³ Information received through the French Embassy in Sweden. This number does not include authorizations for delivery.

⁵⁴ *Arrêté du 12 mars 1973*, article 15. However, according to André Collet, then Contrôleur

Général des Armées, authorizations valid up to 5 years are sometimes granted. Collet, A., 'Le régime des matériels de guerre, armes et munitions', in *Défense Nationale*, June 1985, p. 82.

⁵⁵ *Arrêté du 12 mars 1973*, article 16.

⁵⁶ *Arrêté du 12 mars 1973*, articles 17–19.

⁵⁷ *Décret No 73–364 du 12 mars 1973*, article 7.

⁵⁸ *Arrêté du 12 mars 1973*, article 12.

⁵⁹ See Dubos, J.-F., *Ventes d'armes: une politique* (Gallimard: Paris, 1974), p. 99.

⁶⁰ *Arrêté du 2 avril 1971*, article 1. A general classification covering hunting and other private arms as well (*Décret-loi du 18 avril 1939*, article 1, still in force) was used before the 1971 legislation.

⁶¹ *Arrêté du 30 mars 1981*, articles 1–6.

⁶² See Warusfel, B., 'Le contrôle des exportations stratégiques', in *Défense Nationale*, Feb. 1985, pp. 101–18.

⁶³ *Arrêté du 12 mars 1973*, article 5.

⁶⁴ *Arrêté du 2 avril 1971*, article 5.

⁶⁵ *Import, Export and Customs Powers (Defence) Act*, 1939, 2 & 3 Geo. 6. Ch. 69 (His Majesty's Stationery Office: London, 1939).

⁶⁶ *The Export of Goods (Control) Order*, 1987, No. 2070, Customs and Excise, Statutory Instruments (Her Majesty's Stationery Office: London, 1987).

⁶⁷ *Statement on the Defence Estimates 1988*, presented to Parliament by the Secretary of State for Defence (Her Majesty's Stationery Office: London, 1988), p. 43.

⁶⁸ See Pierre, A., *The Global Politics of Arms Sales* (Princeton University Press: Princeton, N.J., 1982), p. 107.

⁶⁹ The House of Commons does not normally receive any official information on this topic. In a recent parliamentary answer a junior defence minister (Mr Tim Sainsbury) explained this by saying: 'It has been the policy of successive Governments that information on specific arms export contracts is not normally disclosed because it is a commercially confidential matter between the supplier and the overseas purchaser'. *House of Commons Official Report, Parliamentary Debates*, 28 June 1988, volume 136 (Her Majesty's Stationery Office: London, 1988), p. 216.

⁷⁰ See Pearson, F. S., 'The question of control in British defence sales policy', in *International Affairs*, no. 59 (spring) 1983, p. 214.

⁷¹ See Pearson (note 70), p. 213.

⁷² See *The Export of Goods (Control) Order 1987* (note 66), article 5, p. 4.

⁷³ See Pearson (note 70), p. 215.

⁷⁴ These are: Afghanistan, Albania, Bulgaria, China, Czechoslovakia, the German Democratic Republic, Hungary, Mongolia, North Korea, Poland, Romania, the Soviet Union and Viet Nam.

⁷⁵ See *The Export of Goods (Control) Order 1987* (note 66), article 2, p. 2.

⁷⁶ *Grundgesetz für die Bundesrepublik Deutschland* (Bundeszentrale für politische Bildung: Bonn, 1984).

⁷⁷ *Gesetz über die Kontrolle von Kriegswaffen, Kriegswaffenliste*, in *Bundesgesetzblatt*, Jahrgang 1961, Teil I, pp. 444–515 and amendments in volumes for 1968, 1969, 1973, 1974, 1978 and 1987.

⁷⁸ *Außenwirtschaftsgesetz*, in *Bundesgesetzblatt*, Jahrgang 1961.

⁷⁹ See note 1.

⁸⁰ 'Zur Kriegführung bestimmte Waffen dürfen nur mit Genehmigung der Bundesregierung hergestellt, befördert und in Verkehr gebracht werden', *Grundgesetz für die Bundesrepublik Deutschland* (note 76), p. 33: artikel 26 §2.

⁸¹ See *Bonnkontakt*, Rüstungsexport, Ausgabe Nr. 90, 3 Apr. 1987 (Bonnkontakt Verlag: Bonn, 1987), p. 2.

⁸² See Federal Ministry of Defence, *White Paper 1985: The Situation and the Development of the Federal Armed Forces* (Ministry of Defence: Bonn, 1985), p. 358.

⁸³ See Federal Ministry of Defence (note 82), p. 359.

⁸⁴ See Federal Ministry of Defence (note 82), p. 165.

⁸⁵ See Federal Ministry of Defence (note 82), p. 165.

⁸⁶ See KWKG (note 77), §6 (1) 1.

⁸⁷ See AWG (note 78).

⁸⁸ See KWKG (note 77), §6 (2c).

⁸⁹ See KWKG (note 77), §4a.

⁹⁰ See KWKG (note 77), 2. *DV zum Gesetz über die Kontrolle von Kriegswaffen*, §4 (2).

⁹¹ See KWKG (note 77), *Kriegswaffenliste, Anlage zum KWKG*.

⁹² See KWKG (note 77), §1 (2).

⁹³ See *Ausfuhrliste, Liste für sonstige Waren und Technologien von strategischer Bedeutung*, p. 9, *Stand 1987* (Maschinenbau-Verlag: Bonn, 1987).

⁹⁴ See KWKG (note 77), §6 (2).

⁹⁵ See KWKG (note 77), §6 (3).

⁹⁶ See Introduction.

⁹⁷ These guidelines are still officially classified. Their content is discussed, however, in open sources, as in Cowen, R. H. E., *Defense Procurement in the Federal Republic of Germany* (Westview Special Studies in Military Affairs) (Westview Press: Boulder, Colo., 1986), p. 30.

⁹⁸ For an analysis of the use of this rule see Cowen (note 97), p. 264.

⁹⁹ *Politische Grundsätze der Bundesregierung für den Export von Kriegswaffen und sonstigen Rüstungsgütern* (note 1).

¹⁰⁰ *Politische Grundsätze* [. . .] (note 1), p. 309: I: NATO-Länder.

¹⁰¹ *Politische Grundsätze* [. . .] (note 1), p. 310: I: NATO-Länder.

¹⁰² *Politische Grundsätze* [. . .] (note 1), p. 311: III: Länder der Länderliste C.

¹⁰³ *Politische Grundsätze* [. . .] (note 1), p. 310: II: Nicht-NATO-Länder.

¹⁰⁴ *Lag om kontroll över tillverkningen av krigsmateriel m.m.*, SFS 1988: 558.

¹⁰⁵ *Förordning om kontroll över tillverkningen av krigsmateriel, m.m.*, SFS 1988: 562.

¹⁰⁶ *Lag om förbud mot utförsel av krigsmateriel, m.m.*, SFS 1988: 558.

¹⁰⁷ *Förordning om förbud mot utförsel av krigsmateriel, m.m.*, SFS 1988: 561.

¹⁰⁸ The Swedish authorization process for production and sales of war material is described in detail in a report, released in April 1988, by a government-appointed citizen-commission to investigate Swedish arms transfers, *Medborgarkommissionens rapport om svensk vapenexport*, SOU 1988: 15, pp. 27–36.

¹⁰⁹ See *Medborgarkommissionens rapport om svensk vapenexport* (note 108).

¹¹⁰ See *Regeringens skrivelse 1986/87*, Government writ no. 1986/87: 169 (Government Printer: Stockholm, 1986).

¹¹¹ See *Regeringens skrivelse 1986/87* (note 110), p. 3.

¹¹² See *Bilaga. Förteckning över krigsmateriel enligt lag om förbud mot utförsel av krigsmateriel, m.m.*, in *Krigsmaterielinspektionens handbok* (Bröderna Carlssons Boktryckeri: Varberg, 1988), p. 16.

¹¹³ See *Regeringens proposition med förslag till lag om förbud mot utförsel av krigsmateriel, m.m.* Bill no. 1987/88: 154 (Government Printer: Stockholm, 1988), p. 59.

¹¹⁴ See *Lag om förbud mot utförsel av krigsmateriel, m.m.*, SFS 1988: 558, §13.

¹¹⁵ See *Lag om kontroll över tillverkningen av krigsmateriel m.m.*, SFS 1988: 558, §2. Exceptions can be made in cases of minor importance.

¹¹⁶ See *Lag om förbud mot utförsel av krigsmateriel, m.m.*, SFS 1988: 558, §4.

¹¹⁷ Note 116.

¹¹⁸ *Krigsmaterielinspektionens handbok* (note 112), p. 17.

¹¹⁹ See *Regeringens proposition med förslag till lag om förbud mot utförsel av krigsmateriel, m.m.* (note 113).

¹²⁰ *Förordning om förbud mot utförsel av krigsmateriel, m.m.*, SFS 1988: 56, §10 and §17.

¹²¹ See *Bilaga. Förteckning över krigsmateriel enligt lag om förbud mot utförsel av krigsmateriel, m.m.*, in *Krigsmaterielinspektionens handbok* (note 112), pp. 36–38.

¹²² Legislation restricting licensed production and the transfer of technical knowledge was introduced in 1983. See *Lag om förbud mot utförsel av krigsmateriel, m.m.*, SFS 1988: 558, §4–5.

¹²³ See *Lag om förbud mot utförsel av krigsmateriel, m.m.*, SFS 1988: 558, §6.

¹²⁴ See *Lag om förbud mot utförsel av krigsmateriel, m.m.*, SFS 1988: 558, §7.

¹²⁵ See *Lag om förbud mot utförsel av krigsmateriel, m.m.*, SFS 1988: 558, §8–9.

¹²⁶ See *Lag om förbud mot utförsel av krigsmateriel, m.m.*, SFS 1988: 558, §10.

¹²⁷ See Introduction.

¹²⁸ See *Regeringens proposition med förslag till lag om förbud mot utförsel av krigsmateriel, m.m.*, Bill no. 1971: 146 and subsequent drafts (Bill no. 1981/82: 196, Bill no. 1987/88: 154).

¹²⁹ *Regeringens skrivelse 1986/87* (note 110), p. 21.

¹³⁰ *Regeringens skrivelse 1986/87* (note 110), p. 21.

¹³¹ Published in *Supplemento ordinario alla Gazzetta Ufficiale*, no. 179, 1 July 1983, pp. 7 and following.

¹³² Published in *Gazzetta Ufficiale della Repubblica Italiana*, serie generale, no. 284, 6 Dec. 1986, pp. 19–21.

¹³³ Published in *Gazzetta Ufficiale della Repubblica Italiana*, serie generale, no. 255, 31 Oct. 1987, pp. 37–38.

¹³⁴ *Testo Unificato* of 23 Sep. 1988, Camera dei Deputati (Rome, 1988), pp. 1–26. The proposal was prepared with the participation of all parliamentary parties. It was presented to the Parliamentary Foreign Affairs Commission on 28 Sep.

¹³⁵ See *Defence Appendices, White Paper 1985* (Italian Ministry of Defence: Rome, 1985), p. 186.

- ¹³⁶ According to Law 1161 of 11 July 1941.
- ¹³⁷ See *Decreto ministeriale 4 dicembre 1986*, article 2.1.
- ¹³⁸ See *Decreto ministeriale 4 dicembre 1986*, article 1.1.
- ¹³⁹ See *Decreto ministeriale 4 dicembre 1986*, article 4.3.
- ¹⁴⁰ See *Decreto ministeriale 4 dicembre 1986*, article 5.
- ¹⁴¹ See *Decreto ministeriale 4 dicembre 1986*, article 6.1, referring to article 23 of *Legge di Pubblica Sicurezza* of 1931.
- ¹⁴² *Testo Unificato* (note 134), article 4, pp. 8–9.
- ¹⁴³ See *Decreto ministeriale 4 dicembre 1986*, article 2.2.
- ¹⁴⁴ See *Decreto ministeriale 19 ottobre 1987*, article 1.1.
- ¹⁴⁵ See *Decreto ministeriale 19 ottobre 1987*, article 2.1.
- ¹⁴⁶ See *Decreto ministeriale 4 dicembre 1986*, article 7.
- ¹⁴⁷ See *Decreto ministeriale 27 maggio 1983*, *Tabella "Esport"*. *Disposizioni particolari in materia di esportazioni di merci*.
- ¹⁴⁸ *Testo Unificato* (note 134), articles 2–3, pp. 3–5.
- ¹⁴⁹ *Testo Unificato* (note 134), article 1.2, p. 1.
- ¹⁵⁰ The 'friendly countries' are according to *Testo Unificato* NATO, WEU, Council of Europe and EEC members. Note 134, article 8.2, p. 12.
- ¹⁵¹ *Testo Unificato* (note 134), article 8.8, p. 13.
- ¹⁵² *Testo Unificato* (note 134), article 12, pp. 12–17.
- ¹⁵³ See *Decreto ministeriale 4 dicembre 1986*, article 4.3.
- ¹⁵⁴ *Testo Unificato* (note 134), article 1.2, p. 1.
- ¹⁵⁵ *Testo Unificato* (note 134), article 1, pp. 1–3.

9. Major armed conflicts in 1988

KARIN LINDGREN, G. KENNETH WILSON and PETER
WALLENSTEEN

I. Reduced conflict activity in 1988

During 1988, 33 major armed conflicts were waged in the world, according to the following criteria: prolonged combat between the military forces of two or more governments or of one government and organized armed opposition forces, involving the use of manufactured weapons and incurring battle-related deaths of at least 1000 persons (see table 9.1).¹ Since 1945 the world has seen more than 160 conflicts of this type.² By the end of 1988 the number of armed conflicts which were still militarily active had dropped to 28, following agreements concluded during the year among warring parties in five conflicts. In addition, promising developments towards conflict resolution occurred in seven other major conflicts.³ Thus, in 1988 there was a clear break in the pattern of a constant increase in the number of major conflicts to which the world had grown accustomed during the 1980s.

By the end of 1988, mutually agreed solutions seemed to be attainable in five major armed conflicts (in the Iraq–Iran, Ethiopia–Somalia and Chad–Libya conflicts, and in Angola and Namibia). Some of these conflicts were among the most destructive since the Viet Nam War. In seven conflicts there were significant changes in military operations during the year. These include the conflicts in Afghanistan, with Soviet troop withdrawals to be completed by 15 February 1989; in Nicaragua, with reduced violence between the Government and the Contras; and in Kampuchea, with unilateral Vietnamese withdrawal. The conflict between India and Pakistan and that between Laos and Thailand saw some lowering of tension, the latter after an intense period of fighting early in the year. Finally, in Uganda, a country which has long been troubled by serious internal conflict, prospects for agreement increased following a Government-declared amnesty and the integration of opposition forces into the national Army.

Four conflicts recorded for 1987⁴ do not appear in the table this year. In Zimbabwe and Pakistan, progress towards national integration and democratization has meant that conflicts of interest are now disputed by peaceful means. In Syria, the Government has established clear dominance over opposition groups, with no military opposition activity recorded for 1988. In Thailand, a combination of these factors has reduced the scale of domestic conflict.

II. Counter-developments in 1988

The picture of 1988 is complicated by the addition of one major conflict this year which was not recorded in 1987: the internal conflict in Somalia. This conflict was previously regarded as part of the war between Ethiopia and

Somalia. Following the 10-point agreement concluded between the two governments on 3 April 1988 in Mogadishu, Somalia, each side ceased to support internal opposition against the other side. The effect of this was an intensification of some of the internal conflicts in Somalia as well as in Ethiopia. Thus, the Somali National Movement, largely based on the Isaaq clan rooted in the north of the country, waged a series of attacks in Somalia, capturing major towns. As this conflict has its own particular origin, it is treated here as a separate conflict in 1988 and included in the table as such.

In the Afghanistan conflict there was continued escalation in spite of the agreements concluded in 1988. The Geneva Accords implicitly defined this conflict as one between Afghanistan and Pakistan but did not address the internal question of government in Kabul. While the agreements did start the withdrawal of Soviet forces and foreign support, that is, the scaling down of superpower involvement, the original conflict between the communist regime and the Muslim opposition was left unresolved, and warfare continued unabated after Soviet troops began to pull out. Towards the end of 1988, direct contacts were made between Soviet and Muslim representatives.

The conflict in Sri Lanka did not progress towards a settlement in spite of important political developments. Singhalese groups became more active in opposition to the Indo-Sri Lankan agreement of July 1987, conducting a campaign of violence during regional elections—held according to the provisions of that agreement—and during the presidential election in December 1988. Under the 1987 agreement, Ranasinghe Premadasa, the winner of the 19 December presidential election, has the authority to ask the Indian forces to leave at any time. His election campaign included suggestions that he would do this and at the same time seek a Friendship Treaty with India.

Several conflicts intensified dramatically during the year. Burma is one case in which new issues were added to previous ones, involving communist and ethnic opposition to the regime. Largely non-violent efforts to liberalize the government and remove the military from power resulted in a violent government reaction and a return to power of more repressive forces. Escalation of violence was also evident in Iraq (with the use of chemical weapons against the Kurds), Iran, Ethiopia and Somalia. In these four cases, the escalation partly related to efforts to resolve the international disputes. Following the cease-fire with Iran, Iraq tried to recapture territory in the north of the country. In Iran there were reports of intensified internal fighting. Following the 1988 agreement with Somalia, Ethiopia directed forces against Tigray and Eritrea, to recapture towns taken by opponents demanding autonomy and independence. The internal violence was also stepped up in Somalia.

Fighting increased in three additional conflicts in which significant positive changes also took place: the Israeli-Palestinian conflict, in southern Sudan and in the Philippines. In Israel, the Palestinian uprising on the West Bank and in Gaza, the *intifada*, which began in December 1987 and continued throughout 1988, profoundly changed this conflict. Palestinians revolting against the conditions of occupation with non-military means were met by fire from Israeli soldiers. The casualties were nearly all Palestinians killed by Israeli military

forces. In November the Palestinian National Council proclaimed a Palestinian state in the territory and, by accepting UN Security Council Resolutions 242 and 338, implied recognition of Israel. The initial official Israeli reactions were negative. At the end of the year, following the address by the chairman of the Palestine Liberation Organisation (PLO), Yasser Arafat, before the United Nations in Geneva in December—condemning terrorism and recognizing the right of Israel to exist—the USA announced that it would commence direct talks with the PLO. In the conflict over southern Sudan, contacts were also established between opposing parties. In the conflict between the Philippine Government and the New People's Army/Communist Party of the Philippines (NPA/CPP) no progress was reported. In some of the more regionally confined conflicts in the country, however, plans for regional autonomy were presented.

The number of refugees from the countries involved in these conflicts remained high. The numbers increased following from the intensified conflicts in, for instance, Sudan, Ethiopia and Somalia, while in Central America some of the refugees have returned to their countries of origin. Finally, it should be noted that massacres and high levels of repression are not recorded here as major conflicts. Such events should not be overlooked, however. Among the particularly dramatic events in 1988 were the massacres in August in Burundi, where a series of brutal actions were directed by one ethnic group against another. No reliable casualty estimates are available, but the number of deaths was in the thousands. A flow of refugees into neighbouring countries testified to continued tension in the country. However, by the time of writing (January 1989) there were no indications that this violence included organized armed opposition against the regime (a criterion for inclusion in the table of major armed conflicts).

III. Conflict characteristics

One of the 33 major conflicts in 1988 was located in Europe, five were located in the Middle East, five in South Asia, six in Pacific Asia, eleven in Africa, and five in the combined region of Central and South America.

The issues at stake in the 33 conflicts varied considerably. Conflicts of this magnitude seldom involve only one issue; it is not easy to determine which root causes are the most important, and the significance of issues is often different for different actors. However, a number of observations can be made. Border issues were significant elements in 5 conflicts (e.g., Ethiopia–Somalia) and regional autonomy or independence was significant in 11 conflicts (e.g., Ethiopia, Western Sahara and Israel–Palestine). In 17 conflicts, that is, over one-half, control over central government was an issue. Many of the latter concerned either a left–right continuum (e.g., the conflicts in Central and South America, Kampuchea, Malaysia and the Philippines) or a clash over the role of religion in society (e.g., in Iran and Afghanistan). Some conflicts combined several of these properties, for example, religious and regional issues, in Sudan and Northern Ireland.

Outside interference remained a salient feature in spite of the agreed withdrawals of foreign forces from Afghanistan, Angola and Namibia. For the

Irish Republican Army (IRA), the presence of British troops in Northern Ireland was a central issue, and groups in Sri Lanka disputed the presence of Indian troops on the island. Outside support for one side in a conflict was also a feature, involving the superpowers (e.g., US support for the Duarte Government in El Salvador, and Soviet support for the Mengistu Government in Ethiopia) or neighbouring countries (e.g., South African support for the National Resistance Movement, the MNR, in Mozambique; Sudan's provision of basing facilities for Eritrean fighters; and Ethiopia's housing of the leadership of the southern Sudan movement).

In terms of conflict resolution the United Nations played a key role in several situations, as elaborated in chapter 13 of this *Yearbook*. However, it should be noted that regional organizations were also important, such as the Organization of African Unity in the dispute between Chad and Libya. Neighbouring countries played a significant role in defusing tension in Central America and in the Ethiopia–Somalia conflict.

Notes and references

* The assistance of Ms Masako Ikegami is gratefully acknowledged.

¹ To be included in the SIPRI list of major armed conflicts, a conflict must exhibit some degree of intensity, that is, result in more than 1000 battle-related deaths. This criterion leads to the exclusion of two additional armed conflicts in Europe: the conflict in the Basque provinces of Spain and France, resulting since 1968 in more than 600 deaths, and the conflict between the Turkish Government and the Kurdish Workers' Party (PKK), resulting since 1984 in around 700 deaths.

² Compare Gantzel, K.-J. and Meyer-Stamer, J. (eds), *Die Kriege nach dem Zweiten Weltkrieg bis 1984* (Weltforum: Munich, 1986).

³ See the table of 36 major armed conflicts in 1987, reported in Wilson, G. K. and Wallenstein, P., 'Major armed conflicts in 1987', SIPRI, *SIPRI Yearbook 1988: World Armaments and Disarmament* (Oxford University Press: Oxford, 1988), chapter 9.

⁴ See Wilson and Wallenstein (note 3).

Table 9.1. Major armed conflicts in the world, 1988

Location	Year formed/ year joined ^a	Warring parties	No. of troops in 1988 (thou.)	Deaths ^b (thou.)	Change from 1987 ^c
Europe					
Northern Ireland (UK)	1922/1969	Protestant Irish paramilitary, British Govt and Ulster Defence Regiment vs. IRA	(10) 16.5 0.2–0.5	1969–88: >2.6 1988: 0.1	0

Comments: The present conflict was formed in 1922 following the agreement to create the Free State of Ireland in the south of the island, while retaining the north as part of the UK. The conflict was rejoined in 1969. An Anglo-Irish agreement of Nov. 1985 granting increased rights to Catholics did not diminish the violence. The agreement is resented by both the IRA (Irish Republican Army) and Protestant loyalists. In 1988 violence increased somewhat. Attention concentrated on British special forces killing 3 IRA men in Gibraltar. Planned attacks by the IRA on British installations in Western Europe were intercepted. In autumn 1988 secret talks were held between some of the non-warring parties in Northern Ireland.

Location	Year formed/ year joined ^a	Warring parties	No. of troops in 1988 (thou.)	Deaths ^b (thou.)	Change from 1987 ^c
Middle East					
Iraq-Iran	1979/1980	Iraqi Govt vs. Iranian Govt	1000 ^e 1700 ^f	1980-82: 27 (mil.) 1982-88: 500 1988: >5 (mil.)	0
<p><i>Comments:</i> In the first half of 1988 the war escalated, with missile attacks on capitals (Feb. and Mar.), use of chemical weapons (Mar.) and increased involvement by the USA, including the shooting down of a civilian Iranian aircraft (July). US military involvement was said to protect shipping through the Gulf, but involved the country in fighting only with Iran. Iraqi military advances (particularly in June). Iran announced on 18 July that it would accept the cease-fire called for in UN Security Council Resolution 598 of 1987. The cease-fire, supervised by UN observers, went into effect on 20 Aug. 1988. Negotiation with the UN Secretary-General special representative as mediator continued throughout the year, in New York and Geneva.</p>					

Iran	1972/1979	Iranian Govt vs. Kurds, NLA (Mujahideen Khalq) and other opposition	100 (10-15) 15 ..	1979-87: 15 1988: >2	++
------	-----------	---	----------------------------	-------------------------	----

Comments: Kurds seeking greater autonomy or independence in the mountainous north-west became very active militarily following the overthrow of the Shah in 1979. The establishment of 'liberated zones' led to the 1983-84 campaign by Iranian forces to regain control. While opposition inside Iran has largely been suppressed, other ethnic minorities have at times been in armed revolt against the Khomeini Govt, including Baluchis, Azerbaijanis and Khuzistani Arabs. In addition, the Iranian National Liberation Army (NLA, Mujahideen Khalq) seeks to overthrow the Khomeini Govt. It receives aid from Iraq, where its leadership is based. During 1988 both the Kurds and the NLA increased their co-operation with Iraq. The Kurds are receiving military training in special camps set up by the Iraqis. The NLA was involved in some of the heaviest fighting in the Iraqi offensives, near Kermanshah, losing over 2000 troops. On 18 July 1988 Iran accepted UN Security Council Resolution 598 and a cease-fire took effect on 20 Aug. Civil strife continues behind the front-line. Amnesty International reported a high number of executions of political prisoners since the cease-fire.

Iraq	1961/1962 /1974 /1980	Iraqi Govt vs. Kurds and Communists (ICP)	100 15 (1)	1961-70: 5 (mil.) 100 (civ.) 1988: <5	++
------	-----------------------------	---	------------------	---	----

Comments: Kurds received aid from Iran in the mid-1970s and during the Iraq-Iran War. Leading parties have been the Democratic Party of Kurdistan (DPK), Patriotic Union of Kurdistan (PUK) and Socialist Party of Kurdistan. In 1987 a new alliance reportedly formed with the Syrian-based Kurdish Workers' Party (PKK). Armed opposition from the Iraqi Communist Party (ICP) has been reported. In 1987 and early 1988 the DPK and PUK, with Iranian support, slowly advanced through Kurdish parts of Iraq. After the cease-fire in the Iraq-Iran War, Iraq moved against the Kurds and drove DPK and PUK members out of nearly all of Iraq. Approx. 60 000 Iraqi troops took part in the offensive. Reported use of chemical gas by Iraq in Mar. (Halabja) and Aug. 1988 (after cease-fire), mainly against civilians within Iraq; Iraqi Govt denies this. Many Kurds have fled Iraq for southern Turkey and Iran.

Location	Year formed/ year joined ^a	Warring parties	No. of troops in 1988 (thou.)	Deaths ^b (thou.)	Change from 1987 ^c
Israel/Palestine	1948/1948	Israeli Govt vs. PLO (based in Lebanon), other Palestinian groups	130 ^d 8-11 ..	1948-88: >10 1988: <0.3 (mainly civ.)	++

Comments: Fighting in 1988 between Israeli soldiers and Palestine Liberation Organization (PLO) forces in Lebanon. Israel made air strikes against camps in Lebanon. Since Dec. 1987 the conflict has centred on the Israeli-occupied territories of the West Bank and Gaza Strip, where a significant uprising, the *intifada*, is taking place. Palestinians use non-military means to attack Israeli soldiers and have initiated economic measures against Israel's presence in occupied territories. Israeli counter-measures include military actions, arrests, expulsions and the destruction of houses. On 15 Nov. 1988 the Palestine National Council (PNC), the parliament-in-exile of the PLO, declared an independent Palestinian state. UN Security Council Resolutions 242 and 338 were accepted by the PNC as the platform for an international peace conference, which implicitly is thought to recognize Israel. In Dec. the USA and the PLO commenced direct talks.

Lebanon	1975/1975	Lebanese Governing Parties (Aoun, Hoss), Lebanese Army, Lebanese Force Command, Christians, Druse, Muslim Militia, Syria, Israel, SLA, PLO	30 <19 (40) (40) 30-35 1 2 8-11	1975-88: <130 (2/3 mil.) 1988: <0.3	0
---------	-----------	---	--	---	---

Comments: Civil war among Christians, Muslims, Druse and Palestinians since 1975. Different Christian armed units are in conflict with each other. Sunni Muslim armed units are in conflict with Christian troops. Battles in southern Beirut between Hezbollah (Shi'ite Muslim, pro-Iran) and Amal (Shi'ite Muslim, pro-Syria) in May and Nov. 1988 caused at least 200 deaths. Other reported clashes during 1988 were: Amal vs. PLO (Palestine Liberation Organization), SLA (South Lebanese Army, Israeli-supported) vs. Druse Militia, SLA vs. Shi'ite Militia, Israel vs. Hezbollah, Govt and Syria vs. Muslim fundamentalists (Apr.) and Govt vs. Christian Falangists (Sep.). There were also kidnappings of foreign personnel. In 1988, 10 000 of the 30 000-35 000 Syrian troops in Lebanon were reportedly stationed in Beirut. Israel also has troops in the country, and the SLA controls the southern-most part of Lebanon. Iranian paramilitary troops (Islamic Revolutionary Guard Corps, IRGC) are also reported to have some troops (1000-2000) in Lebanon. Israeli attacks, mainly air raids on Palestinian camps (over 25 in 1988), continued (one larger raid carried out in Oct. near Beirut), and left approx. 100 dead. UN peace-keeping troops, UNIFIL (5800 men, Dec. 1988), patrol the area. Election in late 1988 of a new president in Lebanon failed. Two rival Govts, led by Gen. Aoun (Maronite Christian) and Mr Hoss (Sunni Muslim), head Lebanon (as of Dec. 1988).

Location	Year formed/ year joined ^a	Warring parties	No. of troops in 1988 (thou.)	Deaths ^b (thou.)	Change from 1987 ^c
South Asia					
Afghanistan	1978/1978	Afghan Govt and	40	1978-88: >150	0
		USSR vs.	115 (Jan.)	(mil.)	
			50 (Dec.)	>300	
		Afghan Mujahideen	50	(civ.)	

Comments: UN mediation in Geneva resulted in an agreement on 14 Apr. 1988 on Soviet troop withdrawals, to be completed by 15 Feb. 1989, a reduction in arms deliveries to the fighting parties, and a return of refugees. UN observers monitor Soviet troop withdrawals, which began on 15 May. The USA and the USSR are co-guarantors of the agreement. Soviet troops reduced by one-half by mid-Aug. Fighting continued unabated between Kabul Govt and Muslim opposition groups. Alliance of 7 resistance groups announced the formation of a transitional Govt (July). In Dec. talks took place between Soviet officials and guerrilla representatives in Saudi Arabia and Pakistan. Estimates of civilian deaths are very uncertain and could be much higher than reported here. In May the USSR officially acknowledged that c. 13 300 Soviet soldiers had died in battle and 35 500 had been wounded in the war. In June the Kabul Govt informed the UN that 243 900 members of the armed forces and 'civilian supporters of the state' had been killed during the war. In Feb. 1989 Soviet authorities put the Soviet death toll at 15 000.

Burma	1948/1948 /1988	Burmese Govt vs.	170 ^d	1948-51: 8	+
		Communists,	10-15	1980: 5	
		KNLA,	4-10	1981-84: 0.4-0.6	
		other ethnic	12-20	yearly	
		opposition, and other opposition	..	1985-87: >1 yearly 1988: >1	

Comments: At least 14 separatist and revolutionary armed groups have fought against the central Govt since 1948. In 1975 the National Democratic Front (NDF) was formed by 5 insurgent organizations of national minorities. The Burma Communist Party (BCP, not a minority-led group) is regarded as the largest opposition force; its activities have lessened in recent years as support from China has decreased. In Mar. 1986 a military-political alliance was formed between the Karen National Liberation Army (KNLA, the armed wing of the Karen National Union) and the BCP. In 1987 the Govt launched a major military campaign against insurgent groups, the heaviest fighting with the KNLA. Govt control in many areas is weak. In 1988 there were also reports of clashes between Mon and Karen separatist groups. In Aug.-Sep. 1988 there was a massive campaign for democracy, led by students and Buddhist monks, and the then ruling party BSPP voted on 10 Sep. for a multi-party system. This led to a military take-over on 18 Sep. The National Unity Party (NUP) has been the ruling party since 29 Sep. High death tolls reported during Aug. and after military take-over. Many students believed to be in hiding, and over 5000 said to have gone to areas along the borders with Thailand and China held by ethnic rebels, for arms and military training.

Location	Year formed/ year joined ^a	Warring parties	No. of troops in 1988 (thou.)	Deaths ^b (thou.)	Change from 1987 ^c
India	1947/1947 /1981	Indian Govt vs. Sikh separatists, ethnic and religious opposition	24 9	1983-88: >14 1988: >2	0

Comments: Attacks by Sikh groups (the Khalistan Liberation Army and the Khalistan Commando Force) led to the Govt's military assault in June 1984 on the Golden Temple (the main Sikh shrine), resulting in 1000 deaths. Sikhs assassinated Prime Minister Indira Gandhi in Oct. 1984. Nearly 6000 died from Sikh violence in 1984-87. In early 1988 Sikh groups again occupied the Golden Temple, eventually evicted in 'Operation Black Thunder' ending on 18 May. In late May 1988 high-level talks between India and Pakistan produced agreements on measures to prevent illegal cross-border movements of Sikh groups, arms and drugs. For opposition other than Sikh separatists there has been a reduction of armed activities during 1988. However, ethnic violence was reported in Tripura in Jan. 1988, when 30 people died. In early July 1988 a delegation of Tripura National Volunteers (TNV) held secret talks with central and local Govt representatives and a memorandum was signed, lifting the ban on the TNV insurgents, who will be disarmed and granted more political representation. The two-year-old violent separatist struggle of the Gurkhas (GNLF, Gurkha National Liberation Front) was terminated in Aug. 1988 by agreements between the GNLF and the West Bengali and Central Indian govts, respectively. Indian citizenship was granted to the Gurkhas and a local Gurkha council created, but subsequent violence during elections resulted in many deaths. The conflict in Nagaland erupted again in Apr. when guerrillas of the Nagaland Liberation Front ambushed an army convoy.

India-Pakistan	1947/1965 /1971 /1984	Indian Govt vs. Pakistani Govt	1100 ^d 450 ^d	1971: 11 (mil.) 1988: <0.1	-
----------------	-----------------------------	-----------------------------------	---------------------------------------	-------------------------------	---

Comments: Since independence in 1947 there have been several wars—first over partition, then over Kashmir and East Pakistan. Long-standing mistrust between the two countries has been increased by trouble in Punjab Province. India claims Pakistan supports Sikh militants. Tension rose as a result of large-scale military exercises close to the border in early 1987. Skirmishes between special mountain brigades of the two sides occurred in late 1987 and in Feb. and Aug. 1988. Some loss of life was inflicted, from both fighting and the severe weather conditions in the Siachin region. In May co-operation was increased to reduce illegal cross-border traffic in the Punjab, but some exchanges of fire occurred there in Aug. Following the death of President Zia-ul-Haq in Aug. Benazir Bhutto was elected Prime Minister of Pakistan in Nov. Tension was lowered in the area, culminating in a meeting of the prime ministers of India and Pakistan in mid-Dec.

Sri Lanka	1976/1983	Sri Lankan Govt and India vs. Tamil Tigers (LTTE) and Singhalese JVP (DJV)	40 50 2 ..	1983-88: 9 1988: 3	+
-----------	-----------	---	---------------------	-----------------------	---

Comments: The agreement of July 1987 between India and Sri Lanka placed Indian troops (Indian Peace-Keeping Forces, IPKF) on the island. Since Oct. 1987 IPKF has been fighting

Location	Year formed/ year joined ^a	Warring parties	No. of troops in 1988 (thou.)	Deaths ^b (thou.)	Change from 1987 ^c
----------	--	--------------------	--	--------------------------------	-------------------------------------

against forces from the Tamil Tigers (Liberation Tigers of Tamil Eelam, LTTE). In 1988 IPKF controlled most of the Tamil-populated areas, but sporadic opposition continued during the year. Of the 50 300 Indian troops sent to Sri Lanka, 500 were killed and 1500 injured. The Tamils are estimated to have lost 2000 men. A temporary cease-fire was called in Sep. to allow the Tamils to prepare for participation in regional elections in Nov. The Sri Lankan Govt announced in Oct. that it had decided to combine the northern and eastern Tamil areas of the country. The Singhalese People's Liberation Front (JVP), who oppose the partial Tamil autonomy agreement between Sri Lanka and India, became a new party to the conflict in Nov. 1987. Since the agreement was signed 500-600 lives have been lost in the conflict between the JVP (the DJV, Patriotic People's Organization, widely believed to be the JVP's military wing) and the Govt. During Nov. and Dec. violence escalated in connection with the presidential election, which the JVP boycotted. Security forces attacked alleged JVP operatives.

Pacific Asia

China-Viet Nam	1979/1979	Chinese Govt vs. Vietnamese Govt	250 250	1979: 21 (mil.) 9 (civ.) 1980-87: 1 1988: <0.1	0
----------------	-----------	-------------------------------------	------------	---	---

Comments: Border skirmishes have continued since the Chinese-Vietnamese War in 1979. There have been mostly artillery exchanges, cross-border raids and sporadic ground attacks. Attacks appear to be linked to Vietnamese actions in Kampuchea. Military action along border during 1988. The conflict over the Spratly Islands, claimed by both China and Viet Nam (among others), resulted in naval clashes between the two countries in mid-Mar. 1988, causing a number of deaths.

Indonesia	1975/1975	Indonesian Govt vs. 14 Fretilin, 0.2 FPM 0.1	1975-80 10 (mil.) 90 (civ.) 1980-87: 0.1 yearly 1988: <0.1	0
-----------	-----------	--	---	---

Comments: Indonesia's invasion in 1975 of East Timor, a former Portuguese colony seeking independence through the political organization Fretilin, resulted in over 100 000 deaths by 1979. Indonesian troops still occupy East Timor (since annexed by Indonesia). In 1988 Fretilin was reported to be active only in the eastern part of East Timor. The Roman Catholic Church was reported to have mediated in Sep. 1988. Another conflict in Indonesia, which continued on a low level during 1988, is that over West Irian (the Free Papua Movement, FPM). FPM is reported to have bases on Papua New Guinea's side of the border and to cross into Indonesia and ambush Indonesian troops. The Free Aceh Movement has been active in the north-western province of Sumatra throughout the 1980s.

Location	Year formed/ year joined ^a	Warring parties	No. of troops in 1988 (thou.)	Deaths ^b (thou.)	Change from 1987 ^c
Kampuchea	1970/1970 1975/1975 1978/1978	PRK Govt, Viet Nam vs. Khmer Rouge, KPNLF, ANS, Thailand	35-40 100-120 (Jan.) 50-70 (Dec.) 30-40 11-15 8-18 166 ^d	1970-75: 156 1975-78: 500 (mil.) 1500 (civ.) 1979-87: 10 (mil.) 14 (civ.) 1987: <1 1988: <0.2	--

Comments: Original 140 000 Vietnamese troops were gradually and unilaterally withdrawn, leaving 50 000-70 000 men in Dec. 1988. Viet Nam announced complete withdrawal by end 1990. According to Vietnamese figures, 30 000 civilians and military were killed in 1977-79, and 25 000 Vietnamese soldiers were killed in fighting with the Khmer Rouge in 1979-88. Armed opposition is made up of a coalition of Khmer Rouge, Khmer People's National Liberation Front (KPNLF) and Armée Nationale Sihanoukist (ANS), forming the Coalition Govt of Democratic Kampuchea (CGDK), recognized by the UN. Govt has built a defence line along the border with Thailand to prevent Khmer Rouge cross-border offensive. Khmer Rouge regularly attacks villages inside Kampuchea in low-level war. During 1988 reports of fighting between Khmer Rouge and PRK Govt as well as between Khmer Rouge and ANS (June). Arms buildup by Khmer Rouge inside Kampuchea reported. China's support to Khmer Rouge said to be reduced (Dec.). The USA supports non-communist opposition. Jakarta Informal Meeting held in Bogor, Indonesia, on 25-28 July between representatives of CGDK (incl. Khmer Rouge), PRK Govt and others (incl. Viet Nam, Laos and ASEAN countries). Meeting failed to produce final communiqué but new meeting is planned for early 1989. Other meetings to solve the conflict were held between China and the USSR (Aug.), between CGDK (without Khmer Rouge) and PRK Govt (Oct.) and between Prince Sihanouk and Khmer Rouge (Dec.).

Laos-Thailand	1975/1975 /1976	Pathet Lao Govt, Viet Nam vs. Thailand	53 ^d (40-45 ^d) 166 ^d	1975-88: 10 (mil.) 30 (civ.) 1988: 0.3	++
---------------	--------------------	--	--	--	----

Comments: Widespread warfare in 1975-79 following the Pathet Lao's assumption of power. Low-level insurgency mainly by the National Liberation Front (NLF) and Hmong tribesmen until 1987. Opposition against Pathet Lao Govt largely based in Thailand. Clashes between Thai troops and Lao Govt troops over the disputed frontier, first reported in 1976, increased at the end of 1987. On the Thai-Laos border, battle continued into Feb. 1988, causing over 250 deaths. On 17 Feb. a cease-fire was agreed and negotiations were set in progress. In Nov. Viet Nam announced that all its troops were leaving Laos, since relations with both China and Thailand had improved.

Malaysia, Thailand	1945/1945	Malaysian Govt, Thailand vs. CPM (CPT)	90 ^d 166 ^d 1.3	1988: <0.1	0
-----------------------	-----------	--	--	------------	---

Comments: Communist Party of Malaysia (CPM) guerrillas are mainly based in Thailand and in border areas (as are some of the CPT, Communist Party of Thailand, guerrillas). Joint air raids by Thai and Malaysian air forces against suspected communist bases in border region, followed by 300 ground troops in mid-Mar. Amnesty was offered and some members of CPM surrendered to the Thai Govt. 'Friendship villages' were created in Thailand for former CPM members.

Location	Year formed/ year joined ^a	Warring parties	No. of troops in 1988 (thou.)	Deaths ^b (thou.)	Change from 1987 ^c
Philippines	1968/1970 /1986	Philippine Govt vs. NPA, MNLF, MILF, military opposition	170-180 ^{d,g} 25 10 .	1972-87: 20 (mil.) 15 (civ.) 1988: >1.5	+

Comments: During 1988 fighting intensified between Govt forces (AFP) and New People's Army (NPA), connected to the Communist Party of the Philippines (CPP). Increased strength of NPA reported. In Dec. the Army launched a heavy offensive in the Quezon province, as part of 'total war' policy. 'Vigilante' groups appeared. Human rights violations reported. The armed conflict on Mindanao between the central Govt and the MNLF (Moro National Liberation Front) has ebbed. The MILF (Moro Islamic Liberation Front) fights against both the MNLF and the NPA. 1988 saw Govt proposals for regional autonomy on the Mindanao. In the third conflict, in the Cordilleras, the Govt remained in low-level battle with groups demanding autonomy and respect for ancestral lands.

Africa

Angola	1975/1975	Angolan Govt, Cuba, SWAPO vs. UNITA and S. Africa	50 50 6-9 40 6 (Jan.)	1975-85: >11 1985-87: 4 (mil.) 1988: >10	++
--------	-----------	---	-----------------------------------	--	----

Comments: The Govt faces armed opposition by UNITA (Union for the Total Independence of Angola), which is supported by S. Africa and the USA. Angolan troops are supported by Cuban troops (increasing during 1988, reaching approx. 50 000 by end of year) and the USSR (arms and advisers). In Sep.-Nov. 1987 S. African troops fought alongside UNITA against Angolan Govt. In 1988 S. Africa was forced back, to less than 15 km from Angola-Namibia border, by Angolan-Cuban counter-offensive in Cunene province (Jan.-Apr.). SWAPO (South West African People's Organization, Namibia) has fought alongside Angolan-Cuban troops. Military buildup along border, and Angolan-Cuban troops (incl. 300-400 tanks) clashed with S. African soldiers south of Techipa; air raid on Calueque Dam, controlled by S. Africa (late June). On 8 Aug. cease-fire proclaimed between Angola and S. Africa. A Joint Military Monitoring Commission controls border. Continued fighting between Angolan Govt and UNITA throughout 1988; heavy fighting reported in central and northern Angola (Aug.-Sep.). Govt offensive against UNITA (Sep.). During May-Dec. several meetings were held between Govts of Angola, S. Africa and Cuba, with USA as mediator. The Brazzaville Protocol, giving Namibia independence and regulating Cuban and S. African withdrawals, was signed on 13 Dec. in Brazzaville (Congo) and formalized by a tripartite treaty on 22 Dec. in New York.

Chad	1965/1975 /1979	Habré Govt, (France), Islamic Legion, other opposition	17 (2.4) 3 0.3	1965-87: 27 1988: <0.1	--
------	--------------------	---	-------------------------	---------------------------	----

Comments: In 1987 the war became a struggle between the combined forces of the Habré Govt and previously Libyan-backed Goukouni Oueddai against Libya, with France giving active support to the Habré Govt. In 1988 there were no reports of French support. After Libyan forces were defeated a cease-fire was agreed between Chad and Libya on 11 Sep. 1987. Forces from Chad crossed the border into Libya, destroying considerable quantities of Libyan armour. Libyan forces

Location	Year formed/ year joined ^a	Warring parties	No. of troops in 1988 (thou.)	Deaths ^b (thou.)	Change from 1987 ^c
<p>remain in the Aouzou area. Subsequent to the cease-fire between Chad and Libya, diplomatic relations were resumed on 3 Oct. 1988, and a formal cessation of hostilities was declared. During 7-14 Feb. 1988, 12 opposition factions joined the ruling UNIR (Union Nationale de l'Indépendance et la Révolution) coalition. In Mar., 5 GUNT (Govt de l'Unité Nationale Tchadienne) opposition factions met under the chairmanship of Oueddai in Libya to form a new govt-in-exile in opposition to UNIR. On 28 Nov. a Libyan reconnaissance plane was shot down by Chad over its territory; 2 crew members were captured. Military activity in 1988 was confined to the Karkour area in the east near Sudan, where 20 troops of the Islamic Legion were killed, and to southern Chad, where FANT (Forces Armées Nationales Tchadienne) encountered opposition forces of the Frolinat (Chadian National Liberation Front).</p>					

Ethiopia-Somalia	1964/1969	Ethiopia,	300 ^d	1964-86: 38	--
		Cuba	3	1980-88: >2	
		vs. Somalia	61		

Comments: The war has continued on a low level since the heavy fighting in 1977. Cuban troops have appeared on the side of Ethiopia since 1977. On 3 Apr. 1988 a 10-point agreement was signed in Mogadishu, Somalia, between the two countries. The agreement included a disengagement of forces to 15 miles inside the respective borders, supervised by a joint military committee; halt of subversive activities and hostile propaganda, and end of support to insurgencies in one another's countries; and re-establishment of diplomatic relations. A joint committee is to handle the border question. The agreement held some prospects for regulating this long-standing conflict.

Ethiopia	1961/1962	Ethiopian Govt	300 ^d	1962-88 >45 (mil.)	++
	/1970	vs. EPLF,	30	>50 (civ.)	
	/1976	TPLF and other opposition	20 ..		

Comments: The first months of 1988 saw advances of EPLF (Eritrean People's Liberation Front, formed 1970) and TPLF (Tigray People's Liberation Front, formed 1976). In Apr. Ethiopia concluded an agreement with Somalia on border issue. Troops were diverted to the north. Under the slogan 'Everything to the Front' the Army was mobilized, reaching approx. 300 000 men, at least 120 000 of whom were in Eritrea. Intensive fighting, with some Ethiopian advances, particularly in Tigray. EPLF suggests referendum on the status of Eritrea as a solution. The intensified war gave rise to famine conditions and large movements of refugees.

Mozambique	1978/1981	Mozambican Govt,	25	1985-87: 4-6 (mil.)	+
		Zimbabwe,	11	100 (civ.)	
		Tanzania,	1	1988: 3 (mil.)	
		Nigeria,	5		
		Malawi	0.6		
		vs. MNR (S. Africa)	22		

Comments: Battles between FPLM (Popular Forces for Liberation of Mozambique/units of Govt armed forces) and MNR (National Resistance Movement or RENAMO) cause serious casualties (US State Dept report in Apr. 1988 estimated 100 000 civilians killed by MNR during the past two years). MNR receives weapons, training, logistic and other support from S. Africa. The Mozambican Govt has received military aid from the USSR and some assistance from the UK and France. Additionally, military co-operation in the anti-MNR struggle takes place between Mozambican Govt and Zimbabwe, Tanzania, Nigeria and, more recently, Malawi. In Sep. 1988

Location	Year formed/ year joined ^a	Warring parties	No. of troops in 1988 (thou.)	Deaths ^b (thou.)	Change from 1987 ^c
----------	--	--------------------	--	--------------------------------	-------------------------------------

the presidents of Mozambique and S. Africa held talks on the reactivation of the 1984 Nkomati (non-aggression) accord which forbids the basing of non-government military forces on the respective territories. In Dec. Mozambican church leaders held talks with MNR with the permission of the Mozambican Govt.

Namibia	1966/1967	S. African Govt. vs. SWAPO (based in Angola)	21 6-9	1967-84: >10 1985-87: 1.5 1988: 1	0
---------	-----------	--	-----------	---	---

Comments: In 1966 the UN renounced S. Africa's mandate over South West Africa (and renamed it Namibia), but S. Africa has ignored the UN decision. SWAPO (South West African People's Organization), the national anti-colonial movement leading the war for independence, has widespread support among Namibia's population. SWAPO's military arm, the People's Liberation Army of Namibia (PLAN), is based in Angola. In 1988 there were reports of several clashes between SWAPO and S. African troops. Air raid claimed by S. Africa on SWAPO bases in Angola (Feb.). On 13 Dec. the Brazzaville Protocol was signed by senior ministers of Angola, Cuba and S. Africa and was formalized by a tripartite treaty on 22 Dec. in New York. The USA played an active role in the negotiations. The Protocol regulates withdrawal of Cuban troops from Angola and S. African troops from Namibia. The UN plan (Resolution 435) for an independent Namibia will be implemented on 1 Apr. 1989. Election of a constituent assembly will be held on 1 Nov. 1989.

Somalia	1981/1981	Somali Govt vs. SNM, DFSS	61 3.5	1988: >0.2	+
---------	-----------	------------------------------	-----------	------------	---

Comments: Following the Apr. 1988 agreement between Ethiopia and Somalia, the SNM (Somali National Movement, largely based on the Isaaq clan) claims to have made major military advances in May and June 1988, capturing towns in Somalia, to replace bases lost in Ethiopia. Following the Apr. agreement to 'end subversive activities and hostile propaganda against each other', the internal conflict intensified and Ethiopia-supported organizations attempted to create bases of operation inside Somalia. Fighting concentrated on Hargeisa in northern Somalia, with high but divergent casualty figures reported. Large numbers of Somalis sought refuge in Ethiopia. DFSS (Democratic Front for the Salvation of Somalia) also announced intensified actions. Amnesty International reported severe violations of human rights. Prior to the Apr. 1988 Mogadishu agreement this conflict was regarded as part of the Ethiopia-Somalia conflict.

South Africa	1950/1979	S. African Govt vs. ANC	222 ^d 10	1984-87: >3 1988: 0.7	0
--------------	-----------	----------------------------	------------------------	--------------------------	---

Comments: Armed opposition has involved attacks by ANC (African National Congress) armed fighters throughout 1988. Attacks by the smaller PAC (Pan-Africanist Congress) were also reported. Severe communal violence occurred in Pietermaritzburg and elsewhere in Natal (Feb., Mar., July) involving UDF (United Democratic Front) followers and members of Inkatha movement (led by Chief Buthelezi of KwaZulu). Military coup in S. Africa proclaiming independent state of Bophuthatswana was crushed by S. African forces and followed by mass arrests (Feb.). Black African civil rights organizations were banned and trade restricted (Mar.). International opinion focused on trials (e.g., the 'Sharpeville Six' in Dec.) and on the release of ANC leader Nelson Mandela.

Location	Year formed/ year joined ^a	Warring parties	No. of troops in 1988 (thou.)	Deaths ^b (thou.)	Change from 1987 ^c
Sudan	1980/1983	Sudanese Govt vs. SPLA, Anyanya II	57 30 ..	1983-88: >5	+

Comments: Civil war in 1955-72 resulted in hundreds of thousands of deaths. In 1983 civil war resumed, following the break-down of the peace agreement concluded in 1972. Opposition, based in the south, resists the introduction of Islamic (Sharia) law and favours an independent south Sudan federated with the north. The SPLA (Sudan People's Liberation Army, also known as SPLM, under leadership of John Garang) is the main opposition to Sudanese Govt, which is a coalition Govt led by Sadiq al-Mahdi. A successor to the leading Sudanese organization of the previous army, Anyanya II, is also active. These two southern organizations have at times fought each other, but conciliation attempts in 1988 showed increasing unity. Increased fighting in the Equatoria and Upper Nile provinces. Political violence also in Darfour, unrelated to the situation in the south. Aid efforts to alleviate famine in the south hampered by war. In Nov. 1988 an agreement was signed between the SPLA and the Democratic Unionist Party, represented in the Sudanese Govt, to end the war. This led to protest from the National Islamic Front, also represented in the Govt.

Uganda	1979/1981	NRM Govt. (Libya) vs. UDA, UPDA, other opposition	20 ^d (3) .. 1 ..	1981-87: 5-6 (mil.) - - 100 (civ.) 1987: 2 1988: 0.2	
--------	-----------	---	---	---	--

Comments: The NRM (National Resistance Movement) Govt's amnesty to UPDA (Uganda People's Democratic Army) soldiers, offered in Aug. 1987, was extended to Apr. 1988. During this period most UPDA forces surrendered, half of whom were re-settled. Heavy fighting north-west of Kampala on 5 Mar. 1988. An abortive coup against President Museveni by an NRA (National Resistance Army) faction took place in Apr. On 12 Jan. 1988 the political opposition party UDA claimed responsibility for a grenade attack on the Libyan embassy in Kampala. Continued activity of the (Lakwena) Holy Spirit Movement was reported near Gulu in Feb. 1988, when about 50 members of the sect were killed while attacking Govt forces. In early 1988 tension remained high on the Kenyan-Ugandan border where NRA troops were amassed, probably to prevent infiltration by opponent forces from the refugee camps in Kenya.

Western Sahara	1975/1975	Moroccan Govt vs. Polisario	150 ^d 4-15	1975-78: >7 (mil.) + 1988: 0.3	
----------------	-----------	--------------------------------	--------------------------	-----------------------------------	--

Comments: The former Spanish colony of Western Sahara was divided between Morocco and Mauritania in 1975. Morocco annexed Mauritania's half in 1979, following Mauritania's withdrawal from the war and an agreement with Polisario. The Polisario Liberation Front, fighting for independence of the region, is based mainly in Algeria. Morocco built a 2500-km wall, enclosing 75% of Western Sahara, to keep Polisario out. Feb. 1987 saw the heaviest fighting for two and one-half years. Nightly attacks over the wall were carried out by Polisario. The fighting continued during the first months of 1988. On 30 Aug. 1988 Morocco and Polisario agreed to accept a UN peace plan, including a possible UN peace-keeping force. A referendum on the future of Western Sahara, to be held in spring 1989, will decide the future of the area.

Location	Year formed/ year joined ^a	Warring parties	No. of troops in 1988 (thou.)	Deaths ^b (thou.)	Change from 1987 ^c
----------	--	--------------------	--	--------------------------------	-------------------------------------

Central and South America

Colombia	1978/1979	Colombian Govt vs. M-19, FARC and other groups	57 ^d 0.1-1.5 10-12 1-1.5	1980-87: 5.5 1988: >0.2	0
----------	-----------	---	--	----------------------------	---

Comments: At least 8 armed revolutionary groups have been engaged in bombings, kidnappings and armed attacks since the 1970s. Govt forces mount offensives and counter-offensives but are unable to defeat the armed opponents. The May 1984 peace accord with 6 main groups did not end the violence. The biggest group—the Colombian Revolutionary Armed Forces (FARC)—abided by it at least until 1987. Five insurgent groups unified in Oct. 1987 under the 'Simon Bolivar' Guerrilla Co-ordinating Committee and offered to renew talks with the Govt. In 1987 either FARC or a splinter group of the main organization resumed attacks on police stations (Mar. 1987, 100 dead) and security forces (June 1987, 30 dead). The most active and most heavily armed group has been the M-19 (April 19 Movement). Having released the kidnapped leader of the Conservative Party in July 1988, the M-19 demanded a national dialogue. A meeting was held in July, aiming at peace talks between the Govt, M-19, the church and other political parties. The Govt and M-19 did not participate owing to military pressures. The Govt has proposed a constitutional reform and some guerrilla groups have presented a peace plan. In Oct. 1988 there were reports of fighting between Govt and guerrillas from both M-19 and FARC in the south-eastern province of Caqueta. The southern jungle area was in 1988 reported to be under FARC control.

El Salvador	1976/1977 /1979	Salvadorean Govt vs. FMLN	43 4.5-6	1979-87: >17.5 (mil.) 40 (civ.) 1988: 1	—
-------------	--------------------	------------------------------	-------------	---	---

Comments: FMLN (Farabundo Martí Front for National Liberation) is a coalition of armed opposition groups fighting rightist Salvadorean Govt armed forces. FMLN controls portions of the countryside. Extensive arms deliveries, military training and other combat support for Govt forces are provided by the USA. A large number of massacres of civilians by the Govt and paramilitary forces. Civil war deaths estimated at 70 000 (military and civilians). Exiled members of the political opposition and refugees returned in the wake of the Esquipulas II Peace Accord of 7 Aug. 1987. A national reconciliation commission was established but no cease-fire concluded. In Mar. 1988 parliamentary elections the right-wing Arena Party received most votes; this is believed to have stepped up the conflict with FMLN. The guerrillas also launched a new offensive in late 1988.

Guatemala	1967/1968	Guatemalan Govt vs. URNG	38 ^d 1-2	1967-87: 2 (mil.) 43 (civ.) 1988: <0.5	—
-----------	-----------	-----------------------------	------------------------	--	---

Comments: Armed opposition dates to the early 1960s against right-wing military govts. Four guerrilla groups formed the Guatemalan National Revolutionary Unity (URNG) in 1982. The massive counter-insurgency campaign of 1982-83 cut the guerrilla strength by more than one-half; extensive civilian casualties with entire villages destroyed. Counter-insurgency measures restrain guerrilla activity. Under the Esquipulas II Peace Accord of 7 Aug. 1987 the National Commission for Reconciliation, including a Govt representative, met in Costa Rica in Sep. 1988 with URNG representatives, who proposed a 90-day armistice. The proposal was rejected by a military spokesman. The URNG then announced increased activity, also in Guatemala City. The Govt demands that URNG lay down arms before talks, which it has refused. The national dialogue, which was also projected by the Esquipulas Peace Accord, was formally initiated during 1988 in a representatives' meeting, but without the URNG. Under UNHCR (UN High Commissioner for Refugees) supervision, groups of refugees returned in 1988.

Location	Year formed/ year joined ^a	Warring parties	No. of troops in 1988 (thou.)	Deaths ^b (thou.)	Change from 1987 ^c
Nicaragua	1979/1980	Nicaraguan Govt vs. opposition (Contras), Miskito Indians	70 ^d 12-17 ..	1979-88: >29 1988: >3	-

Comments: The right-wing Contras (counter-revolutionaries) are attempting to overthrow the Sandinista Govt, which came into power in 1979 following the national uprising against the Somoza regime. The Contras are largely based in Honduras. The largest Contra group is the Democratic Forces of Nicaragua (FDN). The Esquipulas II Peace Accord of 7 Aug. 1987 applies also to Nicaragua. Domestic efforts at conflict resolution have included a Govt offer of amnesty, a national reconciliation commission and the negotiation of a short cease-fire. The Miskito Indians, who previously fought alongside the Contras, entered into an agreement with the Sandinista Govt in autumn 1987 which gave them some regional autonomy. The Sapoa Agreement between the Nicaraguan Govt and the Contras on a cease-fire was concluded on 23 Mar. 1988, resulting in a reduction in Contras activity. Further talks between the Govt and the Contras ended in June. Border problems with Honduras are still significant. There was no significant development of the conflict pending the US presidential election in autumn 1988.

Peru	1980/1980	Peruvian Govt vs. Sendero Luminoso, MRTA	121 ^d 2-3 0.3	1980-87: 2 (mil.) >1 (civ.) 1988: 0.1	0
------	-----------	---	--------------------------------	---	---

Comments: In 1988 Sendero Luminoso (Shining Path) continued to attack army, police, administrative personnel and installations in low-intensity conflict. Heaviest fighting during 1988 occurred in Dec. Since 1986 an urban guerrilla group (founded in 1984), the Tupac Amaru Revolutionary Movement (MRTA), believed to be financed via the M-19 rebel group in Colombia, has been challenging the Sendero Luminoso for control of local communities and the drug traffic.

^a 'Year formed' is the year in which the two (or more) parties last formed their conflicting policies or the year in which a new party, state or alliance involved in the conflict came into being. 'Year joined' is the year in which the armed fighting last began or the year(s) in which armed fighting recommenced after a period for which no armed combat was recorded. For conflicts with very sporadic armed combat over a long period, the 'year joined' may also refer to the beginning of a period of sustained and/or exceptionally heavy combat.

^b The figures for deaths refer to total battle-related deaths for the duration of the conflict. The figures exclude, as far as data allow, deaths owing to famine and disease. 'Mil.' and 'civ.' refer to estimates, where available, of *military* and *civilian* deaths; where there is no such indication, the figure refers to total battle-related deaths in the period or year given.

^c The 'change from 1987' is measured as the increase or decrease in battle-related deaths in 1988 compared with deaths in 1987. Although based on data that cannot be considered totally reliable, the symbols represent the following changes:

- ++ increase in battle deaths of more than 100%
- + increase in battle deaths of less than 100%
- 0 stable rate of battle deaths (+ or -10%)
- decrease in battle deaths of less than 50%
- decrease in battle deaths of more than 50%.

^d If nothing else is indicated, the figure shows regular army troops (not total armed forces). Not all these troops are necessarily engaged in actual combat.

^e In the total figure for Iraqi troops (which includes total armed forces), reserves (est. 480 000) are also included.

^f In the total figure for Iranian troops (which includes total armed forces), paramilitary forces (Islamic Revolutionary Guard Corps, est. 1 million) and reserves (est. 350 000) are also included.

* In the total figure for Philippine troops, paramilitary forces are also included: the Philippine Constabulary (50 000) and the Civil Home Defence Force (65 000).

^h About 50% are reserves, militia and border guards.

Sources: For additional information on previous events in these conflicts, see Wilson, G. K. and Wallensteen, P., 'Major armed conflicts in 1987', SIPRI, *SIPRI Yearbook 1988: World Armaments and Disarmament* (Oxford University Press: Oxford, 1988), chapter 9; and Goose, S., 'Armed conflicts in 1986, and the Iraq-Iran War', SIPRI, *SIPRI Yearbook 1987: World Armaments and Disarmament* (Oxford University Press: Oxford, 1987), chapter 8. Sources for data in the table are the following: SIPRI Arms Trade Project data base; BBC World Service News (London); *Washington Post* (Washington, DC); *World Reporter* (Datasolve: London); *Keesing's Contemporary Archives* (Harlow, Essex); Sivard, R., *World Military and Social Expenditures* (World Priorities Inc.: Washington, DC, annual); *The Statesman's Yearbook* (Macmillan: London, annual); *Defense and Foreign Affairs* (Alexandria, Va.); *Defense and Foreign Affairs Handbook* (Copley: Washington, DC, 1976); *Far Eastern Economic Review* (Hong Kong); *The Times* (London); *International Herald Tribune* (Paris); *Dagens Nyheter* (Stockholm); *Svenska Dagbladet* (Stockholm); *The Economist* (London); *Asian Defence Journal* (Kuala Lumpur); *Jane's Defence Weekly* (Coulsdon, Surrey); *Financial Times* (London and Frankfurt); *Indian Express* (New Delhi); *Newsweek* (New York); *New York Times* (New York); *Der Spiegel* (Hamburg); *African Defense* (Paris); *Boston Globe* (Boston, Mass.); *New Statesman & Society* (London); *US News & World Report* (Washington, DC); *Time* (New York); Jongman, B., *War, Armed Conflict and Political Violence* (Polemological Institute, National University: Groningen, the Netherlands, 1982); Kaye, G. D., Grant, D. A. and Emond, E. J., *Major Armed Conflict, A Compendium of Interstate and Intrastate Conflict 1720 to 1985*, report R95 (Operational Research and Analysis Establishment [ORAE], Canadian Department of National Defence: Ottawa, 1985); Small, M. and Singer, J. D., *Resort to Arms, International and Civil Wars 1816-1980* (Sage: Beverley Hills, Calif., 1982); Gantzel, K.-J. and Meyer-Stamer, J. (eds), *Die Kriege nach dem Zweiten Weltkrieg bis 1984* (Weltforum: Munich, 1986); research reports on particular conflicts; and information available at the Department of Peace and Conflict Research, Uppsala University, in the continuing research project on armed conflicts.

Part III. Developments in arms control

Chapter 10. US–Soviet nuclear arms control

Chapter 11. Conventional arms control in Europe

Chapter 12. Multilateral arms control efforts

10. US–Soviet nuclear arms control

CHRISTOPH BERTRAM

I. Introduction

1988 could have been a year of crowning effort at the Strategic Arms Reduction Talks (START). By the beginning of the year, the United States and the Soviet Union had come a long way towards finalizing an agreement to cut their respective strategic nuclear forces significantly. And yet the agreement remained elusive.

The 1987 INF Treaty laid foundations both in the sense of showing that agreement could be reached and in developing a joint approach to verification; indeed, the verification methods of the INF Treaty were formulated with a view to their application to a later START accord. The contours of a treaty emerged during 1988, and many of the hurdles on the way to compromise were overcome. To a large extent, the size and composition of the strategic forces that each side would retain after the cuts became clear. Even the contentious issue of space-based strategic defence was, if not removed, then at least defused.

Yet, while the will was there on both sides, there was, most notably in the Reagan Administration, not enough determination to reach the finishing line before the end of President Reagan's term in office. As his successor, George Bush, elected in November 1988, took over the reins of government, it became clear that he, like any newly elected President before him, wanted to put his own stamp on the emerging treaty. As the year ended and the new Chief Executive appointed his principal advisers, START was put 'on hold' for a period of re-examination and reassessment.

What just a few years ago would have seemed a major threat of breakdown for East–West dialogue could now almost pass as no more than a minor irritant. Nuclear arms control had ceased to be the main, if not the exclusive, plank of political relations between the superpowers, and a hiatus in the talks was now understood to be what it really was: less an indication of mistrust than a sign that the Bush team was serious in trying to make up its own mind on the outstanding issues and on how they might be resolved—both with the Soviet Union and for ratification in the US Senate.

II. The contours of the START treaty

What both sides have achieved in the Strategic Arms Reduction Talks, which resumed under the Nuclear and Space Talks in the spring of 1985, is indeed impressive.¹

It had long been agreed that each side be limited to 6000 warheads on 1600 strategic delivery systems (with sea-launched cruise missiles to be limited, if at all, in a special arrangement above that ceiling; see below). Of these warheads, 4900 would be carried on intercontinental ballistic missiles (ICBMs), both

ground- and sea-launched; and a maximum of 1540 of these on 'heavy' ICBMs—weapons that exist only in the Soviet arsenal—whose number, as a result, would be cut by half. Under the 4900 ceiling, a sub-ceiling of 3000 to 3300 warheads would be set on ICBMs on both sides. Warheads per missile would be counted according to the numbers notified in the Washington communiqué rather than according to those tested. Bombers with free-fall bombs would be assumed to carry only one warhead even if their actual loading should significantly exceed that number. The total strategic nuclear throw-weight would be cut by half.

There was even movement towards a compromise on previously disputed issues: in particular how air-launched cruise missiles (ALCMs) should be treated, and how mobile missiles would be included in the agreement.

The ALCM issue characterizes a whole series of arms control problems posed by multi-purpose, multi-range delivery systems. What is a strategic ALCM (to be limited), and what is a tactical one (to remain unaffected by START)? How can a nuclear ALCM be distinguished from an (unrestrained) conventional weapon of the same type? And how can the numbers of cruise missiles carried by each bomber be counted and adequately verified?

None of these questions was fully answered during the negotiations; but perhaps there are no satisfactory answers. The negotiators thought that the problem could be reduced by definitions. Strategic and non-strategic ALCMs would be distinguished by a range definition: anything above 1500 km (the US position) or 600 km (the Soviet position) would be counted as 'strategic'. To distinguish nuclear from conventionally tipped ALCMs, both sides agreed at the Moscow summit meeting of 29 May–2 June 1988 to count all those which had been, or are being, tested in a nuclear role as nuclear ALCMs; conventional ALCMs should be identifiable through visible differences in weapon characteristics.²

Although differences on verifying the number of ALCMs carried by each type of bomber aircraft narrowed, a significant gap remained: the United States pushed for a low number for each aircraft, while the Soviet Union insisted that the maximum loading capacity of each aircraft should be the basis of calculation. There were indications during the year, however, that in the end this gap could be bridged by some compromise figure. A counting rule of 10 ALCMs per bomber was mentioned by the US side, and both sides were considering cutting the range difference in half to around 1000 km.³

Another stumbling-block during 1987 had been how to deal with land-based mobile missiles. In autumn 1985 the United States had demanded that these systems be banned altogether, but that position gradually eroded. In 1987, Washington declared its readiness to permit mobile ICBMs (the Soviet Union had proposed a ceiling of 800 such systems with up to 1600 warheads)—provided that effective means of verifying any limitation be found. During 1988, such means were discussed further, but without conclusion; the idea gained ground that the mobile component of the ICBM force might be based in relatively small, restricted areas, but with a proviso that an agreed percentage could be deployed outside that area at any given time and that dispersal of the total mobile force would be permitted in emergencies. Thus, what had seemed

at some stage to be a major hurdle turned into a more or less technical issue, complicated but, in the end, manageable.

By September, the two delegations had prepared a 300-page joint draft for the START treaty, albeit with a multitude of brackets and blank spaces. It was presented to the last—the 28th—meeting between US Secretary of State George Shultz and Soviet Foreign Minister Eduard Shevardnadze, which was held that same month.

Just as the Moscow summit meeting had failed to fill the major blanks and remove the major brackets, so the foreign ministers could do no more than register how far they had come. 'Maybe a contribution was made at the meeting', Secretary Shultz told the press, 'but I can't report any real substantial movements in those [the disputed] fields'.⁴

The reason for this lack of movement, indeed for the inability of the two sides to finalize an accord before the end of Ronald Reagan's tenure as President, no longer lay in the differences over warhead numbers, counting rules or sub-ceilings; these had largely been settled or would be settled in a final, horse-trading phase of negotiation. As US voters elected George Bush as their new President in November 1988, agreement was still blocked by two, now familiar, stumbling-blocks which, because of their ideological content, eluded pragmatic compromise: how to limit strategic defences in space, and how to limit long-range sea-launched cruise missiles (SLCMs).

III. Stumbling-block I: SDI and space-based defences

From the beginning of the START negotiations in 1985 it had been clear that, in the end, a compromise would have to be struck in which the Soviet Union would agree to major cuts in its offensive, land-based strategic forces and the United States to limitations on strategic defences.

During 1988 the two sides still circled around a compromise. Yet one important step was taken which, in the end, was likely to make agreement possible, if not in 1988 then at a later stage: the strengthening of the ABM (Anti-Ballistic Missile) Treaty. In the heated discussions over President Reagan's Strategic Defense Initiative (SDI) and the way in which strategic defence might be defined and regulated, one basic factor had long been overlooked: that the 1972 ABM Treaty, whatever its shortcomings, provides a model for moving from a purely offensive strategic posture to one which includes defensive elements as well. After all, far from banning all anti-ballistic missiles, the Treaty actually permits not only (limited) deployment but also research, development and testing of new fixed land-based systems. Rather than scrapping the Treaty, as some of President Reagan's advisers in the Pentagon had wanted,⁵ it would make much more sense to retain its basic framework and adjust this to changing requirements when and where necessary. There were encouraging indications during 1988 that even the Reagan Administration in its last year in office was inching towards some, as yet perhaps unconscious, recognition of this basic truth.

A major change had already occurred during the 1987 Washington summit meeting. In the final communiqué, both sides had formulated a contorted

compromise. President Reagan and General Secretary Gorbachev had instructed their respective delegations to work out an:

... agreement that would commit the sides to observe the ABM Treaty, as signed in 1972, while conducting their research, development, and testing as required, which are permitted by the ABM Treaty, and not to withdraw from the ABM Treaty, for a specified period of time. Intensive discussions of strategic stability shall begin not later than three years before the end of the specified period after which, in the event the sides have not agreed otherwise, each side will be free to decide its course of action.⁶

On the surface, this seemed to do no more than confirm the different positions held by each side and emphasize their basic difference over the testing of strategic defence systems in space. But in fact, it amounted to a major confirmation of the ABM Treaty as it had been defined and practised until 1985—before patently tactical attempts were made within the Reagan Administration to interpret away the SDI restrictions inherent in the Treaty.⁷

The Washington formula provided formal flexibility for the Reagan Administration to proceed with SDI testing 'as required', but since both the Soviet Union and the majority in the US Congress agreed on the traditional interpretation of the ABM Treaty, this formal flexibility was without substance. The Washington communiqué had, for all practical purposes, closed the debate over reinterpreting the ABM Treaty.

The other factor for strengthening the Treaty emerged from the dispute over the Soviet radar station in Krasnoyarsk. That station had long been regarded by most Western experts as a violation of the ABM Treaty's rules on permitted radar installations. During the Third ABM Treaty Review Conference, held in Geneva on 24–31 August 1988, the United States had insisted that, unless both the transmitter and the receiver of the radar were destroyed, it would not be prepared to enter into any further agreements on reducing strategic forces.⁸ However, after much internal debate, the Reagan Administration decided not to declare the Krasnoyarsk violation a 'material breach', which would have led to the abrogation of the Treaty as a whole.

During the previous two years, the Soviet Union had sought to avoid a showdown on Krasnoyarsk. In 1987, it decided to stop all further work on the—still unfinished—installation. In the autumn of 1988, General Secretary Gorbachev suggested that the radar complex should become an international civilian centre for space research. In response to continuing US insistence that the relevant facilities would have to be properly dismantled, Gorbachev went one step further (although still not far enough): in a speech to the UN General Assembly on 7 December 1988, he announced the decision to transfer the Krasnoyarsk radar to the Soviet Academy of Sciences and added: 'The Soviet scientists are also prepared to receive foreign colleagues, in order to discuss with them how to turn the radar station, through dismantling, conversion and adding of equipment into an international center for peaceful cooperation'.⁹ It seemed no more than a matter of time before this major irritant, therefore, could be removed from the US–Soviet arms control agenda.

Thus the immediate threats to the ABM Treaty have largely been removed. A formula for research, development and testing of components of space-

based defences has been devised which would, in practice, prohibit the United States from straying from the language of the Treaty. This was, however, more acceptable to the Soviet Union than to the United States. The Soviet side, which for so long had been in the position of *demandeur* on the issue, now clearly decided to rest its case on the Washington formula. If the United States were to go beyond the ABM rules as traditionally interpreted, the Soviet Union would simply no longer regard itself as bound by a future START agreement. For the Reagan Administration, on the other hand, the ambiguity of the Washington formula was difficult to accept. Now Washington became the *demandeur*, pushing for an undertaking from Moscow which would, within defined limits, permit the testing of some elements of strategic defence in space.

Both sides had agreed that there should be a new treaty to deal with strategic defences. This should come into force after the period of non-withdrawal from the ABM Treaty (the USA: 7 years; the USSR: 10 years) had come to an end. The United States aimed at an agreement with no constraints on future research and testing, and a protocol of confidence-building measures to provide a degree of predictability during the transition period from the old ABM regime to the rules of the new treaty.

Yet somehow the urgency was gone. Congress had cut the Reagan Administration's demands for SDI funding; the technical problems of space-based defence had become increasingly obvious; and an idea, floated only the previous year by the Secretary of Defense, of an early Phase I deployment of space defences, never became policy. Instead, Senator Nunn, the influential chairman of the Senate Armed Forces Committee, put himself at the head of a growing body of opinion which called for a much more limited objective: an accidental launch protection system (ALPS), designed to provide a measure of protection for land-based missile silos against very limited attacks.

Whether such a system could be developed and tested within the constraints of the ABM Treaty in its traditional interpretation remained in dispute. But the ideology that once drove SDI gradually fizzled out as the Reagan team prepared for its departure from office.

IV. Stumbling-block II: sea-launched cruise missiles

From the beginning of the START negotiations, the question of whether and how to include nuclear SLCMs in any limitation agreement had been dormant. The US Navy planned to acquire 758 Tomahawk nuclear land-attack cruise missiles (TLAM/N) by 1995, of which 270 would be deployed on attack submarines and the remainder on 90 surface vessels, often interspersed with about 3000 conventional Tomahawk cruise missiles for land-attack and anti-ship use. Some of the nuclear-armed SLCMs were already entering the US arsenal.¹⁰

A similar, though less ambitious, development was under way in the Soviet Union with the SS-N-21 entering operational deployment during the year, but the Soviet leadership seemed to regard this more as a pragmatic improvement than as a militarily particularly useful weapon.¹¹ In the United States, on the

other hand, there were many who surrounded SLCMs with a ideological halo, both as the expression of US technological superiority and a welcome instrument for multiple employment which matched the new search for strategic flexibility in the United States. Not least because of this, the Soviet Union insisted with increasing determination that there could be no START agreement without a limitation on SLCMs.

It was not until 1987 that the United States agreed to include these weapons in some kind of limitation—provided this could be verified adequately. At the December 1987 Washington summit meeting, both sides committed themselves to finding a solution to the problem, but in a separate ceiling, over and above the 6000 warhead total envisaged for START. Much of the year passed in fruitless attempts to put precision to these intentions. The central, most complicated question was how to distinguish between nuclear-armed and conventionally armed SLCMs, since neither side, certainly not the United States, was willing to forgo the SLCM programme as a whole. Three types of solution emerged during the year, even if none offered the hoped-for breakthrough.

The first solution was pursued with considerable effort by the Soviet Union which presented itself, once again, in its new role as the arch-champion of verification. Its delegates argued that a distinction between conventional and nuclear SLCMs was possible and could be verified to the satisfaction of both sides. The Soviet Union envisaged limits of 1000 SLCMs of which no more than 400 would be nuclear. Inspection teams should monitor the transfer of missiles (and their warhead containers) from the designated production factories to deployment areas, and inspect and count each missile in port before it is loaded on to the ships. According to the Soviet proposal, SLCMs would be restricted to one type of surface vessel and two types of submarine. Inspectors should also be allowed to board some of these vessels in port for challenge inspection.¹²

The United States remained distinctly reserved towards these proposals. The type of on-site inspection proposed by the Soviet Union would run counter to the US insistence never to reveal whether US vessels carried nuclear explosives on board; it further threatened to interfere unduly with the normal operation of naval vessels; and there were also those in Washington who genuinely doubted whether, even if these other considerations were put aside, satisfactory verification was at all possible.

The second attempt to solve the problem was the suggestion, advanced in particular by Paul Nitze, Special Adviser on Arms Control to the US President and Secretary of State, to ban nuclear SLCMs altogether.¹³ His arguments were powerful. While a ban would still pose considerable verification problems, these would be much less severe than for mere limitation. If, as is possible, the Soviet Navy catches up with the United States in SLCM technology, the disadvantage for the USA of Soviet possession of these weapons would far outweigh the advantages of possessing them itself, not least because of the large number of targets located along the US coastlines as opposed to the very different distribution of targets in the Soviet Union. If both sides had SLCMs then, Nitze argued, these were 'inherent losers' for the United States. There were other serious shortcomings of SLCMs as strategic weapons.

There was the traditional problem of command and control for sea-launched weapon systems, particularly those deployed on vulnerable platforms, as well as the necessity to withhold some nuclear cruise missiles as a deterrent against Soviet nuclear attacks on US ships. And would it make sense, as the critics argued, to arm the US Navy for nuclear attacks against targets on land and expose it to nuclear counter-strikes by the Soviet Union, thus risking its conventional superiority at sea? If it were possible to ban all nuclear weapons at sea apart from ballistic missiles, the conventional advantage of the US Navy would become even more marked. As one careful analysis concluded: 'While any constraints in US and Soviet naval nuclear weapons would serve US interests, the strategic return of a complete ban on such weapons would be disproportionately high.'¹⁴

This was clearly too radical a turn-around for the Reagan Administration to swallow. The Chiefs of Staff, not just the Navy, were not prepared to accept it and, as the sun set on Reagan's reign, there was no incentive and no time to thrash out the issues in a focused debate.

The third solution to the problem consisted simply of removing the SLCMs from the immediate START agenda, leaving them to be addressed in later negotiations. It had much to recommend it. After all, SLCMs were on the way to becoming 'a treaty-blocker, if not a treaty-buster'.¹⁵ Did it really make sense to hold up a largely complete START agreement for the sake of finding a solution for these hybrid weapons which, in any case, would not be included in the START warhead total of 6000?

This would clearly have been welcome to many in the United States. But there were also voices in the growing civilian 'strategic community' of the Soviet Union who argued in favour of settling what could be settled now and delaying the rest.¹⁶ Yet there was no sign in 1988 that the Soviet leadership was prepared to show similar flexibility, and the Soviet military leadership firmly demanded verifiable limits on sea-launched cruise missiles. Of course, from the objective originally set out for START by the Reagan Administration they were right: if START were to cut only into traditional strategic delivery systems—the ICBMs and SLBMs—while allowing the newer, more flexible and hence both more usable and less verifiable elements of nuclear weapons to run free, this could scarcely be regarded as a deep cut.

V. The Bush Administration and the future of START

Not least because of the SLCM stumbling-block, no START agreement was finalized in 1988. Yet, as the year came to a close, it seemed that the era of 'deep cuts' was in any case coming to an end. Ronald Reagan, its staunchest advocate, had not been able to bring it to completion during his term of office. His successor, even if he were to move quickly to settle the outstanding issues, would do so to get START behind him, not to proceed himself on a similar road in the future.

How the Bush Administration would settle the open issues was still uncertain at the beginning of 1989. Brent Scowcroft, the President's National Security Adviser and his chief strategic thinker, was known to favour mobile ICBM

development, to be sceptical about the promises of SDI while supporting continuing research on strategic defences, and to share the doubts of those who believed that a total ban on nuclear SLCMs might be to the advantage of the United States. Scowcroft had also argued against a START regime which would force the USA to put its sea-launched ballistic missiles on too few submarines.¹⁷

Political considerations rather than detailed strategic assessments will probably determine the Bush approach to START. It is true that the unstructured way in which Ronald Reagan had approached nuclear arms control contributed to resistance within his Administration to striking a deal with the Soviet Union in 1988.¹⁸ But would a successor be able to afford the time needed not only to re-examine the issues but also to lay the ground for a new strategic consensus in the United States? The three months which Bush had given himself for the reassessment of US policies and objectives in US-Soviet relations and arms control would scarcely be sufficient for this task.

Thus, as the new team settled down in Washington in early 1989, it seemed likely that, rather than restructuring the whole START exercise, they would recommend proceeding quickly to a final agreement, leaving for later those complicated issues such as SLCMs which, even if the Administration were of one mind to force them through, could nevertheless jeopardize ratification in the US Senate. After all, Scowcroft and others remembered how President Jimmy Carter in 1977 had undermined his authority at home and in Moscow by trying to break out of the SALT framework bequeathed to him by his predecessor President Gerald Ford (whom Scowcroft had also served as National Security Adviser). It would make more political sense for the new Administration to complete Reagan's START treaty, to reap the political applause—and to reserve its own imprint for future arms control negotiations.

But whatever the new President and his advisers were to decide, the chapter of an extraordinary period in the history of arms control was being closed and a new one opened. For eight years, President Reagan had tried to change the rules of strategy and arms control: he had sought an escape from the realities of deterrence through SDI and he had tried to overcome the limitations of the traditional SALT approach through deep cuts. In both efforts he had failed as the technological and strategic deficits of SDI became increasingly obvious and as the SLCM issue, however it would be resolved, deflated the claim that deep cuts could effectively limit the arms race.

The chapter that opened up with the new year would contain both familiar and new features. There was likely to be, in the strategic thinking of the Bush Administration, a return to the more traditional approach to nuclear arms control, namely, to constrain the nuclear competition between the superpowers within channels of stability. At the same time, arms control, for the first time since the exercise had begun in earnest, was losing its bilateral character. In Geneva, the 20-year-old effort by the Conference on Disarmament to reach a world-wide ban on chemical weapons was receiving increasing public attention. In Vienna, multilateral negotiations between NATO and WTO member states were scheduled to deal with the most serious military problem of post-war Europe: the major discrepancies in conventional forces. Nuclear arms

control as well, hitherto the privilege of the two major powers, was unlikely to remain a purely bilateral effort for long. If negotiations were to turn to short-range nuclear systems in Europe, US (and Soviet) allies would want to take part since many of the delivery systems, although not the warheads themselves, are part of their military arsenals. And if START I should be followed by START II, the interests and forces of at least the other nuclear weapon states would be much more directly involved.

A START treaty, not signed in 1988 but probably to be concluded in 1989, was likely to stand out as the last agreement of a past era: helpful perhaps as a basis on which future arms control efforts could build, but scarcely as a model which they might follow.

Notes and references

¹ For an analysis of developments in 1987, see Bertram, C., 'US-Soviet nuclear arms control', SIPRI, *SIPRI Yearbook 1988: World Armaments and Disarmament* (Oxford University Press: Oxford, 1988), pp. 301-13.

² *Arms Control Chronicle* (Canadian Centre for Arms Control and Disarmament, Ottawa), no. 26 (June 1988), p. 14.

³ *Arms Control Chronicle*, no. 29 (Dec. 1988), p. 8.

⁴ Quoted in *Arms Control Today*, Nov. 1988, pp. 24-25.

⁵ See Talbott, S., *The Master of the Game: Paul Nitze and the Nuclear Peace* (Knopf: New York, 1988), pp. 232-33.

⁶ Text of the Joint US-Soviet Summit Statement, *USIS Wireless File*, 10 Dec. 1987.

⁷ For an excellent description see Talbott (note 5), pp. 237-49.

⁸ Major General William Burns, Director of the US ACDA, at a Press Conference on 15 Sep. 1988, as published in *US Policy Information and Texts*, USIS No. 175, pp. 13-17.

⁹ The text of this speech is published in *Neues Deutschland*, 8 Dec. 1988.

¹⁰ Terriff, T., 'Controlling nuclear SLCM', *Survival*, vol. 31, no. 1 (Jan.-Feb. 1989), p. 53.

¹¹ Gottemoeller, R. E., 'Finding solutions to SLCM arms control problems', *International Security*, winter 1988/89, p. 176.

¹² *Arms Control Chronicle* (note 3), p. 7.

¹³ See Talbott (note 5), pp. 379-80.

¹⁴ Daalder, I. H. and Zimmermann, T., 'Banning nuclear weapons at sea: a neglected strategy', *Arms Control Today*, Nov. 1988, p. 23.

¹⁵ Talbott, S., 'Why START stopped', *Foreign Affairs*, vol. 67, no. 1 (fall 1988), p. 61.

¹⁶ See Talbott (note 5), p. 381.

¹⁷ Scowcroft, B., Deutch, J. and Woolsey, R. J., 'The real danger in the next arms treaty', *International Herald Tribune*, 5 Dec. 1987.

¹⁸ This is well documented in Talbott (note 15).

11. Conventional arms control in Europe

JANE SHARP

I. Introduction

This chapter analyses European arms control diplomacy in 1988, focusing on developments at the third follow-up meeting of the Conference on Security and Co-operation in Europe (CSCE), and prospects for two new sets of negotiations on military security which began in March 1989: a 23-state forum on Conventional Forces in Europe (CFE) and a second 35-state Conference on Confidence- and Security-Building Measures and Disarmament in Europe (CDE-II). NATO and WTO participants in the 15-year-old Mutual and Balanced Force Reduction (MBFR) talks closed down that forum on 3 February 1989.

The CSCE began in Helsinki in 1972 and deals with three baskets of issues: military security in Basket I, technological and economic co-operation in II, and humanitarian concerns in III.¹ Thirty-five states participate in the CSCE: 16 NATO, 7 WTO, 4 neutral and 8 non-aligned. The first CSCE agreement was the Helsinki Final Act, signed in 1975, which established a series of modest military confidence-building measures (CBMs), laid down guidelines for East-West economic relations, and established Europe-wide standards for human rights and fundamental freedoms.

Follow-up meetings in Belgrade (1977-78) and Madrid (1980-83) reviewed the implementation of the Helsinki Final Act and launched several new conferences on all three baskets of issues. At the First United Nations Special Session on Disarmament in May 1978, French President Valéry Giscard d'Estaing proposed a separate 35-state conference on disarmament in Europe. Such a conference had also been proposed in late 1977 by various WTO states, and Poland had offered Warsaw as the site for such a meeting. Most of the NATO states resisted the idea, however, since they saw it as a French move to undermine the inter-alliance MBFR talks under way in Vienna since 1973. Nevertheless the idea was thoroughly debated at the Madrid follow-up meeting, which mandated a new Conference on Confidence- and Security-Building Measures and Disarmament in Europe (CDE-I), that was held in Stockholm from 1984 to 1986.

The Stockholm Document signed in September 1986 failed to reduce the levels of military forces in Europe, but it did establish a series of confidence- and security-building measures (CSBMs) that were militarily far more significant than the CBMs of the Helsinki Final Act, especially in reporting requirements on military activities and obligations for on-site inspection.²

At the third CSCE follow-up meeting in Vienna, which began in November 1986, 12 new conferences were proposed of which 5 were endorsed by all 35 states. These include two conferences to deal with Basket I issues: a 35-state CDE-II to upgrade the CSBMs negotiated in Stockholm, and a 23-state conference on conventional forces. Throughout 1987 and 1988 the latter was

referred to as the Conventional Stability Talks (CST). The mandate for this forum (see appendix 11B) was adopted on 15 January 1989, and since then it has been known as the Negotiation on Conventional Forces in Europe (CFE). Three human rights conferences were scheduled: for 1989 in Paris, for 1990 in Copenhagen and for 1991 in Moscow.

II. Coming to closure at the third CSCE follow-up meeting

At the end of 1988, delegates from the 23 states which would participate in the CFE talks still had some points to settle on the geographical scope and the negotiating mandate, but the beginning of the talks was held up largely because of disagreements about human rights issues in the concluding document of the Vienna follow-up meeting and about the future relationship of the 23-state CFE talks to the 35-state CSCE.

Disputes over human rights issues

Basket III issues were a bone of contention at all three CSCE follow-up meetings; between the 12 neutral and non-aligned (NNA) and the 16 NATO states on the one hand and the 7 WTO states on the other. Of the 10 principles that guide relations between the 35 signatories of the Helsinki Final Act, it is Principle VII ('respect for human rights and fundamental freedoms') that usually proves a stumbling-block for the more orthodox communist regimes of Eastern Europe and the Soviet Union. Principle VII embraces such issues as minority rights, exit permission, the right to unhindered movement, treatment and rights of detained persons, preventing the misuse of psychiatric treatment and freedom of religious education.

Poland and Hungary have a better record on human rights than their WTO alliance partners. The big difference at the third follow-up meeting in Vienna, as compared with the first and second meetings in Belgrade and Madrid, was that since 1985 under the leadership of Mikhail Gorbachev the Soviet record on human rights had moved far closer to acceptable Western standards than those of Bulgaria, the GDR, Czechoslovakia or Romania.³ Romania has the worst record on all these issues; but throughout 1988 Bulgaria was unwilling to ease travel restrictions, Czechoslovakia refused to allow greater religious freedom, and the GDR would not ease its harsh currency restrictions nor allow the establishment of Helsinki monitoring groups.⁴

During 1988, the Soviet delegates in Vienna often seemed as irritated as the Western and the NNA states with the more conservative East European states, but the Gorbachev leadership was nevertheless unable to persuade the WTO as a whole to adopt a more liberal line.⁵ Some Soviet delegates in Vienna even chastized their Western colleagues for having encouraged independent Romanian behaviour in the past.⁶

Nevertheless, the Supreme Soviet seemed to take a backward step on human rights in late October when it approved new legislation (albeit with opposition from a handful of deputies) that stiffened the penalties for organizing and participating in 'unlawful' demonstrations. New draft press laws stipulating, for

example, that only 'legally constituted and registered social organizations will be able to publish regularly', could also imply restrictive practices.⁷ On the other hand, these laws may as likely be designed to curb the emerging right-wing 'memory group' as the more liberal supporters of *glasnost* and *perestroika*.

For most of 1988, neither the Reagan nor the Thatcher Administration was satisfied that conditions in the Soviet Union merited endorsement of Moscow as the site for the 1991 human rights conference. In 1987, the US delegate to the CSCE deplored the restrictive conditions of the recent Budapest Cultural Forum and laid down a series of conditions that must be met in future CSCE meetings with respect to distribution of conference materials, access to meetings and freedom of movement for conference participants. During the year, Canadian, Netherlands and Portuguese delegates often joined the US and British delegates in questioning the suitability of the Moscow site.

By contrast, other Western and NNA states argued that preparations for the Moscow conference over the next two years could enhance the effectiveness of those reformers working to improve human rights in the Soviet Union.⁸ Many Western human-rights activists were particularly encouraged by the appointment in 1987 of Fyodor M. Burlatsky to head a new Soviet Human Rights Commission. During 1988 Burlatsky used the Commission to press for the release of political prisoners and the liberalization of emigration laws, including efforts to provide legal recourse to appeal refusals of exit visas.⁹

By November 1988, all of the 35 CSCE states except the USA and the UK apparently felt that the Soviet Union would be able to meet the appropriate standards by 1991, and no longer opposed the Moscow conference. French Foreign Minister Roland Dumas was still withholding support when he spoke at the Third United Nations Special Session on Disarmament in June, but President François Mitterrand gave his endorsement during Soviet Foreign Minister Eduard Shevardnadze's visit to Paris in early October, as did West German Chancellor Helmut Kohl on his visit to Moscow later the same month.

The USA and the UK, with the encouragement of Andrei Sakharov and other prominent Soviet human rights activists, continued to hold out in the hope that the Soviet authorities would release all those whom Western governments designate as political prisoners as a *quid pro quo*.¹⁰ During discussions in Washington in September, US Secretary of State George Shultz and Soviet Foreign Minister Eduard Shevardnadze resolved several of these cases and, in October, Shevardnadze told West German Foreign Minister Hans-Dietrich Genscher that by the end of the year no one would be able to accuse the Kremlin of holding political prisoners.¹¹

When British Prime Minister Margaret Thatcher and President Mitterrand met in late November it appeared that some compromise had been reached. The USA and Britain were adopting a more neutral 'wait and see' attitude, while the Soviet delegate was no longer making acceptance of the Moscow site in 1991 a condition for Soviet acquiescence to the final document of the Vienna follow-up meeting.¹² During December the Soviet Union registered considerable progress on human rights and drew up plans for new legislation on emigration and freedom of speech.¹³ At the end of the year over 500 of the 600

people identified as political prisoners by Amnesty International had been released, and Western radio broadcasts were no longer being jammed. On 4 January 1989, both Britain and the USA indicated to Yuri Kashlev, the Soviet delegate to the CSCE follow-up meeting, that they conditionally approved Moscow as the site for the 1991 conference on human rights.¹⁴

The relationship of the CFE talks to the CSCE

When the Vienna CSCE follow-up meeting began in November 1986, France and the NNA states wanted both CSBMs and conventional force reductions to be discussed at a second 35-state Conference on Disarmament in Europe (CDE-II), a follow-up to the 1984–86 Stockholm Conference. By contrast, most of the NATO and WTO states preferred two separate negotiations: a 35-state forum to upgrade the Stockholm CSBMs and a new 23-state inter-alliance forum to discuss conventional force reductions. In February 1987, France agreed to participate in informal 23-state talks to discuss a mandate for talks on conventional forces, but always maintained that such a forum, although comprising only NATO and WTO states, should not be a bloc-to-bloc negotiation but a meeting of 23 individual sovereign states, subordinate to the 35-state CSCE.

The US delegate, Stephen Ledogar, was a particularly outspoken opponent of a close connection between the 23- and 35-state forums. Consistent with the long-standing French policy of seeking maximum autonomy within the Atlantic Alliance, a primary reason for French insistence on the importance of the CSCE appeared to be to put maximum distance between the French and US positions. In March 1987 Prime Minister Jacques Chirac warned President Reagan that France would insist on the CSCE link, but in June Foreign Minister Jean-Bernard Raimond and Secretary of State Shultz apparently reached a compromise formula, one which a US official described as an 'optical cover' for France.¹⁵

Paragraph 6 of the Final Communiqué from the Reykjavik meeting of the NATO Foreign Ministers noted that 'two future security negotiations should take place within the framework of the CSCE process with the conventional stability negotiations retaining autonomy as regards subject matter, participation and procedures'.¹⁶ Apparently the compromise also included an understanding that NATO would issue no directives to the Allies who would all negotiate as independent sovereign states. The 23-state CFE talks would report regularly to the 35-state CSCE, but the 12 NNA states would have no voting rights in the proceedings of the CFE talks.¹⁷

This compromise seemed to calm down the simmering feud between France and the USA at the CFE mandate talks although differences erupted later over geographical sub-zones within the Atlantic-to-Urals area and over which weapon systems to include in the CFE agenda. After the French elections in mid-1988, however, French policy seemed more in tune with the other Western powers. On East–West relations, the new Socialist Government in Paris appeared much closer to the Foreign Minister of the FRG, Hans-Dietrich Genscher, whereas the 1986–88 French 'Cohabitation' Government had

shared the more cautious line of London and Washington. This change was reflected primarily in French sympathy with the West German desire not to rush to modernize NATO's short-range nuclear assets but also in a more dynamic *détente* policy towards Eastern Europe and a more co-operative attitude towards the CFE talks.¹⁸ One reason that has been given for the change in French policy was that President Mitterrand did not want the FRG to be too isolated in its enthusiasm for *détente*. Only when the Government in Bonn is firmly bound to France and the other Western allies can the territory of FR Germany serve as an effective security buffer for France.¹⁹

In November 1988, however, French acceptance of a separate CFE forum seemed to be in doubt again. On a visit to Bonn, President Mitterrand was apparently startled to hear Chancellor Kohl refer to the CFE talks as a bloc-to-bloc forum. On his return to Paris, Mitterrand asked for a review of the French position, claiming that the June 1987 compromise in Reykjavik had been agreed to by the former government and may need to be reassessed. In Vienna the French delegate put forward 10 talking points to the 23 CFE states to clarify the French position, and the other delegates complained that the French reassessment delayed progress at the mandate talks by 3–4 weeks. Whether the reassessment was actually triggered by a chance remark of Chancellor Kohl, or whether President Mitterrand had indeed been uninformed about the Reykjavik compromise, was unclear. On the eve of his visit to Moscow President Mitterrand may simply have wanted to make yet another statement of independence from Washington.

In any event, when the dust settled the reassessment did not appear to have fundamentally changed French policy towards the CFE talks.²⁰ As a practical matter, France, and many smaller European powers, are likely to field only one delegation to cover both the CDE-II and the CFE talks. They will simply wear different hats for the different forums.

III. Prospects for the CFE talks

The Gorbachev speech to the UN General Assembly

Ever since taking over the leadership of the Communist Party of the Soviet Union in early 1985, Mikhail Gorbachev has been manifestly impatient with the plodding incrementalism of traditional arms control diplomacy. This was demonstrated in January 1986, by his proposals for complete nuclear disarmament by the year 2000; in April 1986, when his comprehensive proposals for conventional arms control effectively undermined the recent modest progress achieved at the MBFR talks; and even more effectively at the Reykjavik summit meeting in October 1986, when he almost persuaded President Reagan to ban ballistic missiles.

On a number of occasions he chose to present his proposals for conventional arms control via public diplomacy, and in mid-July 1988 he proposed an all-European 'Reykjavik-type' summit meeting to accelerate the proceedings in Vienna. Most dramatically, on 7 December—on the first anniversary of the signing of the INF Treaty—he tried to jump-start the CFE talks with a good will

gesture of unilateral cuts in precisely those forces that NATO officials claimed were most offensive to the West: forward-deployed manpower, tank divisions, artillery, air assault forces and bridging equipment.

In his speech to the UN General Assembly, Gorbachev promised that, by 1991, 500 000 men would be cut from the Soviet armed forces. At least 50 000 men and their equipment, including 5000 tanks, would be withdrawn from the GDR, Hungary and Czechoslovakia. These would include 6 tank divisions (which Western analysts assumed would involve only 2000 modern tanks, so the other 3000 could be from independent tank regiments) as well as other unspecified military units. Another 5000 tanks would be withdrawn from the western military districts of the USSR. Some Soviet analysts suggested that 5000 modern tanks would be redeployed from Eastern Europe to the western military districts, and that 10 000 older tanks from the western military districts would be dismantled. 8500 artillery pieces and 800 combat aircraft would also be withdrawn from the Atlantic-to-Urals area.²¹ After a meeting of WTO defence ministers in Sofia on 17 December 1988 Hungary, Poland, Czechoslovakia, Bulgaria and the GDR all followed suit with announcements of troop and budget cuts of their own. As Western analysts were quick to point out, the announced cuts were not sufficient to eliminate the WTO superiority over NATO in these force categories. Nevertheless, they were consistent with previous proposals by the WTO to eliminate force asymmetries between the two alliances.

Given the lack of Western response to the August 1985–February 1987 Soviet moratorium on nuclear testing, another unilateral gesture cannot have been a universally popular measure with the Soviet military. While many civilian analysts and reformers in the Soviet Government argued for a unilateral gesture of this kind during the year, military authors and spokesmen consistently argued for cuts only in the context of negotiated and reciprocal measures.²² Soviet Chief of Staff, Marshal Sergey Akhromeyev, who was one of the more outspoken opponents of unilateral cuts, resigned on 7 December.²³

The Western response

‘Perhaps not since Woodrow Wilson presented his Fourteen Points in 1918 or since Franklin Roosevelt and Winston Churchill promulgated the Atlantic Charter in 1941 has a world figure demonstrated the vision Mikhail Gorbachev displayed yesterday at the United Nations’, was how the *New York Times* responded the morning after the UN General Assembly speech.²⁴

Whether the Gorbachev gesture will generate reciprocal gestures from the West remains to be seen. Some analysts cautioned NATO against responding with cuts in European forces.²⁵ Others suggested that cuts in NATO tactical nuclear missiles were long overdue and would now be an appropriate response.²⁶

In Washington, William Webster, Director of the Central Intelligence Agency (CIA), admitted that the Soviet cuts would ‘substantially reduce the ability to launch a surprise short warning attack’, but that General Secretary Gorbachev’s announcement would also complicate Western efforts to present

a united position at the CFE talks.²⁷ This sentiment was echoed in France where a Ministry of Defence spokesman complained that the Gorbachev speech 'made things much more difficult'.²⁸ The first NATO response came from the meeting of foreign ministers in Brussels on 8–9 December. Predictably, British Foreign Secretary Geoffrey Howe and Secretary of State George Shultz both responded with caution, and Foreign Minister Hans-Dietrich Genscher with enthusiasm. The official communiqué commended the announced Soviet cuts as a step in the right direction but did not offer any NATO cuts in return.²⁹ Instead, it presented the principles on which European conventional stability should be based, namely:

1. Total holdings of armaments in Europe should be substantially lower than existing levels, and in the case of tanks close to half, with an overall limit of 40 000 in the entire Atlantic-to-Urals area. (This implies no NATO tank cuts but almost 50 per cent cuts in WTO tanks.)

2. To prevent any country from dominating the continent 'by force of arms', no individual country should possess more than 30 per cent of the total holdings of the 23 participants in each equipment category, that is, no single country should possess more than 12 000–13 000 tanks (30 per cent of 40 000). (This is designed to prevent the Soviet Union from making its allies cut disproportionately—a hold-over from the old MBFR thinking.)

3. Special sub-limits would be placed on stationed (foreign) troops since these are especially relevant to surprise-attack potential. (NATO is expected to insist that within the central zone the equipment of foreign forces must not exceed 20 per cent of the alliance ceiling for that zone. This is designed to push most of the Soviet forces out of the GDR, while retaining most of the US forces in the FRG.)

3. To avoid concentrations of forces in certain areas, special regional sub-limits will be proposed.

4. In addition to force reductions the Western states will propose a number of 'stabilizing measures', including measures of transparency, notifications of military activity and constraints of various activities.

5. A verification regime would include periodic exchange of detailed military data and the right to conduct on-site inspections.

The NATO communiqué also proposed a number of CSBMs that it would introduce into the 35-state CDE-II. These would upgrade the Stockholm CSBMs: more information on military activities, improved conditions for observers at exercises, greater openness and predictability, and stronger verification provisions.

For the first time NATO responded positively to repeated WTO proposals for official exchanges of views on military doctrines, 'in the context of actual force structures, capabilities and dispositions in Europe'.

Finally, NATO placed the requirement to restructure forces to enhance defensive over offensive forces as a step to be taken once all the other proposals had been implemented.

IV. Developing the negotiating positions

The intra-WTO debate

During the Khrushchev and Brezhnev years it was sometimes the East European states that provided the impetus for WTO arms control initiatives.³⁰ But since 1985, Mikhail Gorbachev has clearly been the driving force, especially in formulating policy on conventional forces—beginning with his 18 April 1986 speech in East Berlin and culminating with his 7 December 1988 speech to the UN General Assembly. But there has also been an effort to present these initiatives as co-ordinated alliance policy. In May 1987 the Political Consultative Committee of the WTO set up a Commission on Arms Control and Disarmament to co-ordinate WTO policy for the new talks on conventional forces. The Commission has met regularly in different WTO capitals since then.³¹

Thus, a number of authoritative WTO statements on conventional arms control, from the June 1986 Budapest Appeal to the Communiqué from the WTO summit meeting in Warsaw in mid-July 1988, complemented the Gorbachev initiatives. While there did not appear to be significant differences to resolve in formulating WTO policy for the new talks, it became clear during 1988 that East European views on stationed Soviet forces were not identical.

The official rationale for the two divisions of Soviet troops in Poland is to protect the lines of communication between the Soviet Union and the Group of Soviet Forces in the GDR, although Western analysts assume that these troops are also there to control the local population. General Jaruzelski and the rest of the Polish leadership enthusiastically supported all the Gorbachev arms control initiatives and even proposed their own complementary initiative in May 1987.³² On 17 June 1988, the Polish Parliament voted unanimously to give up the 1952 Oath of Loyalty that members of the Polish armed forces had to make to the Soviet armed forces.³³ Poles in general would presumably have welcomed withdrawals of Soviet forces, but there has been no overt pressure, from the government, Solidarity, the Roman Catholic Church or any other quasi-opposition groups, to remove these forces, and they are not included in those to be withdrawn in the two-year schedule announced on 7 December. Nor did all Poles feel comfortable with the idea of complete Soviet withdrawals from Eastern Europe. Some have suggested privately that Soviet forces should remain in the GDR even if they were withdrawn from Poland, Czechoslovakia and Hungary.³⁴ This view reflects apprehension about German reunification as well as uncertainty about the stability of post-1945 borders, Poland having gained a slice of eastern Prussia to compensate for Soviet appropriation of a slice of eastern Poland. The Polish Defence Minister, General Florian Siwicki, told reporters in early January that in the past two years Poland had cut its own armed forces by 15 000 men and would soon shed 'tens of thousands' of personnel in order to reduce defence costs and increase efficiency.³⁵

Hungary is unique in that party leaders, as well as various quasi-opposition groups, were outspoken during 1988 about their desire to be rid of the four Soviet divisions on their territory. This was not only because Hungarians found

the presence of Soviet troops oppressive but also because the party leadership increasingly resented having to pay for what in NATO would be called 'host-nation support'.³⁶ On several occasions government officials proposed that Hungary serve as the pilot country for initial Soviet troop withdrawals.³⁷ This was appropriate as the national armed forces of Hungary apparently served as the pilot for restructuring the WTO into a manifestly defensive posture.³⁸ Hungarian leaders were especially pleased by the Gorbachev UN General Assembly speech since there had been many signals earlier in the year warning against any expectation of unilateral Soviet cuts.³⁹

Czechoslovakia and the GDR were both scheduled for reductions in stationed Soviet forces according to the 7 December speech. Until more details are available, of precisely which forces are involved, reactions are hard to gauge. What is clear, however, is that while the general public in these two countries may welcome the unilateral troop cuts and other aspects of Gorbachev's new thinking, both governments were apprehensive about many of the Soviet reforms. Party leaders appeared to fear that too much *glasnost* and *perestroika* could undermine their authority and legitimacy and trigger another Prague Spring. Milos Jakes of Czechoslovakia had his own idea for a zone of trust and confidence in Central Europe, that was consistent both with the Gorbachev agenda and the Jaruzelski proposal,⁴⁰ but both he and Erich Honecker, Chairman of the GDR's State Council, may want to keep stationed Soviet forces on hand to preserve their shaky legitimacy and guard against domestic upheavals.

Neither Romania nor Bulgaria has stationed Soviet troops, so neither was directly affected by the December initiative. Romania has resisted all Soviet efforts to introduce domestic reforms, but General Secretary Ceaucescu has been totally supportive of all the Gorbachev arms control initiatives; indeed for many years he has called for reduced WTO defence spending. Bulgaria is more amenable than Romania to introducing domestic reforms and also supports the Gorbachev initiatives on arms control.

In addition to the supportive initiatives from East European party leaders such as Jakes and Jaruzelski, other semi-official conventional arms control initiatives were offered by some East European communist parties in conjunction with opposition parties in NATO and NNA countries. Several of these emerged from the regular dialogue that developed during the 1980s between the Social Democratic Party (SPD) of the FRG and the Socialist Unity Party (SED) of the GDR.⁴¹ The SPD also collaborated with the Polish Communist Party in developing new CSBMs that were presented in Warsaw on 11 February and in Bonn the following day.⁴² The Hungarian Communist Party collaborated with the Social Democratic Party of Finland and the Italian Socialist Party, to urge the withdrawal of foreign troops from the territory of other European countries—a particularly interesting proposal since in any European conflict Italian and Hungarian troops would be pitted against each other.⁴³

Elements of the WTO proposal

Prior to the 7 December 1988 announcement of unilateral Soviet force reductions over the next two years, the elements of a likely WTO negotiating position for the CFE talks had emerged in a number of speeches by Mikhail Gorbachev and WTO communiqués.⁴⁴ Three stages are envisaged:

1. Stage I is itself in 3 parts: (a) a reciprocal exchange of relevant NATO and WTO data in the Atlantic-to-Urals zone; (b) on-site verification to resolve any discrepancies in one side's estimates of the other's forces; and (c) once data are agreed upon, force asymmetries in the relevant categories of equipment would be corrected by the side that was ahead levelling down.

2. In Stage II, each side would reduce its military manpower by 500 000 men together with their weapons and equipment. The Soviet Union claimed that this would represent a 25 per cent reduction.

3. In Stage III, each side would restructure its remaining forces into unambiguously defensive postures.

The 7 December initiative appeared to leap-frog to Stage II of the WTO proposal, although the need to exchange and verify data remains.

Developing the Western negotiating positions

The 16 Western states co-ordinated their conventional arms control policies in the High Level Task Force (HLTF) that was established by NATO foreign ministers meeting in Halifax, Nova Scotia, in May 1986, in response to Mikhail Gorbachev's speech calling for Europe-wide negotiations on arms control in East Berlin the previous month.⁴⁵ In this speech Gorbachev reiterated his statements of the previous October in Paris, namely that WTO forces were stronger than those of NATO in some areas and that, where asymmetries existed, the side that was ahead should level down. He also acknowledged that any arms control agreement in Europe would require on-site inspections. The speech received a mixed reception in Brussels and Vienna, where NATO officials had just made a breakthrough on the data dispute at MBFR and felt that the talks were about to yield a result. The Gorbachev speech thus seemed an unfortunate diversion to a more unwieldy forum involving all 35 CSCE states.⁴⁶

For these very reasons, France welcomed the speech and proposed the HLTF as a way of co-ordinating a Western response to Gorbachev. Although the HLTF met regularly in NATO capitals, the French delegate usually made a point at each meeting of emphasizing that this was not a NATO body. France also tried to insist that CFE policy for the Western states not be discussed in the North Atlantic Council since this was the body that normally formulated Alliance policy on MBFR.

Despite these sensitivities, France was also a member of the five-state steering committee that met before each HLTF meeting in order to co-ordinate US, British, West German, French and Italian policy. (While justified by the par-

ticipants in terms of efficiency, the other 11 NATO allies resent these smaller gatherings that serve to emphasize the hierarchical and unequal nature of the Alliance.) The 16 Western states differed in the importance they attach to including various categories of their own forces in the CFE mandate, but they all agreed that a primary goal of the CFE talks should be to undermine the capability of the WTO to launch a surprise attack and to sustain offensive operations. Thus the Western positions articulated in the 9 December NATO communiqué focus on cuts to be made in WTO forces rather than on limits that would be acceptable on NATO forces. These highly asymmetrical cuts that NATO wants (in tanks, infantry fighting vehicles—IFVs—and artillery) are unlikely to be negotiable unless the NATO states also agree to limits on strike aircraft and other dual-capable systems that are most offensive to the WTO states.

Some NATO parliamentarians found the NATO proposals too modest and urged more dramatic reductions. Volker Rühle, deputy leader of the Christian Democrat–Christian Socialist (CDU–CSU) alliance in the Bundestag, for example, suggested that CFE ceilings should be set at 85 per cent of current NATO strength, and that 50 per cent of the permitted equipment should be mothballed and 50 per cent kept in active service. For main battle tanks Rühle suggested that this would mean ceilings of 7500 for each alliance, of which 3750 would be in secure monitored storage.⁴⁷

Intra-NATO differences

Whether to include nuclear weapons

When the mandate talks first began in February 1987 the WTO states pressed for the inclusion of all weapons and equipment in the Atlantic-to-Urals area, in particular nuclear-armed and nuclear-capable systems. This was quite an attractive notion to many of the smaller NATO states. France, the USA and the UK, however, all of whom deploy nuclear weapons in the zone, were adamantly opposed to including them. On the contrary, in the light of the INF Treaty, these three states all wanted to compensate for the loss of US cruise and Pershing II missiles by deploying more US nuclear-capable aircraft in Europe and modernizing the shorter-range systems not limited by the Treaty.

Both government and opposition in the Federal Republic of Germany, on the other hand, were nervous about the likely public reaction to any new land-based nuclear weapons on German soil. Chancellor Kohl is committed to flexible response and the need to maintain some US nuclear systems in FR Germany. Nevertheless he would clearly prefer not to be faced with a decision to accept a new, longer-range, nuclear-armed, land-based Lance missile before the December 1990 elections. Chancellor Kohl and others in the CDU–CSU alliance, such as Volker Rühle and Alfred Dregger, all wanted reductions in nuclear artillery, since these would inevitably wreak havoc on both Germans if used. The CDU–CSU alliance opposed a triple-zero agreement on nuclear missiles of shorter range than those limited in the double-zero INF Treaty, but they would welcome negotiations aimed at very low NATO–WTO ceilings in the shorter-range systems—negotiations parallel rather than integral to the CFE talks.

Foreign Minister Genscher and the Free Democratic Party (FDP), while more enthusiastic about Mikhail Gorbachev's dynamic diplomacy than Chancellor Kohl and the CDU-CSU, are also against a triple-zero agreement and appear to believe that some land-based nuclear weapons in the FRG are necessary to make extended deterrence credible. In general, they appear more enthusiastic about drastic reductions in nuclear artillery and more adamantly opposed to an early modernization decision than is Chancellor Kohl.

During the 1980s, the opposition SPD has adopted security policies that rely less and less on nuclear weapons. In May 1984, for example, the party congress in Essen committed itself to a policy of nuclear no-first-use. At the party congress in Münster in September 1988, the SPD rejected modernization of the Lance missile, or any other measure that might be construed as compensating for nuclear assets withdrawn as a result of the INF Treaty. For the long term, the SPD would prefer to develop a minimum deterrence posture by removing all land-based nuclear weapons (the triple-zero proposal) and basing NATO deterrence requirements on air- and sea-based systems.⁴⁸

Conservatives in France grew increasingly nervous about the anti-nuclear tendency of the SPD throughout 1988. During the first half of the year Defence Minister André Giraud and Prime Minister Jacques Chirac strongly supported the Anglo-US axis that favoured modernization rather than limitation of the remaining US nuclear forces in Europe. President Mitterrand on the other hand, while no less nervous about the SPD, was always much more sensitive to the political problems that a modernization decision would pose for Chancellor Kohl. Thus, at the summit meeting of NATO leaders in Brussels in March, Jacques Chirac supported Prime Minister Thatcher's pitch for early modernization of Lance, while François Mitterrand supported Helmut Kohl's position to shelve the decision.⁴⁹

No one in the French Government wanted to include nuclear weapons in the CFE agenda, and most assuredly did not want any limits imposed on French nuclear programmes, but President Mitterrand was anxious that FR Germany not be isolated in the Alliance on the modernization issue (much as he had not wanted Helmut Kohl to be isolated in his decision to deploy cruise and Pershing II missiles in 1983). In a number of different forums, President Mitterrand raised the possibility of linking progress at the CFE talks to NATO nuclear modernization, and more importantly to the modernization of French short-range systems such as the Hadès missile. By this means the French President could support the Federal Chancellor's position on nuclear modernization, as well as give Mikhail Gorbachev and the WTO powerful incentives to negotiate co-operatively on conventional forces. The implicit offer to the WTO was that if they were prepared to cut their conventional superiority, the NATO countries might be willing to forgo a new generation of short-range nuclear weapons.⁵⁰

After the French elections, the new cabinet was much more in tune with President Mitterrand. Prime Minister Michel Rocard and Foreign Minister Roland Dumas echoed President Mitterrand's proposal to give the CFE talks two years' grace before taking any nuclear modernization decisions.⁵¹

These measures did not imply any less interest in maintaining and

modernizing the French strategic deterrent, but indicated President Mitterrand's preference for a purely deterrent force that did not contemplate the kind of limited nuclear war-fighting options envisaged in NATO's flexible-response doctrine. Defence Minister Jean-Pierre Chevenement was more reluctant to delay French nuclear programmes and warned against any plans to de-nuclearize Europe. He and President Mitterrand both claimed several times during the year that the future security of Europe might have to be based on British and French strategic weapons.⁵²

Meanwhile British and US officials and the Supreme Allied Commander, Europe (SACEUR) continued to press for a follow-on to Lance and for a new nuclear-armed stand-off air-launched missile. In Brussels, the US Ambassador to NATO, Alton Keel, was a particularly strong advocate of a follow-on missile.⁵³ Chancellor Kohl said in November that he might be willing to accept two new nuclear-capable systems if the USA and NATO would agree to reduce or, better still, completely eliminate short-range nuclear artillery. By late December, however, some Washington analysts felt that the Gorbachev initiative on conventional forces effectively stymied prospects for NATO nuclear modernization for the near term.⁵⁴

Whether to include aircraft and naval forces

In the CFE mandate talks the WTO delegates argued that NATO seeks to offset WTO superiority in ground forces with superior air and naval assets. Thus, if the WTO countries were willing to cut their ground strength, NATO should be willing to reduce its superiority in air and naval power.

Norway and Turkey expressed some interest in provisions that might limit Soviet naval forces in the Black Sea and the Baltic. But most NATO countries resisted broadening the CFE agenda to include air and sea power. There was a willingness to consider including air power at a later stage of the CFE talks but a widespread feeling that including it in the first stage would overburden the agenda and undermine the prospects for reductions on ground forces.⁵⁵ Some West Europeans also feared that putting air and naval assets on the agenda would make the CFE talks a more bilateral forum in which the smaller allies would have little influence.

Britain and France were opposed to the inclusion of air and naval forces in part because this could involve limits on their nuclear arsenals. In June 1988, both governments appeared somewhat alarmed to learn that that Foreign Minister Shevardnadze and Secretary of State Shultz some weeks before had been discussing a compromise whereby dual-capable aircraft and artillery might be discussed at the CFE talks.⁵⁶

V. Reconciling the NATO and WTO positions

The developing NATO proposal for equal alliance-wide ceilings on IFVs, tank and artillery holdings corresponds to part 3 of WTO Stage I, described above, but many questions remain about how to reconcile the two proposals. As with MBFR the problem areas to resolve are likely to be: the stage and level of detail at which data should be exchanged; the definition of the overall reduction zone

and any sub-zones for special ceilings; deciding for which categories of forces asymmetries matter, which weapons should be reduced and which left unlimited, and the kind of verification regime that should be established.

The data exchange

Proposals to exchange official NATO and WTO data on forces within the Atlantic-to-Urals zone were made at various times during 1988 by General Secretary Gorbachev, Marshal Akhromeyev and General Yazov.⁵⁷ Initially NATO rejected the idea because the 16 NATO countries were having difficulty co-ordinating their separate estimates. In Washington in June the State Department spokesman, Charles Redman, called the proposal to exchange data a 'useless exercise'.⁵⁸ It was clear, however, that the Soviet proposal was a source of embarrassment for NATO and good public relations for Mikhail Gorbachev. Eventually public pressure triggered NATO to produce a set of data. This appeared on 25 November 1988, entitled *Conventional Forces in Europe: The Facts*.⁵⁹ Included were 'ground forces belonging to the member countries of NATO and the WTO that are stationed in Europe from the Atlantic to the Urals',⁶⁰ and combat aircraft 'stationed on land in Europe from the Atlantic to the Urals'.⁶¹

An accompanying statement noted that the categories chosen were not intended to prejudge the CFE agenda and that the information being made available was not a substitute for the more detailed and disaggregated data which all participants would need to provide in the course of the negotiations.

On 30 January 1989, the WTO Defence Ministers published in *Pravda* official data 'On the Relative Strengths of the Armed Forces and Armaments of the Warsaw Treaty Organization and the North Atlantic Treaty Organization in Europe and Adjacent Water Areas'. As anticipated the WTO acknowledged superiority in tanks, artillery, tactical missiles and submarines, and claimed NATO superiority in strike aircraft and naval assets. The WTO did not produce any comprehensive budget data during 1988, although some senior officials revealed snippets of information about items not included in previously released official budget figures.⁶² Deputy Foreign Minister Vladimir Petrovsky produced data on Soviet naval forces for the First Committee of the UN General Assembly in New York in October.⁶³ Moreover, it was clear that in response to both domestic and international pressure, a serious effort was beginning in 1988 in Moscow to establish a pricing system that would enable analysts to compare Soviet defence spending with that of other countries.⁶⁴

CFE zones of application

The Atlantic-to-Urals area (ATTU) is a large unwieldy zone, not only in its east-west but also in its north-south extent, stretching from the North Cape to the Mediterranean. Even with good will on both sides it will be extremely difficult to negotiate equitable force limits. Most analysts assume that the zone of application will have to be carved up into manageable sub-zones for which equitable ceilings in selected categories of military forces must be established.

Eastern proposals usually envisage starting the CFE process by excluding the most offensive systems from Central Europe where the concentration of military forces is heaviest. The exclusion zone could then be progressively widened as reductions are implemented and compliance regimes successfully established.

NATO countries on the other hand tend to favour the approach in which the ATTU zone is divided into northern, central and southern tiers, each of which has separate alliance force ceilings appropriate to its strategic situation. From NATO's perspective it is important that initial reductions are taken in a wide swathe of Central Europe that includes Soviet forces capable of offensive action. NATO fears of attack focus on tanks and artillery holdings in Soviet ground forces.

Geographical asymmetries obviously influence the ways in which NATO and WTO countries view potential CFE zones. NATO countries in Europe are conscious of the narrowness of their 'half' of the continent and their inability to defend in depth, as compared with the WTO and the Soviet military districts west of the Urals. This uncomfortable force-to-space ratio accounts for much of the asymmetry in the two alliance force postures. For example, NATO feels it must compensate for superior WTO ground-attack capabilities with superior air power. NATO countries also tended to define the ATTU area so as to exclude as many islands and adjacent seas as possible, in order to preserve maximum flexibility to reinforce Western Europe from North America by sea.

Soviet fears of attack focus on NATO's nuclear weapons rather than on conventional ground forces, so Soviet analysts prefer a wider concept of the ATTU zone that justifies the inclusion of US forces designated for the European theatre but normally deployed in the USA, as well as air and naval forces targeted on the western half of the USSR.

Soviet military planners divide the globe into three theatres of war (Euro-Atlantic, Asian-Pacific and Indo-Arabian). The USSR is divided into five continental theatres of military action (TVDs) and 16 military districts (MDs). Forces in the Western, South-Western and North-Western TVDs are focused on contingencies in the Euro-Atlantic region, forces in the Far Eastern TVD are primarily concerned with contingencies in the Asian-Pacific theatre and forces in the Southern TVD are focused on the Indo-Arabian region.⁶⁵

One problem in defining the Soviet portion of the ATTU zone is that, of the 16 military districts, 7 are unambiguously situated in the European part of the USSR: the Moscow MD; the Leningrad MD in the North-Western TVD; the Baltic, Byelorussian and Carpathian MDs in the Western TVD; and the Odessa and Kiev MDs in the South-Western TVD. But three military districts straddle the continents of Europe and Asia: in the central region, the Volga and the Urals MDs and in the southern region the Northern Caucasus MD. One military district, the Transcaucasus, is wholly in Asia but borders Turkey, a NATO country. Opinions differ therefore as to how many of these should be included in the ATTU area. Most analysts agree that the first 7 districts should be included, but some would include all 11. For example, including military districts such as the Urals and the Volga, that are in the European part of the USSR but far from the inter-alliance border and likely theatre of conflict,

makes it easier for the USSR to justify the inclusion on the NATO side of those areas in the eastern USA where forces earmarked for Europe are based in peacetime. By a similar logic, the USSR argues that if northern districts, such as the Leningrad MD, and southern districts, such as the Kiev and Odessa MDs, are included, then on the NATO side, the marine forces and carrier-based aircraft targeted on those Soviet districts should also be included.

By late 1988 the ATTU zone of application agreed by all 23 CFE states, except Greece, was to be the land territories of all the European members of the WTO, including the 11 Soviet military districts listed above, and the land territories of all NATO countries except Canada, the USA, Greenland and the south-eastern corner of Turkey. Greece objects to the exclusion of south-eastern Turkey because it wants to include in the zone of application the port of Mersin, which is the main supply base for Turkish troops in northern Cyprus.⁶⁶ Attached to the mandate are five national statements from Denmark, Norway, Portugal, Spain and the USSR pertaining to their island territories in the Mediterranean and the Atlantic. Denmark will include the Faroes, Norway will include Svalbard and Bear Island, Portugal will include the Azores and Madeira, Spain will include the Canary Islands, and the USSR will include Franz Josef Land and Novaya Zemlya.

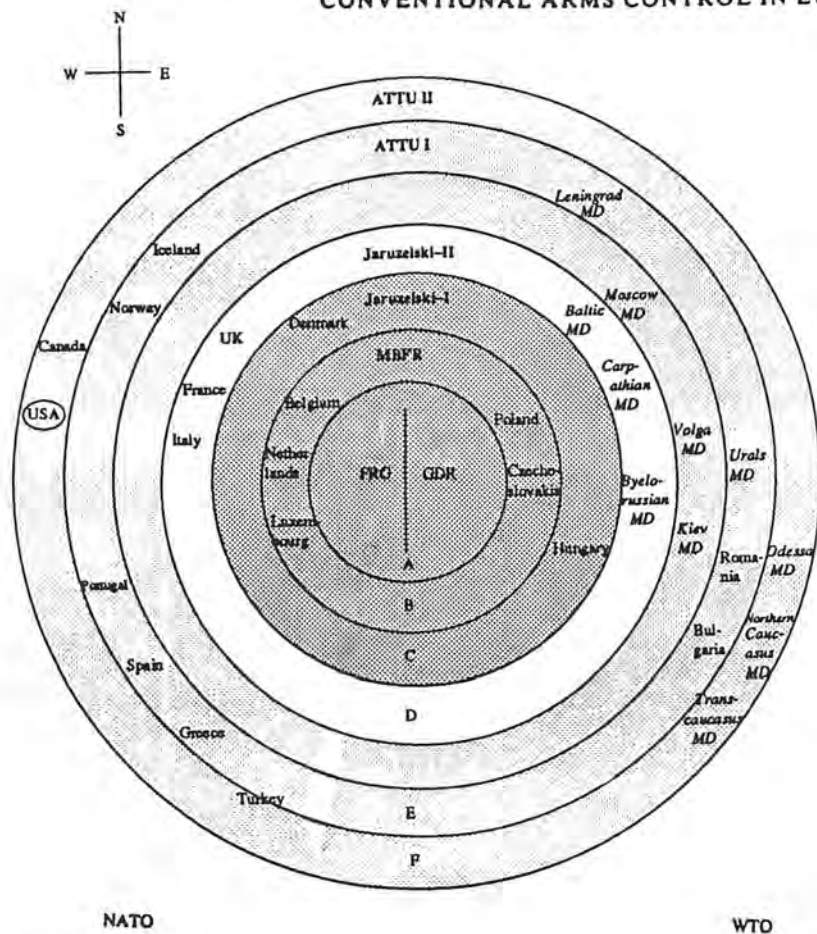
Eastern concepts of the sub-zones

Some Soviet analysts have suggested six concentric zones as a basis for analysing conventional force reductions.⁶⁷ These are shown in figure 11.1 as follows:

A: FRG and GDR. The two German states bear the heaviest military burden and will presumably also be the zone of greatest force reduction. Many unofficial proposals from East and West have proposed an even smaller exclusion zone on the inter-German border, from which the most offensive military systems would be banned altogether. Former Ambassador Jonathan Dean, for example, proposed the elimination of six equipment categories from a Restricted Military Area (RMA) stretching 50 km west and 100 km east of the inter-German border. All surface-to-surface missiles, fighter bombers, attack helicopters, tanks, armoured personnel carriers, and artillery over 50-km range would be banned from this RMA. See figure 11.2 for the RMA.

B: MBFR. This is the guidelines area agreed by the 11 direct and 8 indirect participants in the MBFR talks: it comprises the FRG and the Benelux countries for NATO; and the GDR, Poland and Czechoslovakia for the WTO. Setting the zone was a difficult process in 1973, particularly because of disputes over whether to include Italy and Hungary, both of which were excluded. This is now generally agreed to be an impractical reduction zone. The FRG, in particular, does not want a line dividing France and the FRG just as better Franco-German co-operation, with a common defence council and joint brigade, is emerging.

C: The Jaruzelski zone (Jaruzelski I), acknowledges some of the disadvantages of the MBFR zone by adding Denmark and Hungary.⁶⁸



A: The FRG and the GDR

B: MBFR—the guidelines area agreed upon by the 11 direct and 8 indirect participants in the Mutual and Balanced Force Reduction (MBFR) talks

C: Jaruzelski-I—MBFR plus Denmark and Hungary

D: Jaruzelski-II—Jaruzelski-I plus France, Italy, the UK and the Baltic, Carpathian and Byelorussian Soviet military districts

E: ATTU-I: the Atlantic-to-Urals zone defined by the 1986 Stockholm Document, excluding North America and the south-east corner of Turkey

F: ATTU-II: a larger Atlantic-to-Urals zone including all of Turkey, the eastern seaboard of the USA and Canada, and 11 Soviet military districts



Zone I



Zone II



Zone III

Figure 11.1. CFE reduction zones—a Soviet view

D: The wider Jaruzelski zone (Jaruzelski II), includes France, the UK and the Baltic, Carpathian and Byelorussian MDs of the USSR.

E: Atlantic-to-Urals (I). This is the ATTU zone as defined by the Stockholm Document in September 1986, that is, exclusive of North America and the south-east corner of Turkey.

F: Atlantic-to-Urals (II). This larger ATTU zone would include all of Turkey, the eastern seaboard of the USA and Canada, and 11 Soviet MDs.

To illustrate the possibilities of a CFE agreement, Alexei Arbatov of the Moscow Institute of World Economy and International Relations (IMEMO) suggested that the ATTU zone be divided into three sub-zones,⁶⁹ also shown in figure 11.1.

1. Zone I would comprise the Jaruzelski zone which, according to Arbatov, contains more than 50 per cent of the tanks, and more than 40 per cent of the artillery in the European theatre. The most radical cuts would be in this zone, including: (a) withdrawal, from a central corridor 50 km each side of the inter-German border, of the same categories of equipment designated most offensive by Ambassador Dean: tanks, strike aircraft, long-range artillery, combat helicopters and tactical surface-to-surface missiles; (b) in the remainder of the Jaruzelski zone, asymmetrical reduction of these systems to equal alliance levels of 4700 tanks and 2000 artillery pieces. Equipment withdrawn is to be destroyed or warehoused under strict international supervision; and special sub-limits will be imposed on stationed forces, for example, that no single state can deploy more than 50 per cent of the alliance troops permitted in the zone.

2. Zone II, the 'intermediate' zone, would include for the West forces on the territory of the UK, France and Italy, as well as the six divisions of US reinforcements for Europe deployed in the USA. For the East the intermediate zone would include the Baltic, Byelorussian and Carpathian MDs. This zone contains 15 per cent of the tanks and 7 per cent of the artillery of the entire ATTU zone. The second stage of asymmetrical reductions would occur in this zone, down to alliance ceilings of 2500 tanks and 800 units of artillery.

3. Zone III would include, for the West, all the remaining countries of NATO in Europe (Norway, Iceland, Spain, Portugal, Greece and Turkey), and for the East, Romania, Bulgaria and eight Soviet military districts (Leningrad, Odessa, Moscow, Kiev, Urals, Volga, Northern Caucasus and Transcaucasus). Alliance ceilings for this zone would be set at 4600 tanks, 5600 artillery pieces and 2000 aircraft.

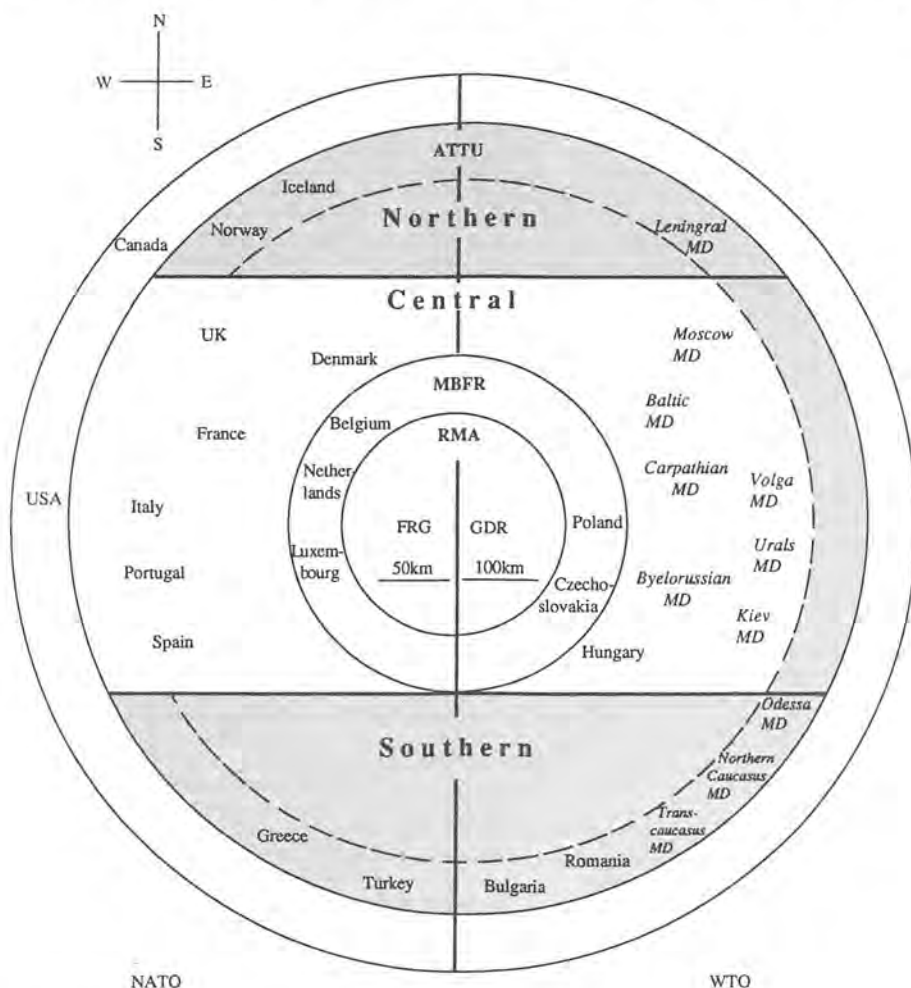
To summarize, the Arbatov proposal would produce equal NATO and WTO ceilings in the Atlantic-to-Urals zone of 11 800 tanks, 8400 artillery pieces and 2000 strike aircraft.

Western approaches to the CFE zones

Initially, the Anglo-US preference was for a simple (that is, negotiable) CFE agreement that set equal alliance ceilings on tanks and artillery pieces for the

entire ATTU area, perhaps with special sub-ceilings in the central zone. France objected to alliance ceilings, however, arguing that such an agreement would emphasize the bloc-to-bloc nature of the exercise, and could undermine the rationale for NATO's reliance on nuclear deterrence.

France, Britain and FR Germany eventually decided on a three-tier zone (the approach illustrated in figure 11.2). The northern zone would include



Northern, central and southern sub-zones



The 'horseshoe-shaped' zone, comprising the northern and southern sub-zones

ATTU—Atlantic-to-Urals

RMA—Restricted Military Area

MD—Military District

Figure 11.2. CFE reduction zones—Western concepts

Norway in the West and the Leningrad MD in the East. The southern zone would comprise Greece and Turkey in the West; and Romania, Bulgaria and the Odessa, Northern Caucasus and Transcaucasus MDs in the East. The central zone would include the rest of the Atlantic-to-Urals area: the UK, Denmark, the FRG, France, the Benelux countries, Spain, Portugal and Italy in the West; and the GDR, Poland, Czechoslovakia, Hungary and seven Soviet military districts in the East (Moscow, Kiev, Volga, Urals, Baltic, Carpathian and Byelorussian).

Predictably, the flank states opposed separate reduction zones. Norwegian Defence Minister Johan Jørgen Holst went to Paris in mid-September to complain about being condemned to a singular position in the Alliance, being left to face 'alone' the superior forces in the Leningrad MD.⁷⁰ Neutral Sweden also complained about the likely '*polse-effekt*' of Soviet forces being squeezed out of a central zone to threaten the flanks.⁷¹

After hearing about the Norwegian complaints from both Defence Minister Johan Jørgen Holst and Prime Minister Gro Harlem Brundtland, Secretary of State George Shultz apparently pressed hard for a reversion to the original US preference for alliance-wide ceilings in the Atlantic-to-Urals zone. By late 1988 the compromise seemed to be that the northern and southern zones would be considered as a single horseshoe-shaped zone (see figure 11.2).

Can the NATO-WTO asymmetries be corrected?

Creating the political conditions under which inter-alliance asymmetries would be tolerable might be a better way to achieve conventional stability than trying to correct them by formal treaty. Once engaged in formal arms control negotiations, however, policy makers are usually driven to seek easily measurable and verifiable agreements. These goals usually imply equal ceilings of comparable forces. The INF Treaty is a good example. Though often referred to as a triumph of asymmetry because it required unequal cuts, the result was an equal ceiling (zero for both sides) in a particular category of weapons.⁷²

At the CFE talks, NATO wants to negotiate equal ceilings on tanks, armoured personnel carriers and artillery pieces.⁷³ For their part, although they have not yet produced any data, WTO spokesmen indicated on several occasions that an important asymmetry to correct is NATO superiority in combat aircraft. The NATO aircraft they want to limit include: the US carrier-based A-6 and A-7, as well as the land-based FB-111, F-4E, F-16, and the European Tornado, F-16 and Mirage aircraft. NATO officials are reluctant to admit air superiority in the context of the CFE talks; indeed the counting rules employed in the NATO document published on 25 November suggest a substantial WTO numerical superiority in air power overall.⁷⁴ Nevertheless in legislative hearings and other forums, officials in NATO countries acknowledge the manifest qualitative superiority of NATO training, firepower and mobility in the air. A US Assistant Secretary of Defense admitted in congressional testimony in April 1987, for example, that 'the NATO air advantage offsets the slight degree of inferiority that NATO has on the

ground'.⁷⁵ In 1988, two studies released by the US General Accounting Office to the Chairmen of the Armed Services Committees of the House and the Senate acknowledge that air superiority is NATO's 'ace-in-the-hole'.⁷⁶

The air balance is particularly difficult to measure since aircraft are so easily moved from one theatre to another. A West German study shows the numerical superiority of the WTO over NATO in fighter and fighter-bomber (air-to-ground attack) aircraft—8650 WTO:8300 NATO overall.⁷⁷ Adjustments for geostrategic availability transform this slight WTO edge into a slight NATO edge, given that the USSR has many air assets at the central Asian and the Far Eastern fronts—NATO 7600:WTO 7050. Manifestly, NATO does not have numerical superiority in aircraft. The numerical superiority of the WTO is even more marked with reconnaissance aircraft, but NATO enjoys a 5:1 advantage in naval air assets. One problem is that, as the CFE zone is currently defined, NATO carrier-based aircraft would be off limits and Soviet naval aviation (all land-based) would be included. This is one reason why the 25 November NATO data make WTO air superiority look so lopsided.

NATO spokesmen deny the feasibility of a tanks-for-aircraft deal,⁷⁸ but there is a precedent of sorts in the NATO Option III proposal presented at the MBFR talks in December 1975. Then, NATO offered to withdraw 54 nuclear-capable F-4 aircraft, 36 Pershing 1A missiles and 1000 nuclear warheads in exchange for a Soviet tank army of 68 000 men and 1700 tanks. The WTO response in February 1976 was for a symmetrical trade of Su-7 Fitter aircraft for NATO F-4s, and Scud-B missiles for Pershing 1A missiles.⁷⁹

More recently, in November 1987 General Jaruzelski, in refining his earlier proposal for restructuring NATO and WTO defence postures, suggested that Soviet tank cuts should be offset by reductions in NATO aircraft. In 1988 General Nikolai Chervov suggested that 20 000 Soviet tanks were equivalent to 1500 strike aircraft. Colonel Dimitry Belskiy of the Soviet General Staff cited Western estimates that suggest 440 NATO strike aircraft were equivalent to three tank divisions.⁸⁰ In July 1988 Mikhail Gorbachev proposed another symmetrical trade-off. He offered to withdraw 72 equivalent aircraft if the USA would take its 72 F-16s from the Torrejon base in Spain back to the continental USA rather than transferring them to Italy. The Italian Prime Minister, Ciriaco de Mita, who had previously said that he wanted the F-16s to be included in the CFE mandate, approved of the idea.⁸¹ But the new Secretary General of NATO, Manfred Wörner, opposed it on several grounds: first, that General Secretary Gorbachev had suggested a bilateral deal whereas agreed limits on conventional forces in Europe should be negotiated on an alliance basis; second, that NATO's primary focus was on curbing the WTO ability for surprise attack, and that aircraft cannot capture and hold territory; and third, Wörner argued that Soviet aircraft might only be withdrawn a few hundred miles whereas US aircraft would be withdrawn thousands of miles across the Atlantic.⁸²

Some Western analysts are taking the Soviet tanks-for-aircraft deal seriously and modelling various force-ratio exchanges. But a more practical solution seems to be to work out a separate aircraft deal, by choosing categories of forces for which equal NATO-WTO ceilings make some sense.

Inclusion of air power at the CFE talks will be increasingly difficult for NATO to avoid, especially after Mikhail Gorbachev's 7 December announcement of the unilateral withdrawal from the ATTU area of 800 Soviet combat aircraft. In effect, with his UN General Assembly speech the Soviet President introduced into the CFE agenda the elements of both side's force postures on which he would like to see negotiated limits.

Prospects for an agreement to limit aircraft

What are the incentives for both sides to impose limits on air power? If, as NATO planners claim, it is Western air superiority that offsets WTO superiority on the ground, to the extent the WTO gives up strength on the ground should NATO be willing to give up some air power? Politically, it will be important to Moscow that the USA is willing to withdraw some offensive air power from Western Europe in order to justify the withdrawal of more heavy armour from Eastern Europe. Economically, both sides would benefit if a CFE agreement made it possible to avoid investing in yet another generation of sophisticated multi-role aircraft. WTO planners are aware that NATO plans to deploy new F-15 E long-range nuclear-capable aircraft to supplement the F-111s, F-16s and Tornados already at European bases.

Militarily, however, NATO planners continued to argue throughout 1988 that Western air power was a strength to build on, not a surplus to be bargained away. Throughout 1987 and most of 1988 NATO resisted language in the mandate that would specify aircraft limits, arguing that the focus of initial cuts should be on limiting tanks and artillery as the offensive forces most capable of rapid mobility and higher firepower with which the WTO can take and hold territory.

As the WTO persisted in raising the aircraft issue, however, the Western states countered with the argument that if any aircraft were to be included, then all NATO and WTO aircraft should be covered, including those that the Soviet Union designates for air defence.⁸³ For most of the year the WTO states resisted this approach arguing that their air-defence forces must remain outside any CFE limits. As one member of the Soviet delegation, Major General Victor Tartarnikov, put it:

The Warsaw Treaty Countries will not allow the talks to cover fighter aircraft as is demanded by NATO. Fighter aviation is part of the Air Defence structure designed to protect our political, economic and military facilities against the attacks of strategic aviation. It cannot be used for surprise attack, and it does not undermine the basis of the states' security . . . Common sense should prevail and fighter aviation should not be in one package with strike aircraft, tanks, artillery and other types of conventional weapons.⁸⁴

The mandate talks were in recess for most of August, but at a number of informal meetings and conferences over the summer Western analysts explained why Soviet air-defence forces, which include multi-role MiG-23 fighters, could not be seen as entirely non-offensive. By late September, Soviet Foreign Minister Shevardnadze told West German Foreign Minister Genscher,

at the UN General Assembly in New York, that the USSR was no longer insisting on excluding air defence from the CFE mandate.⁸⁵

This could open the way for a CFE agreement to reduce aircraft on both sides. Former US Ambassador to the MBFR talks, Jonathan Dean, has proposed mutual reductions of several categories of offensive aircraft. Dean would reduce tactical ground-attack aircraft such as the A-10 for NATO and the Su-25 for the WTO; fighter bombers, such as the F-111, F-16 and Tornado for NATO and the Su-24 for the WTO; medium bombers such as the Soviet Badger, Blinder and Backfire for the WTO and some of the French Mirages for NATO; and dual-purpose aircraft such as the F-16 and the MiG-21.⁸⁶

Because of the mobility of aircraft, in order to sustain an agreement on air power limits it will be necessary to make the limits global, following the precedent of the INF Treaty; thus for an agreement on air power the zone should not be 'Atlantic to Urals' but 'San Francisco to Vladivostok'. In addition an agreement should supplement any ceilings on aircraft with constraints on ground-support facilities. These might include closing down some airfields, in ways that prevent landing and take-off, providing for close surveillance of remaining permitted airfields, removal of battle-support helicopters and non-interference with airborne surveillance.⁸⁷

More problematic for the military is that reducing air power on both sides could require radical changes for each alliance's military doctrine and training. Proclaiming that the goal of the CFE talks is to make each alliance manifestly non-offensive is one thing; actually putting it into practice will involve curtailing military careers and overturning long-standing practices. The WTO will have to reduce close air support of its ground forces, and NATO will not be able to sustain the follow-on-forces attack (FOFA) doctrine if it sets limits on its nuclear-capable fighter aircraft.

Naval forces

It is generally acknowledged by East and West that NATO enjoys a substantial advantage in naval forces, so it is natural that the WTO wants to impose limits on naval assets at the CFE talks, the more so in the light of the new, more offensive maritime strategy adopted by the Reagan Administration.⁸⁸

On numerous occasions WTO spokesmen have said they want to include naval forces in the CFE mandate. General Yazov did so, for example, in his prepared statement after the meetings with Defense Secretary Frank Carlucci in Berne on 17 March, and Marshal Akhromeyev did so in a lengthy article in *Pravda* on 5 September 1988.⁸⁹ NATO in general wants to exclude naval forces from the CFE limits. It wants to protect its own navies from limitation and most NATO countries do not feel particularly threatened by Soviet fleets, although Turkey has asked that the mandate not eliminate the possibility to set limits on the size of the Soviet Black Sea fleet. Norway and Denmark would also like to impose limits on WTO amphibious forces at the CFE talks. The USA resists any limits on naval forces, and argues in particular that the CFE talks should not limit the 6th Fleet which has a global rather than a European mission.⁹⁰

What kind of verification?

Verification is no longer the stumbling-block to arms control negotiations that it used to be in the days when the Soviet leadership regarded satellite reconnaissance and on-site inspections as intrusive espionage. Indeed, in the Gorbachev era the Western states often seem more nervous than the WTO countries about intrusive inspection. Nevertheless, with 23 parties and a number of anticipated Treaty-Limited Items (TLIs), a CFE verification regime is likely to be far more complex than any of the current bilateral arms control agreements, and more demanding than the inspections and observations associated with the Stockholm Document. Most of the vast literature on verifying arms control agreements deals with nuclear arms control, but research programmes on the specific problems of verifying a CFE agreement are now under way in both East and West.⁹¹

The TLIs in a CFE agreement could include tanks, armoured personnel carriers, artillery, aircraft, helicopters, manpower, and possibly ammunition stocks.

The monitoring tasks will include the verification of reductions to agreed ceilings, removal of TLIs from forward areas and non-entry of TLIs back into forbidden zones, destruction and/or neutralization of TLIs and monitoring of production.

Verifying compliance will require a combination of monitoring techniques. A continually updated exchange of data will be crucial. On-site inspections will obviously be necessary, by both permanent and temporary inspectors. Permanent inspection teams may be necessary at entry and exit points to the treaty-limited zones. These teams might be formed by expanding current deployments of military attachés at embassies, or liaison officers with other armed forces. This is not a universally popular concept with the military who complain that treaty monitoring is not real 'soldiering', and also that military attachés should not be given potentially adverse intelligence-gathering roles when their main mission is supposedly diplomatic.

Inspection teams will probably have to include civilian and technical experts in any event, as have been established for the INF Treaty.⁹² Random inspections will be required. These could be made by national, alliance or NNA inspection teams. Many of the smaller CSCE countries have not been able to take advantage of the observation opportunities offered by the CDE because of lack of competence. If all 23 parties to a CFE agreement want to participate in treaty monitoring, this will require training personnel in some of the smaller powers.

Observations on the ground will have to be supplemented by aerial and satellite reconnaissance. Technological gaps between East and West, between the superpowers and their allies, as well as among the allies themselves, will make it necessary to work out an equitable sharing of data by the superpowers or the acquiring of satellite competence by a consortium of the smaller powers. Of the smaller NATO powers, Canada and France have the greatest satellite competence, but neutral Sweden may also want to play a role in monitoring a CFE agreement.⁹³

Aerial reconnaissance by airborne warning and control systems (AWACS) can monitor activity in the air, while tactical reconnaissance aircraft can monitor troop presence and movements on the ground. With both satellite and aerial reconnaissance it will be necessary to distinguish between the competence to monitor the treaty and capabilities for intrusive intelligence gathering.

Finally, some form of unmanned sensors and tagging may be necessary to identify the presence or absence of TLIs. These devices should be non-removable and tamper-resistant. The inspection regime of the International Atomic Energy Agency (IAEA) should provide useful evidence about the pros and cons of unmanned sensors.⁹⁴ The Western European Union is studying the possibilities of electronic and other kinds of tagging that might be applicable to a CFE regime.⁹⁵

No less important than the technical requirements of monitoring a CFE agreement will be the political skills needed to resolve ambiguities of compliance that might arise among the 23 states. This will require some form of East-West consultative commission to weigh the costs and benefits of the treaty regime as a whole against the need to detect each and every technical violation of the provisions of an agreement. If the CFE exercise is to be confidence-building rather than confidence-eroding, adequacy rather than precision will have to be the criterion for compliance.

VI. Prospects for the new 35-state CDE-II

Analysts divide the subject matter of the CFE talks and the CDE into structural and operational arms control. In the former the goal is to reduce military forces. In the latter the goals embrace efforts to stabilize force postures and increase mutual transparency in order to build confidence and constrain military activity. Operational arms control can be further subdivided into constraints and confidence-building measures. Constraints are negotiated measures that impose limits on the deployment and activities of military forces, while confidence-building measures are steps designed to increase confidence in the benign intentions of a potential adversary, primarily by facilitating information and data exchange, as well as the mutual observation of military activity.⁹⁶

The prospects for structural arms control at the CFE talks are inevitably clouded by the failure to achieve force reductions at MBFR. By contrast, there are good prospects for improved operational arms control at the CDE-II, since that forum builds on the successful CDE-I and the excellent record of compliance with the 1986 Stockholm CSBMs, which have already imposed far more constraints on European military forces than the modest CBMs negotiated in the 1975 Helsinki Final Act.

The same security interests that shape the policies of the 23 states participating in the CFE talks will also influence their negotiating positions at the CDE-II. Thus a primary objective of the NATO states will be to curb the offensive potential of Soviet land forces, to gain greater oversight over the more numerous but smaller WTO exercises, as well as overall out-of-garrison military activity to check on rotations of Soviet troops in and out of Eastern

Europe.⁹⁷ Primary objectives of the WTO states will be to seek constraints on NATO's air and naval activities, and especially to limit the size of NATO exercises.⁹⁸

In practice, there is likely to be considerable overlap between the kind of verification and stabilizing measures that the 23 CFE states will be seeking to bolster any agreement they might achieve on reductions, and the new CSBMs that the 35 CSCE states will be negotiating at the CDE-II. In the NATO communiqué on *Conventional Arms Control*, paragraphs 4-7, under the heading 'Towards Transparency', relate to NATO policy for the 35-state CDE-II. Paragraph 6 states: 'To buttress the resulting reductions in force levels in the whole of Europe, we shall propose stabilizing measures. These could include measures of transparency, notifications and constraint applied to the deployment, movement and levels of readiness of conventional armed forces, which include conventional armaments and equipment'.⁹⁹ These are listed under measures relevant to the CFE talks but obviously are also the kind of measures that will be discussed at the 35-state CDE-II.

This overlap helps to explain why France and the NNA countries wanted one negotiating forum to deal with both structural and operational arms control in Europe. Western conservatives prevailed, however, in their desire to preserve the autonomy of the CFE forum from the oversight of the 12 neutral and non-aligned states who are also participants in the CSCE. There is an irony here because the Western conservatives could find the 35-state CDE-II more rewarding than the 23-state CFE talks in terms of constraining WTO mobilization capabilities, and some of the NNA states (Sweden and Switzerland for example) may be reluctant to negotiate CSBMs that hamper their ability to mobilize their own reserves. Moreover, if the WTO fails to persuade NATO to reduce air and naval assets in the CFE talks, they are likely to harness NNA support to push all the harder for constraints on air and naval activities at the CDE-II.

During the CDE-I the Soviet delegation pressed hard for constraints on air and naval activities but the Stockholm Document constrained only those activities that relate directly to land battle, leaving independent air and naval exercises unlimited. Soviet policy on air and naval activities in the CDE context is reminiscent of Soviet policy on strategic nuclear forward-based systems (FBS) during the 1970s in the context of bilateral negotiations on strategic arms limitation. In both the SALT I and SALT II negotiations the FBS issue was periodically raised, then relinquished as a concession in the interest of agreement on other issues. Whether air and naval CSBMs are bargaining tools, or issues of real concern to the Soviet Union, remains to be seen. Mikhail Gorbachev showed flexibility on naval constraints as early as 15 January 1986, when he proposed postponing the question of naval activities until the next stage of the CDE.¹⁰⁰ Since the Stockholm Conference Soviet spokesmen have repeatedly urged constraints on independent air and naval activities, both at the CSCE follow-up meeting in Vienna and in a variety of other diplomatic forums. General Secretary Gorbachev, for example, raised the issue in major speeches in Vladivostok in July 1986, in Murmansk in October 1987, in Belgrade in March 1988 and in Krasnoyarsk in September 1988.¹⁰¹ In January

1988, Soviet Premier Nikolai Ryzhkov proposed NATO–WTO consultations on naval confidence-building measures in the general region stretching from Iceland through the Faroes to Scandinavia, including the Barents Sea, the Baltic Straits, the Denmark Straits and the English Channel.

Coincident with these diplomatic initiatives, Soviet naval activity in northern waters was reduced. The number of Soviet sea days in the Norwegian Sea was 456 in 1985, for example, but only 114 in 1987, while Soviet naval activity outside home waters in the Barents Sea was cut by some 50 per cent.¹⁰² Moreover, on several occasions in 1988, the Soviet Union invited the Nordic countries to send observers to Soviet naval exercises. Premier Ryzhkov did so on visits to Oslo and Stockholm in January 1988, and in February the Supreme Soviet issued an appeal to the parliaments of the Nordic states, the USA and Canada to discuss naval confidence-building measures in the context of a Nordic zone of peace.¹⁰³ The NATO and NNA states alike declined these invitations stating that they preferred CSBMs to be arranged via the CSCE or the UN rather than in a smaller regional forum.¹⁰⁴

Despite the largely negative official responses of Western and NNA governments to Soviet proposals for naval CSBMs, there were signs during 1988 that some policy makers in the northern and southern flank countries of NATO were weighing the advantages of naval CSBMs that could curb Soviet naval activities. And even in the larger NATO powers, academics, military officers and parliamentarians urged their governments to explore naval confidence-building measures.¹⁰⁵

With respect to further constraints on ground-force activity at the CDE-II, the WTO countries may have more success in limiting the size of exercises than they had at the CDE-I. This is in part because West Europeans, especially in the FRG, are growing less tolerant of low-flying aircraft and the other disturbances associated with NATO manoeuvres. In 1988 low-level flights were banned for two months in the FRG after several fatal accidents.¹⁰⁶ In addition, the West German Defence Ministry announced in December that troop-training manoeuvres would be cut by 50 per cent starting in 1990.¹⁰⁷

East European publics also complained about the noise from low-level flights during 1988, but in general WTO exercises do not cause as much public outcry in the East as NATO exercises do in the West. This is because WTO armies can use special exercise grounds, whereas NATO lacks such facilities, so manoeuvres must be carried out over farm land and open country.

VII. The MBFR and the CFE talks: continuity and change

In contemplating the start of the CFE talks, comparisons with the MBFR experience are hard to avoid. Why should the new forum produce an agreement if 15 years of MBFR talks failed to do so? The MBFR forum has not of course been a total failure. If delegates did not produce a formal agreement, they nevertheless laid the necessary groundwork that came to fruition in the CSBMs of the 1986 Stockholm Document, most of which were first proposed as the 'associated measures' for an MBFR agreement. Moreover, in less easily documented ways, the 15-year MBFR dialogue built a degree of confidence

and trust between East and West and raised the level of competence of a generation of European diplomats in security issues.

Many of the problems that plagued the MBFR talks have already proved troublesome at the CFE mandate talks, namely, the geographical zone in which reductions will take effect, the number and status of direct and indirect participants in the negotiations, how and when to assemble and verify each side's data, which force asymmetries matter and the way in which they should be corrected.

Many of the differences between the CFE and the MBFR talks suggest that CFE will be a more rather than a less complicated process. CFE involves a larger geographical zone from the Atlantic to the Urals, as distinct from the MBFR guidelines area comprising the territory of the FRG and the Benelux countries for NATO and the GDR, Czechoslovakia and Poland for the WTO. The CFE talks involve all 16 members of NATO and all 7 WTO countries, compared with 7 NATO countries and 4 WTO countries as direct participants in MBFR, that is, those states with forces stationed in the guidelines area. The CFE negotiating agenda is far from settled but will certainly be broader than the manpower cuts envisaged at MBFR. The NATO countries want to set limits on tanks, infantry fighting vehicles and self-propelled artillery, but the WTO states would like to include much else besides, including air and naval assets and nuclear systems.

The matter of political will: NATO

With respect to political motivation, NATO proposed the MBFR talks in the late 1960s largely to counter congressional pressure for unilateral US withdrawals. In that sense the talks were viewed as ends rather than means and were highly successful. The congressional pressure that arose during the 1970s and early 1980s was easily deflected by the bargaining-chip argument, namely, that reducing forces unilaterally would deprive NATO of valuable bargaining currency at the Vienna talks. Moreover, NATO's doctrine of flexible response (adopted in 1967) reduced the automaticity of a US nuclear response to an attack on Western Europe and suggested the need for stronger not weaker conventional forces to raise the nuclear threshold. Given the narrowness of NATO (as opposed to WTO) territory in Europe, Western (especially US and West German) strategists wanted conventional forces deployed along the East-West border. This forward-defence requirement makes for an uncomfortable force-to-space ratio in which NATO cannot afford to trade space for time. Those who believed that NATO forces were already spread too thin to maintain a credible conventional deterrent judged that NATO could not afford to reduce any of its own forces even if facing a leaner WTO force, on the assumption that the WTO could always choose to attack at NATO's weakest point.

Under these conditions and assumptions it is not surprising that the MBFR talks never went beyond consideration of a modest status quo agreement.

In late 1988 in many NATO capitals (certainly in Washington, London, Rome, Bonn and Ankara), much the same attitude prevailed, namely, even if

the WTO was willing to reduce to parity with NATO in armoured divisions, NATO could not afford to thin out its own forces and still maintain a credible flexible-response and forward-defence policy. The most pessimistic defence and foreign policy élites in the West thus tended to view the CFE talks as a dangerous trap rather than an opportunity. They adopted a damage-limiting approach and saw that the only perceived advantage of the CFE talks might be to counter the political economic and demographic pressures for unilateral NATO withdrawals.

A more optimistic view (both of Soviet intentions and Western capabilities) prevailed in the Foreign Ministry in Bonn and in some of the smaller NATO countries, where decision makers believed that economic constraints and demographic pressures would force cuts in defence spending and available manpower in NATO and the WTO in any event. They saw the CFE talks as a rare opportunity to build down increasingly non-functional arsenals on both sides. An interesting development in 1988 was the apparent shift of senior French government officials from the pessimistic to the optimistic view. This could eventually tilt the balance of power within NATO in favour of those interested in using the CFE talks to achieve arms reductions, rather than merely to codify NATO force levels.

The matter of political will: WTO

If the major NATO powers were almost as cautious about conventional force reductions in the late 1980s as they had been in the late 1960s, the WTO states, and especially the Soviet Union, were far more enthusiastic about the CFE talks in the late 1980s than they ever were about MBFR. Herein lies the main, perhaps the only, reason to expect force reductions from the CFE talks.

In the late 1960s, the Soviet leadership was looking forward to bilateral talks to codify its newly achieved strategic parity with the USA, but was reluctant to enter talks on conventional force reductions. On the contrary, as NATO changed its doctrine from 'massive retaliation' to 'flexible response' that implied a conventional phase of any European conflict, the Soviet military was anxious to upgrade the non-nuclear components of the WTO. Thus, Soviet acquiescence at the MBFR talks in 1971 was a political quid pro quo for Western participation in the CSCE, rather than a desire to mutually reduce forces.¹⁰⁸

By contrast, when Mikhail Gorbachev took over the Soviet leadership in 1985, there were powerful political, economic, and demographic incentives to reduce Soviet forces. Gorbachev's first priority was political and economic reform at home, but these reforms would only be possible if the Soviet defence agenda was radically changed to permit the re-allocation of resources from the military to the civilian sector. This in turn required not only arms reductions in the short term, but also new foreign and defence policies that would preclude building the next generation of military systems already in research and development.¹⁰⁹

Beginning in late 1985, Mikhail Gorbachev and his advisers articulated the basic themes of the new security thinking. These were the primacy of war prevention over war winning, the primacy of political and economic means

over military means to enhance Soviet security, the importance of striving for common rather than national security, reasonable sufficiency rather than parity or superiority as the main criterion for military force planning, and the need to reformulate Soviet military doctrine and restructure Soviet military forces to emphasize defensive over offensive capabilities.¹¹⁰

With respect to regional security issues, Soviet spokesmen admitted that earlier Soviet policies had been too provocative and interventionist and claimed that henceforth Soviet foreign-policy goals would no longer be pursued by military means.¹¹¹

Evidence that the new thinking was being translated into restructuring and retraining of Soviet military forces began to emerge with the 'Autumn 88' exercises in the Ukraine. These exercises, commanded by General Yazov, the Soviet Defence Minister, were said to be the first field test of the new defensive war plans.¹¹² Mikhail Gorbachev's speech to the Komsomol on 29 October hinted at cuts in the length of military service.¹¹³ An article by Lt Colonel Alexander Savinkin in *Moscow News* floated the more radical idea of abolishing conscription altogether in favour of a smaller professional militia.¹¹⁴ Thus, even before the Gorbachev speech at the UN General Assembly, Western military experts had revised their perceptions of the Soviet military threat. Military officers testifying before the US House of Representatives Defense Policy Panel in September 1988 concluded that the Soviet military and political leadership was highly risk-averse, and that there was little risk of a short-warning surprise attack by the WTO.¹¹⁵

The unilateral force cuts announced by Mikhail Gorbachev at the UN General Assembly in December also support Soviet claims of restructuring for the defence, in so far as six tank divisions currently deployed in Eastern Europe were to be disbanded and additional tanks, air assault and bridging equipment, and troops withdrawn. Sceptical Western analysts were withholding judgement until they could see the cuts put into effect, but all the evidence suggested a genuine attempt to meet Western concerns by reducing manifestly offensive elements of forward-deployed Soviet forces.¹¹⁶

Further evidence of Gorbachev's faith in unilateral measures came in early 1989 at the Paris Conference on chemical arms control, at which Foreign Minister Shevardnadze announced that, whether or not a chemical weapons agreement was concluded, the Soviet Union would begin demolishing its stockpile of chemical weapons in 1989.¹¹⁷

If more Western leaders can move away from their damage-limiting, status quo-preserving attitude to the CFE talks, then perhaps the new forum can be treated as an opportunity to be exploited rather than a trap to be avoided. The window for this opportunity will not remain open indefinitely, however. In early 1989 Mikhail Gorbachev again acknowledged the parlous state of the Soviet economy and the sluggish pace of domestic restructuring.¹¹⁸ Manifestly, the Soviet leaders needed to demonstrate to sceptics and conservatives at home that a dynamic foreign and arms control policy, specifically Mikhail Gorbachev's unilateral gestures and co-operative bargaining techniques, will not undermine Soviet security, but will indeed pay dividends in terms of enhancing security for the international community as a whole.

Notes and references

¹ For the background and early history of the CSCE, see Ferraris, L. V. (ed.), *Report on a Negotiation. Helsinki-Geneva-Helsinki 1972-75* (Leiden: The Hague, 1979); Mastny, V. (ed.), *The CSCE and Expansion of European Security* (Duke University Press: Durham, N.C., 1987); the CSCE is also extensively covered in past *SIPRI Yearbooks*.

² On the Stockholm Conference, see *inter alia*: Borawski, J., *From the Atlantic to the Urals: Negotiating Arms Control at the Stockholm Conference* (Pergamon-Brassey's: London, 1988); Birnbaum, K. E. and Hultdt, B. (eds), *From Stockholm to Vienna: Building Confidence and Security in Europe* (Swedish Institute of International Affairs: Stockholm, 1987).

³ For US assessments of the improvement in Soviet standards of human rights, see Zimmerman, W., 'The evolving Soviet approach to human rights', *Current Policy* (US State Department), no. 929 (1987); and Shultz, G., 'Vienna Meeting: commitment, cooperation and the challenge of compliance', *Current Policy*, no. 1145 (1989).

⁴ Dempsey, J., 'Human rights are the remaining stumbling block to negotiations', *Financial Times*, 11 Nov. 1988.

⁵ 'Gorbachev reads lecture to Ceausescu', *Financial Times*, 6 Oct. 1988.

⁶ Interviews with CSCE delegates in 1988. See also 'More security, less cooperation', *The Economist*, 29 Oct. 1988.

⁷ *Le Monde*, 5 Nov. 1988.

⁸ Amalric, J., 'Bush victory will not slow US/USSR talks', *Le Monde*, 13-14 Nov. 1988 (reprinted in *Guardian Weekly*, 20 Nov. 1988).

⁹ Bortin, M., 'No dangers for Gorbachev', *International Herald Tribune*, 9 Dec. 1988.

¹⁰ Gordon, M. R., 'US seeks Soviet advance on rights', *International Herald Tribune*, 15-16 Oct. 1988; see also, 'Soviet Union: just nuisances', *The Economist*, 5 Nov. 1988, pp. 27-28.

¹¹ On discussions between Shevardnadze and Genscher, see McCartney, R. J., 'Kohl misstated Soviet pledge', *International Herald Tribune*, 1 Nov. 1988; and on discussions between Shevardnadze and Shultz, see *Pravda*, 25 Sep. 1988.

¹² 'Moscow drops rights link with new arms forum', *Financial Times*, 2 Dec. 1988.

¹³ Lloyd, J., 'Moscow plans new laws to improve human rights', *Financial Times*, 22 Dec. 1988; Dempsey, J., 'East-West talks set to end on January 16', *Financial Times*, 21 Dec. 1988; Dejevsky, M., 'Moscow to ease entry and exit restrictions', *The Times*, 29 Dec. 1988.

¹⁴ Dempsey, J., 'West gives guarded welcome to CSCE agreement', *Financial Times*, 5 Jan. 1989.

¹⁵ Oberdorfer, D., *Washington Post*, 13 June 1987.

¹⁶ 'Statement: Ministerial Meeting of the North Atlantic Council at Reykjavik (11-12 June 1987)', reprinted in *NATO's 16 Nations*, July 1987, pp. 88-89.

¹⁷ *The Economist*, 30 June 1987.

¹⁸ On French policy towards Eastern Europe, see *inter alia*, Trean, C., 'La nouvelle Ostpolitik française au banc d'essai', *Le Monde*, 17 Sep. 1988; Fitchett, J., 'France seeks new role in Eastern Europe', *International Herald Tribune*, 18 Oct. 1988; Trean, C., 'Mitterrand's common home', *Guardian Weekly*, 19 Dec. 1988.

¹⁹ Heisbourg, F., to the Foreign Affairs Committee of the House of Commons, Session 1987-88, *The Political Impact of the Process of Arms Control and Disarmament, Minutes of Evidence*, 25 May 1988 (Her Majesty's Stationery Office: London, 1988), pp. 88-99.

²⁰ Dempsey, J., 'French objections hamper talks on conventional arms', *Financial Times*, 25 Nov. 1988; Schemann, S., 'The tangle grows in 2 sets of East-West talks', *New York Times*, 29 Nov. 1988; Gordon, M. R., 'US-Paris dispute on armies erupts', *New York Times*, 18 Nov. 1988.

²¹ *Statement by Mikhail S. Gorbachev at the Plenary Meeting of the United Nations General Assembly*, 7 Dec. 1988, pp. 21-23.

²² The debate in the Soviet Union between those (primarily civilians) who favour unilateral and those (primarily military) who favour multilateral force reductions is well documented in Phillips, R. H. and Sands, J. I., 'Reasonable sufficiency and Soviet conventional defense', *International Security*, vol. 13, no. 2 (fall 1988), pp. 164-78.

²³ On 29 September 1988 Marshal Akhromeyev delivered the SIPRI 1988 Olof Palme Memorial Lecture in Stockholm. His address is reproduced in chapter 14 of this *Yearbook*.

²⁴ Quoted in *International Herald Tribune*, 9 Dec. 1989.

²⁵ Bundy, McG., 'One good arms cut doesn't always deserve another', *International Herald Tribune*, 10-12 Dec. 1988.

²⁶ Hoagland, J., 'The issue in Europe is firstly strategic', *Intl Herald Tribune*, 12 Dec. 1988.

²⁷ Smith, R. J., 'CIA Chief sees reduced risk of surprise attack', *International Herald Tribune*, 14 Dec. 1988.

²⁸ Eisenhower, J., 'France keeps its distance while moving closer to NATO', *The Independent*, 29 Dec. 1988. See also Lellouche, P., 'The danger of trading in optimism', *International Herald Tribune*, 17-18 Dec. 1988.

²⁹ North Atlantic Council communiqué, 8-9 Dec. 1988.

³⁰ Sharp, J. M. O., 'Security through detente and arms control', eds D. Holloway and J. M. O. Sharp, *The Warsaw Pact: Alliance in Transition?* (Cornell University Press: Ithaca, N.Y., 1984), pp. 161-94.

³¹ For reports of WTO Commission meetings in Warsaw in early February, Sophia in mid-March, Budapest in mid-April, Sophia in mid-June and Bucharest in October, see *Arms Control Reporter (ACR)* (Institute for Defense and Disarmament, IDDS: Brookline, Mass., 1988), pp. 407.B.14, 28, 37, 47 and 78.

³² On the Jaruzelski Plan see: *Memorandum of the Government of the People's Republic of Poland on Decreasing Armaments and Increasing Confidence in Central Europe*, Warsaw, 7 July 1987; Karkoszka, A., 'Merits of the Jaruzelski Plan', *Bulletin of the Atomic Scientists*, vol. 44, no. 7 (Sep. 1988), pp. 32-34.

³³ Simmons, M., 'Poland's military gives up loyalty oath to Moscow', *The Guardian*, 18 June 1988; Reuters, 'Poles drop oath of allegiance to Russian armed forces', *The Times*, 18 June 1988.

³⁴ Interviews with CSCE delegates in 1988.

³⁵ Bobinski, C., 'Poland to cut forces by "tens of thousands"', *Financial Times*, 4 Jan. 1988.

³⁶ Interviews with CSCE delegates in 1988.

³⁷ Kotai, G., Hungarian TV interview, 8 July 1988, cited in *ACR*, p. 407.B.50; Hungarian Defence Minister, Colonel-General Ferenc Karpati, radio interview, 9 July 1988, cited in *Foreign Broadcast and Information Service-Soviet Union (FBIS-SU)*, 11 July 1988; Reuters, 'Hungary seen as model for disarmament moves', *Financial Times*, 31 Aug. 1988; Grosz, K., interview in Budapest, 2 Aug. 1988, *ACR*, p. 407.B.61; Secretary of State for Foreign Affairs, Gulya Horn, to the CSCE Plenary Session, 13 Sep. 1988, cited by *ACR*, pp. 407.B.67.

³⁸ Karber, P., *Newsweek*, 25 July 1988, cited in *ACR*, p. 407.B.57.

³⁹ Chervov, N., *Bratislava Pravda*, 2 July 1988, cited in *FBIS-SU*, 6 July 1988 and at the Potsdam meeting of the Institute for East-West Security Studies in early June, *ACR*, 1988, pp. 407.B.44-45; Vadim Perfilev, Soviet Foreign Ministry spokesman, cited by Reuters, *New York Times*, 13 July 1988; Sergey Akhromeyev cited by Peel, Q., 'Moscow hopeful of summit arms control progress', *Financial Times*, 27 May 1988; Colonel General Vladimir Lobov in Budapest, 5 Sep. 1988, *New York Times*, cited in *ACR*, 407.B.65.

⁴⁰ The Jakes proposal was presented to the group of 23 CFE states by the Czechoslovakian delegate, Frantisek Dolozel on 29 Feb. 1988, see *ACR*, p. 407.B.23.

⁴¹ *ACR*, 1988, pp. 401.B.192, 407.B.34, 58, 70.

⁴² *ACR*, 1988, p. 402.B.172.

⁴³ Dunay, P., 'Allies role in structuring arms control: an Hungarian view', *The New Force Reduction Negotiations in Europe: Problems and Prospects*, Proceedings from the AAAS Symposium, Boston, Mass., 13 Feb. 1988.

⁴⁴ See, for example, the WTO communiqué and 'Statement about talks of reduction in armed forces and conventional armaments in Europe', *Pravda*, 17 July 1988, reprinted as supplements to *Moscow News*, no. 30 (1988). The position was also confirmed by Marshal Akhromeyev in Stockholm—see chapter 14 of this *Yearbook*.

⁴⁵ *ACR*, 1988, pp. 401.B.108.

⁴⁶ See Robert Blackwill's comments cited in *ACR*, 1988, pp. 401.B.110.

⁴⁷ Rühle, V., 'West must not be seen as mere arbitrator of Gorbachev proposal of the week', *Süddeutsche Zeitung*, 22 Sep. 1988 (reproduced in *German Tribune*, no. 1342 (9 Oct. 1988), p. 3).

⁴⁸ Asmus, R. D., 'Security policy in the FRG: West Germany faces nuclear modernization', *Survival*, vol. 30, no. 6 (Nov.-Dec. 1988), pp. 499-514.

⁴⁹ Fitchett, J., 'NATO leaders end summit still divided on nuclear arms', *International Herald Tribune*, 4 Mar. 1988.

⁵⁰ On Mitterrand at the UN General Assembly in Sep. 1988, see Fitchett, J., 'At UN Mitterrand ties French initiatives on arms control and debt', *International Herald Tribune*, 30 Sep. 1988; see also Davidson, I., 'Gaullism still shackles French policy on defence', *Financial Times*, 24 Nov. 1988.

⁵¹ Mauthner, R. and Dempsey, J., 'Dumas urges NATO grace for Moscow', *Financial Times*, 20 Nov. 1988; 'Genscher and Dumas rejoin forces', *Süddeutsche Zeitung*, 22 Oct. 1988.

⁵² Davidson, I., 'French warning on disarmament', *Financial Times*, 23 Nov. 1988.

⁵³ Interviews by the author with CSCE delegates in 1988.

⁵⁴ Dean, J., 'On arms we need the details', *The Washington Post*, 11 Dec. 1988.

⁵⁵ Rühle (note 47).

⁵⁶ Hoagland, J., 'Conventional arms: the Allies in disarray', *International Herald Tribune*, 16 June 1988.

⁵⁷ Akhromeyev on Radio Moscow, 9 Feb. 1988, cited in *FBIS-SU*, 22 Feb. 1988; Gerasimov press conference, 30 May 1988, reported by Binyon, M., 'Gorbachev seeking phased reduction of troops in Europe', *The Times*, 31 May 1988; Shevardnadze at the Third UN Special Session on Disarmament, 8 June 1988, in *Pravda*, 9 June 1988; Chervov in Potsdam, cited by Hoagland, J., *International Herald Tribune*, 13 June 1988.

⁵⁸ Redman's remarks are reported by Associated Press in *New York Times*, 25 June 1988, cited by ACR, 1988, pp. 407.B. 47-48; see also Owen, R. 'Carrington enters row over Soviet arms offer', *The Times*, 1 June 1988.

⁵⁹ North Atlantic Treaty Organization, *Conventional Forces in Europe: The Facts* (NATO: Brussels, 25 Nov. 1988).

⁶⁰ NATO (note 59), p. 5.

⁶¹ NATO (note 59), p. 26.

⁶² Fouquet, D. and Elliot, S., 'General Gareev on the French, Spanish and objectivity', *Jane's Defence Weekly*, 29 Oct. 1988, p. 1061.

⁶³ Statement by V. F. Petrovsky, Deputy Head of the USSR Delegation at the 43rd Session of the UN General Assembly, in the First Committee, *Multilateral Mechanisms and their Role in the Military Sphere of Comprehensive Security* (Union of Soviet Socialist Republics, Mission to the United Nations: New York, 18 Oct. 1988), p. 9.

⁶⁴ Portugalov, N., 'In defence of defence statistics', *Moscow News*, no. 46 (Nov. 1988).

⁶⁵ McGwire, M., *Military Objectives in Soviet Foreign Policy* (Brookings Institution: Washington, DC, 1987), pp. 128-60.

⁶⁶ Dempsey, J., *Financial Times*, 9 Jan. 1988.

⁶⁷ USSR Academy of Sciences, Institute of World Economy and International Relations (IMEMO), *Disarmament and Security: 1987 Yearbook* (Novosti: Moscow, 1988), pp. 339-41.

⁶⁸ Note 32.

⁶⁹ Arbatov, A., 'Conventional arms reduction approaches', ed. F. S. Larrabee, *Conventional Arms Control and East-West Security* (Institute for East-West Security Studies: New York, forthcoming in 1989).

⁷⁰ Fitchett, J., 'Allies near accord on new arms talks', *International Herald Tribune*, 14 Sep. 1988; 'The art of getting unknotted', *The Economist*, 22 Oct. 1988, pp. 23-25.

⁷¹ Christiansson, L. 'Nordeuropa isoleras i Natoförslag', *Svenska Dagbladet* (Stockholm), 24 Oct. 1988.

⁷² For an analysis and the text of the INF Treaty, see SIPRI, *SIPRI Yearbook 1988: Armaments and Disarmament* (Oxford University Press: Oxford, 1988), chapter 13 and appendix 13A.

⁷³ North Atlantic Council communiqué, *Conventional Arms Control: The Way Ahead* (NATO Press Office: Brussels, 3 Mar. 1988); and communiqué of 9 Dec. (note 29).

⁷⁴ Note 59.

⁷⁵ Testimony of McCoy, T., cited in ACR, 1988, pp. 401.B.141.

⁷⁶ Collins, J. et al., 'NATO-Warsaw Pact: US and Soviet perspectives of the conventional force balance', Supplement A, *NATO-Warsaw Pact: Assessment of the Conventional Force Balance*, Report to the Chairmen, Committee on Armed Services, US Senate and House of Representatives (US General Accounting Office: Washington, DC, Dec. 1988).

⁷⁷ Unterscher, L., *Tactical Air Forces: For a Disarmament Initiative of the West* (Studiengruppe Alternative Sicherheitspolitik: Bonn, Sep. 1988).

⁷⁸ Mordoff, K. F., 'Allied commander warns against trading aircraft for tanks in treaty talks', *Aviation Week & Space Technology*, 14 Nov. 1988, pp. 95-96.

⁷⁹ *Frankfurter Allgemeine Zeitung*, 14 Feb. 1976.

⁸⁰ *Wien Kurier*, cited in *FBIS-SU*, 28 June 1988, but citing a Western study; see IMEMO *Yearbook* (note 67), pp. 391, citing Steinbruner, J. D. and Sigal, L. V. (eds), *Alliance Security: NATO and the No-First-Use Question* (Brookings Institution: Washington, DC, 1983), p. 77.

⁸¹ Hoagland, J., *Washington Post*, 16 June 1988.

⁸² Talgiabue, J., *New York Times*, 12 July 1988.

⁸³ Interviews by the author with CSCE delegates in 1988.

⁸⁴ Tartanikov, V., 'Reliable security for Europe', *Krasnaya Zvezda*, 16 Aug. 1988.

⁸⁵ Dempsey, J., 'Soviets lift obstacle to arms talks', *Financial Times*, 3 Oct. 1988.

⁸⁶ Dean, J., 'How to reduce NATO and WTO forces', *Survival*, vol. 31, no. 2 (Mar.-Apr. 1988).

⁸⁷ Mason, R. A., 'Conventional Stability Talks: a seat at the table for air power', *Council for Arms Control Bulletin*, 1989 forthcoming.

⁸⁸ US Naval Institute Forum, 'The maritime strategy from the Kremlin's point of view' (Naval Post Graduate School: Monterey, Calif., 24 Apr. 1987), p. 33.

⁸⁹ Yazov cited by Pond, E., *Christian Science Monitor*, 18 Mar. 1988; see also Forobin, P., 'Disarmament and development: Mediterranean aspect', *Voennyi Vestnik* (Military Bulletin), no.

20 (Oct. 1988), pp. 5–8. Akhromeyev, S., 'Naval forces and universal security', *Pravda*, 5 Sep. 1988; see also chapter 14 in this *Yearbook*.

⁹⁰ Cited in *ACR*, 1988, p. 407.B.14.

⁹¹ SIPRI's verification project, for example, is an East–West collaborative study.

⁹² Lall, B. and Chollick, E., 'The INF nuclear forces treaty: a verification breakthrough', *CEP Research Report* (Council on Economic Priorities: New York, Apr. 1988); Leggett, J. K. and Lewis, P., 'Verifying a START agreement: impact of INF precedents', *Survival*, Sep.–Oct. 1988, pp. 409–28.

⁹³ Jasani, B. and Sakata, T. (eds), *SIPRI, Satellites for Arms Control and Crisis Monitoring* (Oxford University Press: Oxford, 1987).

⁹⁴ Bolt, R., 'Plutonium for all: leaks in global safeguards', *Bulletin of the Atomic Scientists*, vol. 44, no. 10 (Dec. 1988), pp. 14–19.

⁹⁵ WEU, *Requirements of a Tag for Conventional Arms Control* (Western European Union: Paris, 15 July 1988), (AGI (88) D/10). See also Krepon, M., 'Verification of conventional arms control', *Survival*, vol. 30, no. 6 (Nov.–Dec. 1988), pp. 544–55.

⁹⁶ Sloan, S. and Sawtelle, M., *Confidence-Building Measures and Force Constraints for Stabilizing East–West Military Relations in Europe* (Congressional Research Service: Washington, DC, 17 Aug. 1988).

⁹⁷ NATO goals for CDE-II and CFE can be found in *NATO communiqué*, 8–9 Dec. 1988.

⁹⁸ WTO objectives in the communiqué from the WTO Foreign Ministers meeting in Budapest, 29 Oct. 1988.

⁹⁹ *NATO communiqué*, 8–9 Dec. 1988.

¹⁰⁰ Mikhail Gorbachev speech on 15 Jan. 1986, text in *ACR*, 1986, p. 402.B.99.

¹⁰¹ Akhromeyev (note 89).

¹⁰² Huitfeldt, T., 'Major drop in Soviet Norwegian Sea exercises', *Jane's Defence Weekly*, 5 Mar. 1988, pp. 382–83. See also Gordon, M., 'Soviet Navy: wanderlust lost', *International Herald Tribune*, 18 July 1988.

¹⁰³ The Foreign Affairs Commission of the Supreme Soviet, 'Appeal to parliamentarians of the nations of Nordic Europe, the USA and Canada', *Izvestiya*, 12 Feb. 1988.

¹⁰⁴ Nordic Foreign Ministers, meeting in Tromsø in late March 1988, declined to discuss military matters in the northern region with the USSR, and in August declined to attend Soviet naval exercises scheduled for September.

¹⁰⁵ North Atlantic Assembly, Policy Recommendations, 34th Annual Session, Hamburg, 13–18 Nov. 1988, p. 14.

¹⁰⁶ Markham, J. M., 'Jet roar puts NATO at war with West Germans', *International Herald Tribune*, 11 Aug. 1988; Goodhart, D., 'West German military finds itself fighting on two fronts', *Financial Times*, 20 Dec. 1988; McCartney, R. J., 'Suspended flights to hamper NATO, US general says', *International Herald Tribune*, 14 Dec. 1988; and 'Growing German resentment at NATO flights and maneuvers', *Washington Post/Guardian Weekly*, 8 Jan. 1989.

¹⁰⁷ Fitchett, J., 'Bonn sets cuts in training', *International Herald Tribune*, 2 Dec. 1988.

¹⁰⁸ Sharp, J. M. O., 'Are the Soviets still interested in arms control?', *World Policy Journal*, vol. 1, no. 4 (summer 1984).

¹⁰⁹ Gorbachev, M., *Perestroika: New Thinking for Our Country and the World* (Collins: London, 1987).

¹¹⁰ Meyer, S. M., 'The sources and prospects of Gorbachev's new political thinking on security', *International Security*, vol. 13, no. 2 (autumn 1988), pp. 124–63.

¹¹¹ Primakov, Y., 'The new philosophy of foreign policy', *Pravda*, 10 July 1987. See also Becker, E., 'Selling the cause of Cambodian peace', *International Herald Tribune*, 21–22 Jan. 1988.

¹¹² Urban, M., 'Russia's new war plan', *The Independent*, 19 Oct. 1988.

¹¹³ *Pravda*, 30 Oct. 1988; see also Reuters, *Financial Times*, 1 Nov. 1988.

¹¹⁴ Slavinkin, A., 'What kind of armed forces do we need?', *Moscow News*, no. 45 (6 Nov. 1988).

¹¹⁵ Defense Policy Panel of the Committee on Armed Services, *Soviet Readiness for War: Assessing One of the Major Sources of East–West Instability*, US Congress, House of Representatives, 100th Congress, 2nd Session (US Government Printing Office: Washington, DC, 5 Dec. 1988) (from Hearings on 8 and 14 Sep. 1988).

¹¹⁶ See, among others, Fitchett, J., 'West shifts thinking on Soviet strategy', *International Herald Tribune*, 16 Dec. 1988.

¹¹⁷ 'Speech by Eduard Shevardnadze at Paris Conference on Chemical Weapons', *Pravda*, 9 Jan. 1989.

¹¹⁸ Gorbachev, M., 'Building up the Intellectual Potential of Perestroika', speech to Scientific and Cultural Workers at the CPSU Cultural Committee, 6 Jan. 1989, reproduced in *Daily Review*, vol. 35, no. 1 (10 Jan. 1989), pp. 8–15.

Appendix 11A. Implementation of the Stockholm Document and calendar of planned notifiable military activities in 1989 and forecast for 1990

RICHARD FIELDHOUSE and AXEL KROHN

An important requirement of the Document of the Stockholm Conference¹ is that each of the participating states must prepare and exchange with all the other CSCE states, by 15 November each year, an annual calendar of notifiable military activities planned for the following year (paragraph 55). Each state is also required to provide information on activities involving more than 40 000 troops that are planned for the second subsequent year (paragraph 59). The results of these requirements this year—the annual calendar for 1989 and the advance forecast for 1990—are presented in table 11A.1.

The Stockholm Document specifies the information to be included in each calendar (paragraph 56). Most of this information is included in table 11A.1. Participating states are also required to make a formal notification of each military activity at least 42 days before it begins (paragraph 29). The information in the notifications is more detailed than in the calendars.

Table 11A.1 is a compilation, based on official information submitted to SIPRI, of the information from the 35 CSCE states' calendars, and thus gives the overall picture of all their planned notifiable military activities. States are required to report all such activities occurring on their territory or in which their participation reaches the notifiable level (paragraph 31). Twenty states plan no notifiable military activities for 1989 (see notes to table 11A.1), although at least four of these plan to participate in notifiable activities.² The table presents activities in chronological order. Each activity is listed as one event, regardless of the number of states notifying or participating, or the number of exercises occurring simultaneously. States are required to give the planned duration and the 14-day period ('start window'), indicated by dates, within which the military activity is planned to start. Some of the dates are more precise than prescribed because some states provide actual exercise dates. In the column for the number and type of divisions, the designations of units are those given by notifying or participating states.

For all activities at or above the threshold for observation, observers must be invited from all other participating states (paragraph 38). The details of activities listed in the calendars may change as plans are revised. States are required to make such changes known in the formal notification for each activity.

Implementation

The Stockholm Document entered into force on 1 January 1987. After its first year of implementation it was somewhat difficult for SIPRI to obtain a clear picture of the course of implementation because of insufficient information.³ After two years it has become easier to determine how well the agreement has been implemented. The picture is a good one: no nation has indicated dissatisfaction with the process

Table 11A.1. Calendar of planned notifiable military activities in 1989 and forecast for 1990, as required by the Stockholm Document

State(s)/ Location	Dates/ Start window	Type/Name of activity ^a	Area	Level of command	No. of troops	Type of forces or equipment	No. and type of divisions ^a	Comments
1. Switzerland	4 days, 23–26 Jan.	FTX 'Feuerzange'	Aargauer Jura: Eglisau– Rheinfelden– Rothrist– Dietikon	Corps	16 500	Ground and air forces	Elements of: 1 mech. div. and territorial zone forces 1 border brig. (+)	..
2. USSR	5–6 days, 1–14 Feb.	FTX	Mikhailo–Koz- youbinskoye– Vyshgorod– Kozelets	Moscow Military District	13 000	Ground and air forces	1 mot. inf. div. (+)	..
3. USSR	5–6 days, 15–28 Feb.	FTX	Ushachi– Begoml'– Aleksandrovo– Dukora– Bezenkovichi	Kiev Military District	>13 000	Ground and air forces	1 mech. div. 1 tank div. (–)	..
4. Czechoslovakia	27 Feb.– 3 Mar.	FTX 'Ohre 89'	Jáchymov– Becov–Benátky– Liberec–Decín	Army	13 200	Ground and air forces, 220 tanks	1 mech. inf. div. 1 tank div. (–)	..
5. Norway, UK and Netherlands in Norway	1–2 days, 1–14 Mar.	Amphibious landing 'Cold Winter 89'	Sennedals- fjellet– Grunnfjorden– Lyngstuva– Kvalvik	Norwegian Regional Command and Commando Brigade	4 000 (800 Neth.) (3 200 UK)	Amphibious forces with landing craft and helicopters	1 brig.	Activity in conjunction with (precedes) FTX 'Cold Winter 89' (No. 6)
6. Netherlands, Norway, UK and USA in Norway	6 days, 1–14 Mar.	FTX 'Cold Winter 89'	Lyngstuva– Forøya– Sørfossbogen– Istind–Ligga– Vassdalsfjellet– Helligskogen	Norwegian Regional Command	17 300 (8 000 Nor.) (5 300 USA) (3 200 UK) (800 Neth.)	Ground and air forces	1 light inf. div.	Observers to be invited

7. USA and FRG in FRG	22 days, 8-21 Mar.	FTX 'Caravan Guard 89'	Niederkrüchten- Meerbusch- Benndorf-Trier- Schleiden- Herzogenrath	Corps	30 000 (27 000 USA) (3 000 FRG)	Ground and air forces	1 tank div. (-) 1 mech. inf. div. (-)	Observers to be invited; elements of 2 German brigades involved; forecast 45 000- 60 000 troops in 1988
8. USSR, Poland and GDR in GDR	6-7 days, 15-28 Mar.	FTX 'Druzhba 89'	Gardelegen- Haldensleben- Jessen-Dahme- Baruth- Tangermünde	Group of Soviet Forces in Germany	16 000 (13 000 USSR) (2 000 GDR) (1 000 Poland)	Ground and air forces	1 mot. inf. div. . . 1 tank div. (-) (USSR) 1 mot. inf. div. (-) (GDR) 1 tank div. (-) (Pol.)	
9. USSR	5-6 days, 1-14 Apr.	FTX	Vyazniki-Yuzha- Gorodets- Dzerzhinsk	Moscow Military District	17 000	Ground and air forces	1 mot. inf. div. 1 tank div. (+)	Observers to be invited
10. GDR	6-7 days, 1-14 Apr.	FTX	Gardelegen- Magdeburg- Genthin-Rhinow	Military District	13 000	Ground and air forces	1 mot. inf. div. . . Support troops	
11. USSR and GDR in GDR	5-6 days, 15-28 Apr.	FTX	Treuenbrietzen- Jessen-Cottbus- Eisenhüttenstadt- Teupitz	Group of Soviet Forces in Germany	18 500 (18 000 USSR) (500 GDR)	Ground and air forces	1 mot. inf. div. 1 tank div. (-) Support troops	Observers to be invited
12. Italy, UK, USA, Spain and Netherlands in Italy	8 days, 20-27 Apr.	Amphibious exercise 'Dragon Hammer 89'	South-west Sardinia-Capo Teulada	Area Command	3 160 (800 UK)	Amphibious and air forces	. . . . .
13. USSR and GDR in GDR	5-6 days, 15-28 May	FTX	Gardelegen- Magdeburg- Brandenburg- Neustrelitz- Pirzwalk	Group of Soviet Forces in Germany	>20 500 (>20 000 USSR) (500 GDR)	Ground and air forces	2 mot. inf. divs. (+) Support troops	Observers to be invited

State(s)/ Location	Dates/ Start window	Type/Name of activity ^a	Area	Level of command	No. of troops	Type of forces or equipment	No. and type of divisions ^a	Comments
14. Czechoslovakia	12-16 June	FTX	Cheb- Jáchymov- Decín-Liberec- Melník-Planá- Marianské Lázně	Army	13 000	Ground and air forces, 160 tanks	2 mech. inf. divs. (-)	. .
15. Poland	4-5 days, 16-30 June	FTX 'Orion 89'	Zary-Polkowice- Chojnów-Wegliniec	Division scale (possibly Corps)	17 100	Ground and air forces	1 arm. div. (+) 1 arm. div. (-) 1 mech. div. (-)	Observers to be invited; 2 division command staffs involved
16. USSR	5-6 days, 1-14 Aug.	FTX	Dubravka- Vishtitis- Kibartay- Gelgaudishkis- Erzvilkas- Vieshvile	Baltic Military District	13 000	Ground and air forces	2 tank divs. (-)	. .
17. USSR	7-8 days, 15-28 Aug.	FTX	Dubrovo- Shatsk- Berezino-Ulla	Byelorussian Military District	>17 000	Ground and air forces	2 tank divs. (+)	Observers to be invited
18. Bulgaria	6 days, 15-28 Aug.	CPX 'Maritsa 89'	Assenovgrad- Kroumovgrad- Aitos-Kotel	Deputy Minister of Defence	13 000	Ground and air forces	1 mot. inf. div. 1 tank brig. (-)	. .
19. USSR and GDR in GDR	6-7 days, 1-14 Sep.	FTX	Gardelegen- Magdeburg- Wittenberg- Brandenburg	Group of Soviet Forces in Germany	25 600 (25 000 USSR) (600 GDR)	Ground and air forces	2 tank divs. (+) Support troops	Observers to be invited
20. USA, FRG and Netherlands in FRG	14 days 1-14 Sep.	FTX 'Reforger'- related	Marsberg- Friedland-along inter-German border to	Army	83 300 (80 000 USA) (3 000 FRG) (300 Neth.)	Ground and air forces	2 arm. divs. (-) 2 mech. inf. divs. (-)	Observers to be invited; annual 'Reforger' exercise; forecast

			Ermershausen– Karlstadt– Grossostheim– Wetzlar					50 000–75 000 troops in 1988
21. Sweden	13 days 4–12 Sep.	FTX 'FMÖ-S/89'	Southern Småland– Öland–Blekinge and eastern Skåne– adjoining sea area	Southern Military Region	25 500	Ground, naval and air forces	1 mech. div. (–) 1 inf. div. (–)	Observers to be invited
22. FRG and Netherlands in FRG	9 days, 4–17 Sep.	FTX 'Offenes Visier'	Cuxhaven– Hamburg– Lüneburg– Braunschweig– Hannover– Bramsche– Emstek–Bremen– Bremerhaven	Corps	39 000 (36 000 FRG) (3 000 Neth.)	Ground and air forces	1 tank div. 1 mot. inf. div.	Observers to be invited; annual German exercise
23. Italy, USA, Spain and Portugal in Italy	13–21 Sep.	Amphibious exercise 'Display Determination 89'	South-west Sardinia	Area Command	3 000	Amphibious and air forces	..	..
24. USSR	5–6 days, 15–28 Sep.	Airborne exercise	Pobedino– Dobrovol'sk– Kudirkos– Naumestis	Commander Airborne Troops	3 500	Airborne forces	1 abn. regt. (+)	..
25. UK, Netherlands, Belgium and FRG in FRG (Netherlands and Belgium)	21 days, 15–29 Sep.	FTX 'Plain Sailing'	Dutch/German border–Werth– Greven–Menden	Logistic support command (division equivalent)	15 700 (15 500 UK) (200 FRG)	Volunteer reservists, logistic troops	Logistic and support units (no manoeuvre divs.)	The 13 000 notification threshold is exceeded only in FRG
26. France and FRG in France	6 days, 16–30 Sep.	FTX 'Champagne' (‘Extel 1’)	Troyes– Charlons-sur– Marne–Verdun– Neufchateau	Corps	23 000 (20 000 France) (3 000 FRG)	Ground and air forces	3 mech. inf. divs. 1 tank brig.	Observers to be invited; forecast >40 000 troops in 1988

State(s)/ Location	Dates/ Start window	Type/Name of activity ^a	Area	Level of command	No. of troops	Type of forces or equipment	No. and type of divisions ^a	Comments
27. Czechoslovakia and USSR in Czechoslovakia	5-6 days, 26 Sep.-9 Oct.	FTX	Jáchymov- Becov-Benátky- Liberec-Decín	Central Group of Soviet Armed Forces in Czechoslovakia	17 000 (16 400 USSR) (600 Czech.)	Ground and air forces, 300 tanks	1 mech. inf. div. 1 tank div. (-) Staff of: 1 mech. inf. regt. 1 mech. inf. bn. 1 arty. bty.	Observers to be invited
28. Turkey	5 days, 11-15 Oct.	FTX 'Mehmetcik 89'	Demirkoy- Yenikoy- Kucukcek-Mece- Babaeski- Kirkklareli	Army	34 000	Ground forces	1 mech. inf. div. 2 inf. divs. 1 tank brig.	Observers to be invited; forecast >40 000 troops in 1988
29. France	3 days, 15-18 Oct.	FTX 'Fartel' ('Extel 2')	Clermont-Ferrand- Albertville- Nice-Nîmes	Rapid Action Force (i.e., Corps)	21 000	Ground and air forces, 200 helicopters	1 tank div., 1 air trans. div. 1 abn. div.	Observers to be invited
30. Hungary and USSR in Hungary	5-6 days, 15-28 Oct.	FTX	Tüskevar- Tapolca- Sárszentmihály- Fehérvárcsurgó	Southern Group of Forces (USSR)	13 500 (13 000 USSR) (500 Hung.)	Ground and air forces	1 mot. inf. div. . . 1 mot. inf. bn.	
31. Switzerland	10 days, 14-23 Nov.	FTX 'Dreizack 89'	Thurgau- St. Gallen- Appenzell (Innerrhoden)- Appenzell (Ausserrhoden)	Corps	27 000	Ground and air forces	Elements of: 1 field div. 1 mech. div. and territorial forces 2 border brigs.	Observers to be invited
Advance forecast for 1990								
1. USA, FRG and others in FRG	14 days, 1-14 Feb.	'Reforger 90'- related FTX	Southern and central FRG	Army	80 000 (USA)	Ground and air forces	. .	Observers to be invited
2. USA, FRG and others in FRG	14 days, 1-14 Sep.	FTX 'Caravan Guard 90'	Central and southern FRG	Corps	50 000 (USA), others to be decided later	Ground and air forces	. .	Observers to be invited

3. FRG, USA, France and Belgium in FRG	17 days, 12–28 Sep.	FTX 'Heeresübung 1990'	Dierdorf– Biedenkopf– Arolsen– Holzminden– Rotenburg/ Fulda– Bad Nauheim	Corps	52 000	Ground and air forces	..	Observers to be invited
4. FRG, Denmark, Netherlands, UK and USA in FRG	11 days, 29 Sep.–9 Oct.	FTX 'Bold Guard 90'	Klanxbüll– Flensburg east of Fehmarn– Stockelsdorf– Ratzeburg– Lauenburg– Hamburg– Brunsbüttel– St. Peter Ording	Corps	55 000– 70 000	Ground and air forces	..	Observers to be invited

^a See the list of abbreviations below. (–) means that the division is below full strength or not comprised of all its component units; (+) means that the division (according to standard organization) is reinforced with other units.

Abbreviations used in the table:

abn.	airborne	bty.	battery	log.	logistic
arm.	armoured	CPX	command post exercise	mech.	mechanized
arty.	artillery	div(s).	division(s)	mot.	motorized
bn.	battalion	FTX	field training exercise	regt.	regiment
brig(s).	brigade(s)	inf.	infantry	trans.	transport

States participating in notifiable military activities in 1989, by activity number:

Belgium: 25	Hungary: 30	Sweden: 21
Bulgaria: 18	Italy: 12, 23	Switzerland: 1, 31
Czechoslovakia: 4, 14, 27	Netherlands: 5, 6, 12, 20, 22, 25	Turkey: 28
France: 26, 29	Norway: 5, 6	UK: 5, 6, 12, 25
FRG: 7, 20, 22, 25, 26	Poland: 8, 15	USA: 6, 7, 12, 20, 23
GDR: 8, 10, 11, 13, 19	Portugal: 23	USSR: 2, 3, 8, 9, 11, 13, 16, 17, 19, 24, 27, 30
	Spain: 12, 23	

States planning no notifiable military activities in 1989: Austria, *Belgium*, Canada, Cyprus, Denmark, Finland, Greece, the Holy See, Iceland, Ireland, Liechtenstein, Luxembourg, Malta, Monaco, *the Netherlands*, Portugal, Romania, San Marino, *Spain*, and Yugoslavia.

(States participating in notifiable activities but not responsible for notification are given in italics.)

and those nations which have been willing to make their assessments public have commended the process, although recognizing room for improvement.

During 1988, as in 1987, all provisions of the Document's implementation were exercised: exchange of calendars, notification of activities, observation of activities above the appropriate thresholds and obligatory on-site inspections. Given the increasing and improving information available to SIPRI, some numerical analysis is now possible for the first two years of implementation. As of December 1988, 86 military activities had been notified by the parties to the Stockholm Document. Thirty-five of these were observed by other nations, or 40 per cent of all notified activities. In the first two years of implementation there were 18 inspections, 5 in 1987 and 13 in 1988 (see table 11A.2). Of the 31 activities included in the calendar for 1989, 16 (about 50 per cent) are planned at the observable level. Of course, all activities in the advance forecasts would be observed unless they are scaled back drastically by the time of notification. Implementation of each of the Document's provisions is reviewed briefly below.

Calendars

In 1987, 47 military activities were included in the annual calendar: 25 by WTO nations, 17 by NATO members and 5 by neutral and non-aligned (NNA) nations. These numbers corresponded closely to the activities notified and held; NATO members added four no-notice alert exercises and Switzerland scaled back all three of its planned activities to below 13 000 troops. There were eight advance forecast activities for 1988, seven by NATO nations and one by the USSR. This has been the only Soviet military activity to date included in the advance forecast section of the calendar.⁴ In the calendar for 1988 there were 38 activities: 22 by WTO states, 14 by NATO states and 3 by NNA states. Five activities were included by NATO members in the advance forecast for 1989. In the present calendar for 1989 there are 31 activities: 17 for WTO countries, 11 for NATO members and 3 for NNAs. All four of the advance forecast activities are by NATO member nations.

As of January 1989, it appears that all 35 participating CSCE states have complied with the terms of the Stockholm Document concerning the exchange of annual calendars and forecasts. So far, the calendars are the best single source of information on the process of implementation and on the planned military activities covered by the Stockholm Document. This is because the calendars are the most readily available documents on implementation and because most CSCE nations are not yet willing to make public other official material. It is encouraging to note that governments generally seem more willing to share information on this topic after two years of implementation than after the first year. This could be an indication that the objective of transparency or openness is taking hold in many CSCE states—a major goal of the CDE.

Notifications

All 35 CSCE nations have fulfilled their obligations in providing notification of military activities. As far as available information indicates, there have been only two instances (both by NNA states in 1987) of nations not providing notification at least 42 days before an activity was scheduled to begin, as required by the Stockholm Document.⁵ No other nations complained publicly about these two delayed notifications. There have also been cases of voluntary notifications of activities or participation below the notification threshold. For example, in 1987 the USSR, Hungary, the USA and the FRG each gave such voluntary notifications. The information required in each notification is far more

detailed than in the annual calendars and can differ considerably from the calendar information. Notifications are the final information sent to all other CSCE states concerning activities, and thus are the basis for assessing observed or inspected activities.

Table 11A.2. On-site inspections of military activities conducted in 1987–88, as permitted by the Stockholm Document

Date	Inspecting state	Host/ Participating state(s)	Exercise name/ area	Comments
1987				
1. 25 Aug.– 1 Sep.	USA	USSR	Byelorussian Military District (near Minsk)	
2. 10–12 Sep.	UK	GDR/USSR	Wittenberg, Cottbus	
3. 5–7 Oct.	USSR	Turkey/USA	'Display Determination' (near Istanbul)	
4. 28–30 Oct.	USSR	FRG/USA	'Iron Forge'	
5. 9–13 Nov.	GDR	FRG	'Sichere Festung' (Göttingen area)	
1988				
6. 4–6 Feb.	USA	Hungary/USSR, Czechoslovakia	'Baratsag 88' (Csor)	
7. 13–15 Mar.	USSR	Norway/USA, Canada, FRG, Italy, Netherlands, UK	'Arrowhead Express' (Bardufoss)	
8. 9–11 Apr.	UK	USSR	Odessa Military District	Airborne exercise
9. 10–12 Apr.	USA	GDR/USSR	..	Unnotified activity coinciding with 'Druzhiba 88'
10. 1–3 May	Bulgaria	Italy/USA, UK, France, Netherlands	'Dragon Hammer' (Sardinia)	Amphibious exercise; not forecast
11. 25–27 July	USA	Poland/USSR	Borne, Sulinovo	
12. 12–14 Aug.	FRG	GDR	Burg	
13. 23–25 Aug.	Turkey	USSR	Transcaucasus Military District	
14. 7–9 Sep.	USSR	FRG/USA	'Reforger Concentration'	Not forecast; connected to 'Certain Challenge'
15. 5–7 Oct.	USSR	UK	'Drake's Drum'	Unnotified activity
16. 14–16 Oct.	USA	USSR	Baltic Military District	
17. 7–9 Nov.	Poland	FRG	Eastern Lower Saxony	Inspection of area next to 'Iron Hammer' exercise
18. 28–30 Nov.	GDR	FRG	'Sachsentrass 88'	

Observations

Observers have been invited to and present at all notified military activities at or above the threshold for observation (17 000 regular troops or 5000 amphibious or airborne troops, paragraph 38.4). The 35 observation programmes in 1987–88 have given all CSCE states a first-hand opportunity to learn about the military activities and practices of other states. Until an observed Soviet exercise in 1987, US observers had not observed military activities on Soviet territory since 1978, under the terms of the Helsinki Final Act. The Stockholm Document provisions apply to a larger portion of Soviet territory than is covered by the Final Act. It appears that all observations have met at least the letter of the Stockholm Document.

There have been a number of cases where CSCE states have exceeded the letter of the Stockholm Document and met the spirit of the agreement. This good-will behaviour includes such acts as voluntary notifications of activities below the threshold level, invitations to observers for activities below the observable level, and so on. For example, on a voluntary basis, Finland invited observers from all other CSCE states to its 'Tuisku' exercise in April 1988 even though it involved only 13 000 troops (4000 below the observation threshold).

The observations seem to have improved with time and experience. Concerning the observation of a Soviet–Czechoslovakian exercise in Czechoslovakia in March 1988, the USA reported: 'Some improvement was noted in the conduct of this observation. Observers were allowed to use both their own cameras and dictaphones throughout most of the program'.⁶ Although this may seem a small measure of progress, the Stockholm Document guarantees only that observers may use their own binoculars—if they are approved by the host state—and leaves it to the host state to provide other observation equipment (paragraph 53.2).

Inspections

One of the most remarkable features of the Stockholm Document is the right of states to conduct on-site inspections to verify compliance with the terms of the agreement (paragraphs 65–66).⁷ Each state must accept, without the right of refusal, up to three inspections per year on its territory within the zone of application for CSBMs from different inspecting states (paragraphs 67–68).⁸ In effect, these provisions permit an inspecting state to inspect *any* actual or suspected notifiable military activity within the prescribed zone, with the exception of restricted areas (paragraphs 73–74).⁹ The provisions for obligatory inspections have set the precedent for including on-site or 'challenge' inspections in future arms control agreements, including the INF Treaty.

There were 18 inspections of military activities in 1987–88; they are listed in table 11A.2. All involved members of either NATO or the WTO; none of the neutral and non-aligned states has been involved in any inspection. The ratios of inspections by each bloc have been fairly even. Of the 18 inspections, NATO nations have conducted 9 and the WTO member states have held 9, including one each of an unnotified military activity. The USA and the USSR have each conducted 5 inspections; other allies have each conducted 1 (the FRG, Turkey, Czechoslovakia and Poland) or 2 (the UK and the GDR) inspections. Inspections on the territories of WTO countries have been held in the GDR, Hungary, Poland and the USSR; inspections on the territories of NATO states have taken place in the FRG, Italy, Norway, Turkey and the UK.

As far as available information indicates, the inspections have gone well and have been accepted as an important and routine aspect of the agreement's implementation. Concerning the first two inspections conducted, the USA reported in 1987 that 'the US

and the UK were satisfied with the conduct of the inspections by the receiving states. Although some questions of interpretation were raised regarding restricted areas and minor technical problems were experienced (particularly as regards required telecommunications among the UK inspectors in the GDR), both the GDR and the Soviet Union met fully their responsibilities in receiving an inspection'.¹⁰ Several nations have provided SIPRI with copies of their inspection reports,¹¹ and they are all basically positive, although a number of questions and concerns were raised by inspecting states.

Several sorts of difficulties tend to reappear in the reports: the problem of delays in beginning the inspection period; the problem of under-powered communications equipment for the NATO inspection teams; the problem of areas thought or claimed to be restricted or sensitive—and thus off-limits for inspection—and the general inability of inspectors to get a clear idea of the scope of the military activity because of problems of access to areas or people. It is clear that inspections provide the participating states with an unprecedented opportunity to learn about each other's behaviour and to verify compliance with the terms of the Stockholm Document. The CSCE participating states appear to accept and appreciate the confidence-building aspect of routine inspections as an important component of the Stockholm CSBMs. Concerning its inspection of an exercise in Hungary in February, the USA reported that 'all provisions of the Stockholm document for receiving inspectors were fully met by the Hungarian Government, which clearly viewed the inspection as a positive development'.¹²

The inspection reports available to SIPRI indicate that the host nation was co-operative and met the requirements of the Stockholm Document in each inspection. In no case did any inspecting state charge that the activity inspected was inconsistent with the information provided in the prior notification.

Questions of compliance

One complaint was made in 1988 about compliance with the Stockholm Document. The USSR and Czechoslovakia each charged that the FRG had failed to provide a two-year advance forecast in 1986 of a US exercise planned for September 1988 involving more than 75 000 troops on German soil.¹³ Since the USA was responsible for the exercise and only its forces would exceed the advance forecast threshold of 40 000 troops, it provided the two-year advance forecast for the exercise in December 1986, indicating it was envisaged to involve 60 000–75 000 troops.¹⁴ The FRG was not responsible for providing the advance forecast because the Stockholm Document does not require participating or host states to provide such forecasts *unless* their own forces will exceed 40 000 troops (paragraph 59).¹⁵ Both the USA and the FRG included the exercise—named 'Certain Challenge'—in their annual calendars for 1988 as required, indicating that it was expected to involve some 97 000 troops.¹⁶ The exercise actually reached a level of 128 500 troops. A discussion ensued at the Vienna CSCE follow-up meeting, where the USA and the FRG refuted the charges.

Assessments

In an official statement of December 1988 on conventional arms control NATO ministers stated: 'We are encouraged thus far by the successful implementation of the Stockholm Document and we consider that the momentum must be maintained'.¹⁷ Although most CSCE states have not publicized their assessments of the implementation of the Stockholm Document, information submitted to SIPRI indicates that the NATO view seems to be shared by other CSCE states, including NNA states and members of the WTO. It appears that the process and procedures of the Stockholm

Document CSBM implementation have shown improvement during their first two years of existence. Experience with implementation has been good, sufficiently so for the 35 CSCE states to be ready to move on to negotiating further confidence- and security-building measures at the next round of the CDE. In this sense the Stockholm Document and its implementation must be considered a success.

Notes and references

¹ For the full text of the Stockholm Document, see SIPRI, *SIPRI Yearbook 1987: World Armaments and Disarmament* (Oxford University Press: Oxford, 1987), appendix 10A.

² These are Belgium, the Netherlands, Portugal and Spain. The Netherlands, although not responsible for any notifications, plans to participate in six notifiable activities.

³ See SIPRI, *SIPRI Yearbook 1988: World Armaments and Disarmament* (Oxford University Press: Oxford, 1988), p. 346.

⁴ See *SIPRI Yearbook 1987* (note 1), activity no. 8 of advance forecast, p. 380. This has been the only Soviet activity to date forecast to involve more than 40 000 troops. In the event, the exercise was carried out with 21 000 troops.

⁵ These were Austria in February 1987 and Yugoslavia in October 1987. The Austrian notification was provided on 13 February for the 'Wintersturm 87' exercise that began on 16 February. In early October Yugoslavia notified the 'Jesen 87' exercise that commenced in late October.

⁶ US Department of State, *Implementation of Helsinki Final Act, October 1, 1987–April 1, 1988*, Twenty-fourth Semiannual Report of the President to the Commission on Security and Cooperation in Europe on the Implementation of the Helsinki Final Act, 1 October 1987–1 April 1988, State Department Special Report No. 178 (US Government Printing Office: Washington, DC, 1988), p. 19.

⁷ 'In accordance with the provisions contained in this document each participating State has the right to conduct inspections on the territory of any other participating State within the zone of application for CSBMs.' (paragraph 65); 'Any participating State will be allowed to address a request for inspection to another participating State on whose territory, within the zone of application for CSBMs, compliance with the agreed confidence- and security-building measures is in doubt.' (paragraph 66)

⁸ 'No participating State will be obliged to accept on its territory within the zone of application for CSBMs, more than three inspections per calendar year.' (paragraph 67); 'No participating State will be obliged to accept more than one inspection per calendar year from the same participating state.' (paragraph 68)

⁹ 'The participating State which requests an inspection will be permitted to designate for inspection on the territory of another State within the zone of application for CSBMs, a specific area. Such an area will be referred to as the "specified area". The specified area will comprise terrain where notifiable military activities are conducted or where another participating State believes a notifiable military activity is taking place. The specified area will be defined and limited by the scope and scale of notifiable military activities but will not exceed that required for an army level military activity.' (paragraph 73); 'In the specified area the representatives of the inspecting State accompanied by the representatives of the receiving State will be permitted access, entry and unobstructed survey, except for areas or sensitive points to which access is normally denied or restricted, military and other defence installations, as well as naval vessels, military vehicles and aircraft. The number and extent of the restricted areas should be as limited as possible. Areas where notifiable military activities can take place will not be declared restricted areas, except for certain permanent or temporary military installations which, in territorial terms, should be as small as possible, and consequently those areas will not be used to prevent inspection of notifiable military activities. Restricted areas will not be employed in a way inconsistent with the agreed provisions on inspection.' (paragraph 74)

¹⁰ US Department of State, *Implementation of Helsinki Final Act, April 1, 1987–October 1, 1987*, Twenty-third Semiannual Report of the President to the Commission on Security and Cooperation in Europe on the Implementation of the Helsinki Final Act, 1 April 1987–1 October 1987, State Department Special Report No. 172 (US Government Printing Office: Washington, DC, 1987), p. 17.

¹¹ Inspection reports were received from the USA (4), the FRG (1) and the USSR (3). These 8 reports cover nearly half of all 18 inspections conducted in 1987–88 and provide an interesting view of the details of implementation.

¹² See note 6, p. 20.

¹³ See note 6.

¹⁴ See *SIPRI Yearbook 1987* (note 1), activity no. 3 of advance forecast, p. 379.

¹⁵ 'Each participating State will communicate, in writing, to all other participating States, by November 15 of each year, information concerning military activities subject to prior notification involving more than 40 000 troops, which it plans to carry out in the second subsequent calendar year. Such communication will include preliminary information on each activity, as to its general purpose, timeframe and duration, area, size and States involved.'

¹⁶ See *SIPRI Yearbook 1988* (note 3), activity no. 21, p. 341.

¹⁷ NATO Press Communiqué M-3(88)75, 'Conventional arms control', Statement issued by the North Atlantic Council meeting in ministerial session at NATO Headquarters, Brussels, 8 Dec. 1988, p. 3.

Appendix 11B. Extracts from the Concluding Document of the 1986–89 Vienna Meeting of Representatives of the Participating States of the Conference on Security and Co-operation in Europe

The Concluding Document covers all three baskets of CSCE issues. Extracts dealing with the Conference on Confidence- and Security-Building Measures and Disarmament in Europe, and with the mandate for the Negotiation on Conventional Armed Forces in Europe, are reproduced below.

The representatives of the participating States of the Conference on Security and Co-operation in Europe (CSCE), Austria, Belgium, Bulgaria, Canada, Cyprus, Czechoslovakia, Denmark, Finland, France, the German Democratic Republic, the Federal Republic of Germany, Greece, the Holy See, Hungary, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Malta, Monaco, the Netherlands, Norway, Poland, Portugal, Romania, San Marino, Spain, Sweden, Switzerland, Turkey, the Union of Soviet Socialist Republics, the United Kingdom, the United States of America and Yugoslavia, met in Vienna from 4 November 1986 to [19 January] 1989 in accordance with the provisions of the Final Act relating to the Follow-up to the Conference, as well as on the basis of the other relevant CSCE documents.

The participants were addressed on 4 November 1986 by the Austrian Federal Chancellor.

Opening statements were made by all Heads of Delegations among whom were Ministers and Deputy Ministers of many participating States. Some Ministers of Foreign Affairs addressed the Meeting also at later stages.

The participants were addressed by a representative of the Secretary-General of the United Nations. Contributions were made by representatives of the United Nations Economic Commission for Europe (ECE) and UNESCO.

Contributions were also made by the following non-participating Mediterranean States: Algeria, Egypt, Israel, Lebanon, Libya, Morocco, Syria and Tunisia.

The representatives of the participating States reaffirmed their commitment to the CSCE process and underlined its essential role in increasing confidence, in opening up new ways for co-operation, in promoting respect for human rights and fundamental freedoms and thus strengthening international security.

The participating States welcomed the favourable developments in the international situation since the conclusion of the Madrid Meeting in 1983 and expressed their satisfaction that the CSCE process has contributed to these developments. Noting the intensification of political dialogue among them and the important progress in negotiations on military security and disarmament, they agreed that renewed efforts should be undertaken to consolidate these positive trends and to achieve a substantial further improvement of their mutual relations. Accordingly, they reaffirmed their resolve fully to implement, unilaterally, bilaterally and multilaterally, all the provisions of the Final Act and of the other CSCE documents.

As provided for in the Agenda of the Vienna Meeting, the representatives of the

participating States held a thorough exchange of views both on the implementation of the provisions of the Final Act, and the Madrid Concluding Document and of the tasks defined by the Conference, as well as, in the context of the questions dealt with by the latter, on the deepening of their mutual relations, the improvement of security and the development of co-operation in Europe, and the development of the process of détente in the future.

During this exchange of views the participating States examined thoroughly and in detail the implementation of the Final Act and of the Madrid Concluding Document. Different and at times contradictory opinions were expressed about the extent of the realization of these commitments. While encouraging developments were noted in many areas, the participants criticized the continuing serious deficiencies in the implementation of these documents.

An open and frank discussion was held about the application of and respect for the principles of the Final Act. Concern was expressed about serious violations of a number of these principles. In particular, questions relating to respect for human rights and fundamental freedoms were the focus of intensive and controversial discussion. The participating States agreed that full respect for the principles, in all their aspects, is essential for the improvement of their mutual relations.

The implementation of the provisions of the Final Act concerning confidence-building measures, concerning co-operation in the field of economics, of science and technology and of the environment, concerning questions relating to security and co-operation in the Mediterranean as well as concerning co-operation in humanitarian and other fields was discussed. The implementation of the provisions of the Madrid Concluding Document and of other CSCE documents was also discussed. It was considered that the numerous possibilities offered by the Final Act had not been sufficiently realized.

The participating States also expressed concern about the spread of terrorism and condemned it unreservedly.

The discussion reflected the broader context of the CSCE process and confirmed the importance of taking into account its world dimension in implementing the provisions of the Final Act.

In their deliberations the representatives of the participating States took into account the results of

- the Stockholm Conference on Confidence- and Security-Building Measures and Disarmament in Europe;
- the Athens Meeting of Experts in order to pursue the examination and elaboration of a generally acceptable method for the peaceful settlement of disputes aimed at complementing existing methods;
- the Venice Seminar on Economic, Scientific and Cultural Co-operation in the Mediterranean;
- the Ottawa Meeting of Experts on Questions concerning Respect, in their States, for Human Rights and Fundamental Freedoms, in all their Aspects, as embodied in the Final Act;
- the Budapest 'Cultural Forum';
- the Bern Meeting of Experts on Human Contacts.

The participating States moreover noted that the tenth anniversary of the signing of the Final Act had been commemorated at Helsinki on 1 August 1985.

The participating States reaffirmed their commitment to the continuation of the CSCE process as agreed to in the chapter on the Follow-up to the Conference contained in the Final Act. Recognizing the need for balanced progress covering all sections of the

Final Act, they expressed their determination also to benefit from new opportunities for their co-operation and reached corresponding decisions concerning follow-up activities.

The representatives of the participating States examined all the proposals submitted to the Meeting and agreed on the following:

* * *

CONFIDENCE- AND SECURITY-BUILDING MEASURES AND CERTAIN ASPECTS OF SECURITY AND DISARMAMENT IN EUROPE

Stockholm Conference: Assessment of progress achieved

The participating States,

In accordance with the relevant provisions of the Madrid Concluding Document, assessed progress achieved during the Conference on Confidence- and Security-building Measures and Disarmament in Europe, which met in Stockholm from 17 January 1984 to 19 September 1986.

They welcomed the adoption at Stockholm of a set of mutually complementary confidence- and security-building measures (CSBMs).

They noted that these measures are in accordance with the criteria of the Madrid mandate and constitute a substantial improvement and extension of the confidence-building measures adopted in the Final Act.

They noted that the adoption of the Stockholm Document was a politically significant achievement and that its measures are an important step in efforts aimed at reducing the risk of military confrontation in Europe. They agreed that the extent to which the measures will in practice contribute to greater confidence and security will depend on the record of implementation. They were encouraged by initial implementation and noted that further experience and detailed review will be required. They reaffirmed their determination to comply strictly with and apply in good faith all the provisions of the Document of the Stockholm Conference.

They reaffirmed their commitment to the provisions of the Madrid Concluding Document relating to the Conference on Confidence- and Security-building Measures and Disarmament in Europe and agreed to resume the work of the Conference with a view to achieving further progress towards its aim.

New efforts for security and disarmament in Europe

The participating States,

Recalling the relevant provisions of the Final Act and of the Madrid Concluding Document according to which they recognize the interest of all of them in efforts aimed at lessening military confrontation and promoting disarmament,

Reaffirming their determination expressed in the Final Act to strengthen confidence among them and thus to contribute to increasing stability and security in Europe,

Stressing the complementary nature of the efforts within the framework of the CSCE process aimed at building confidence and security and establishing stability and achieving progress in disarmament, in order to lessen military confrontation and to enhance security for all,

Stressing that in undertaking such efforts they will respect the security interests of all CSCE participating States inherent in their sovereign equality,

Having also considered ways and appropriate means to continue their efforts for security and disarmament in Europe,

Have reached the understanding that these efforts should be structured as set forth below:

Negotiations on Confidence- and Security-building Measures

The participating States have agreed that Negotiations on Confidence- and Security-building Measures will take place in order to build upon and expand the results already achieved at the Stockholm Conference with the aim of elaborating and adopting a new set of mutually complementary confidence- and security-building measures designed to reduce the risk of military confrontation in Europe.

These negotiations will take place in accordance with the Madrid mandate.

The decisions of the Preparatory Meeting held in Helsinki from 25 October to 11 November 1983 will be applied *mutatis mutandis* (see Annex II).

These negotiations will take place in Vienna, commencing in the week beginning on 6 March 1989.

The next Follow-up Meeting of the participating States of the CSCE, to be held in Helsinki, commencing on 24 March 1992, will assess the progress achieved in these negotiations.

Negotiation on Conventional Armed Forces in Europe

The Negotiation on Conventional Armed Forces in Europe will take place as agreed by those States named in the mandate contained in the Chairman's statement in Annex III of this document, who among themselves have determined the agenda, the rules of procedure and the organizational modalities of these negotiations, and will determine their timetable and results. These negotiations will be conducted within the framework of the CSCE process.

These negotiations will take place in Vienna, commencing in the week beginning on 6 March 1989.

The next Follow-up Meeting of the participating States of the CSCE, to be held in Helsinki, commencing on 24 March 1992, will exchange views on the progress achieved in these negotiations.

Meetings in order to Exchange Views and Information concerning the course of the Negotiation on Conventional Armed Forces in Europe

It has been agreed that the participating States will hold meetings in order to exchange views and information concerning the course of the Negotiation on Conventional Armed Forces in Europe.

These meetings will be held at least twice during each session of the Negotiation on Conventional Armed Forces in Europe.

Provisions on practical modalities relating to these meetings are contained in Annex IV of this Document.

At these meetings, substantive information will be provided by the participants in the Negotiation on Conventional Armed Forces in Europe on developments, progress and results in the negotiations with the aim of enabling each participating State to appraise their course.

The participants in these negotiations have undertaken to take into consideration, in the course of their negotiations, the views expressed at such meetings by other participating States concerning their own security.

Information will also be provided on a bilateral basis.

The next follow-up Meeting of the participating States of the CSCE, to be held in Helsinki, commencing on 24 March 1992, will consider the functioning of these arrangements.

Taking into account the relevant provisions of the Final Act and of the Madrid Concluding Document, and having considered the results achieved in the two

negotiations, and also in the light of other relevant negotiations on security and disarmament affecting Europe, a future CSCE follow-up meeting will consider ways and appropriate means for the participating States to continue their efforts for security and disarmament in Europe, including the question of supplementing the Madrid mandate for the next stage of the Conference on Confidence- and Security-building Measures and Disarmament in Europe.

* * *

Annex III

CHAIRMAN'S STATEMENT

NEGOTIATION ON CONVENTIONAL ARMED FORCES IN EUROPE

It is understood that the following mandate has been agreed by the States participating in the future Negotiation on Conventional Armed Forces in Europe:

MANDATE FOR NEGOTIATION ON CONVENTIONAL ARMED FORCES* IN EUROPE

The representatives of Belgium, Bulgaria, Canada, Czechoslovakia, Denmark, France, the German Democratic Republic, the Federal Republic of Germany, Greece, Hungary, Iceland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Turkey, the Union of Soviet Socialist Republics, the United Kingdom and the United States of America held consultations in Vienna from 17 February 1987 to 10 January 1989.

These States,

Conscious of the common responsibility which they all have for seeking to achieve greater stability and security in Europe;

Acknowledging that it is their armed forces which bear most immediately on the essential security relationship in Europe, in particular as they are signatories of the Treaties of Brussels (1948), Washington (1949) or Warsaw (1955), and accordingly are members of the North Atlantic Alliance or parties to the Warsaw Treaty;

Recalling that they are all participants in the CSCE process;

Recalling that, as reaffirmed in the Helsinki Final Act, they have the right to belong or not to belong to international organizations, to be or not to be a party to bilateral or multilateral treaties including the right to be or not to be a party to treaties of alliance;

Determined that a Negotiation on Conventional Armed Forces in Europe should take place in the framework of the CSCE process;

Reaffirming also that they participate in negotiations as sovereign and independent States and on the basis of full equality;

Have agreed on the following provisions:

Participants

The participants in this negotiation shall be the 23 above-listed States hereinafter referred to as 'the participants'.

Objectives and Methods

The objectives of the negotiation shall be to strengthen stability and security in Europe through the establishment of a stable and secure balance of conventional armed forces,

* Conventional Armed Forces including conventional armaments and equipment.

which include conventional armaments and equipment, at lower levels; the elimination of disparities prejudicial to stability and security; and the elimination, as a matter of priority, of the capability for launching surprise attack and for initiating large-scale offensive action. Each and every participant undertakes to contribute to the attainment of these objectives.

These objectives shall be achieved by the application of militarily significant measures such as reductions, limitations, redeployment provisions, equal ceilings, and related measures, among others.

In order to achieve the above-objectives, measures should be pursued for the whole area of application with provisions, if and where appropriate, for regional differentiation to redress disparities within the area of application and in a way which precludes circumvention.

The process of strengthening stability and security should proceed step-by-step, in a manner which will ensure that the security of each participant is not affected adversely at any stage.

Scope and Area of Application

The subject of the negotiation shall be the conventional armed forces, which include conventional armaments and equipment, of the participants based on land within the territory of the participants in Europe from the Atlantic to the Urals.

The existence of multiple capabilities will not be a criterion for modifying the scope of the negotiation:

- No conventional armaments or equipment will be excluded from the subject of the negotiation because they may have other capabilities in addition to conventional ones. Such armaments or equipment will not be singled out in a separate category;
- Nuclear weapons will not be a subject of this negotiation.

Particular emphasis will initially be placed on those forces directly related to the achievement of the objectives of the negotiation set out above.

Naval forces and chemical weapons will not be addressed.

The area of application* shall be the entire land territory of the participants in Europe from the Atlantic to the Urals, which includes all the European island territories of the participants. In the case of the Soviet Union the area of application includes all the territory lying west of the Ural River and the Caspian Sea. In the case of Turkey the area of application includes the territory of Turkey north and west of the following line: the point of intersection of the border with the 39th parallel, Muradiye, Patnos, Karayazi, Tekman, Kemaliye, Feke, Ceyhan, Dogankent, Gözne and thence to the sea.

Exchange of Information and Verification

Compliance with the provisions of any agreement shall be verified through an effective and strict verification regime which, among other things, will include on-site inspections as a matter of right and exchanges of information.

Information shall be exchanged in sufficient detail so as to allow a meaningful comparison of the capabilities of the forces involved. Information shall also be exchanged in sufficient detail so as to provide a basis for the verification of compliance.

The specific modalities for verification and the exchange of information, including the degree of detail of the information and the order of its exchange, shall be agreed at the negotiation proper.

* The participants will be guided by the language on non-circumvention as set out in the section on Objectives and Methods.

Procedures and Other Arrangements

The procedures for the negotiation, including the agenda, work programme and timetable, working methods, financial issues and other organisational modalities, as agreed by the participants themselves, are set out in Annex 1 of this mandate. They can be changed only by consensus of the participants.

The participants decided to take part in meetings of the States signatories of the Helsinki Final Act to be held at least twice during each round of the Negotiation on Conventional Armed Forces in Europe in order to exchange views and substantive information concerning the course of the Negotiation on Conventional Armed Forces in Europe. Detailed modalities for these meetings are contained in Annex 2 to this mandate.

The participants will take into consideration the views expressed in such meetings by other CSCE participating States concerning their own security.

Participants will also provide information bilaterally.

The participants undertake to inform the next CSCE Follow-up Meeting of their work and possible results and to exchange views, at that meeting, with the other CSCE participating States on progress achieved in the negotiation.

The participants foresee that, in the light of circumstances at the time, they will provide in their timetable for a temporary suspension to permit this exchange of views. The appropriate time and duration of this suspension is their sole responsibility.

Any modification of this mandate is the sole responsibility of the participants, whether they modify it themselves or concur in its modification at a future CSCE Follow-up Meeting.

The results of the negotiation will be determined only by the participants.

Character of Agreements

Agreements reached shall be internationally binding. Modalities for their entry into force will be decided at the negotiation.

Venue

The negotiation shall commence in Vienna no later than in the seventh week following the closure of the Vienna CSCE Meeting.

* * *

The representatives of the 23 participants, whose initials appear below, have concluded the foregoing mandate, which is equally authentic in the English, French, German, Italian, Russian and Spanish languages.

The representatives, recalling the commitment of their States to the achievement of a balanced outcome at the Vienna CSCE Meeting, have decided to transmit it to that Meeting with the recommendation that it be attached to its Concluding Document.

Palais Liechtenstein
Vienna, Austria,
the 10th day of January 1989

Here appear the initials of the representatives of Belgium, Bulgaria, Canada, Czechoslovakia, Denmark, France, the German Democratic Republic, the Federal Republic of Germany, Greece, Hungary, Iceland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Turkey, the Union of Soviet Socialist Republics, the United Kingdom and the United States of America.

Annex 1**PROCEDURES FOR THE NEGOTIATION ON CONVENTIONAL ARMED FORCES IN EUROPE**

The representatives of the 23 States listed in the mandate, hereinafter referred to as 'the participants', held consultations in Vienna from 17 February 1987 to 10 January 1989, and agreed on the following procedural arrangements for the conduct of the Negotiation on Conventional Armed Forces in Europe.

These procedural arrangements have been adopted by the consensus of the participants. They can be changed only by consensus of the participants.

I. Agenda

1. Formal opening.
2. Negotiations, including presentation of proposals by the participants, elaboration of measures and procedures for their implementation, in accordance with the provisions of the mandate of the Negotiation on Conventional Armed Forces in Europe.

II. Work Programme

The first plenary of the Negotiation on Conventional Armed Forces in Europe will open in Vienna at 3 p.m. on the Thursday of the week referred to in the section of the mandate on Venue. A work programme for the meetings of the plenary during the first fourteen days of the round is attached. Thereafter, the plenary will agree further work programmes for the remainder of the first round, and for subsequent rounds. A decision on the date for conclusion of the round will be taken at the first plenary.

In 1989, there will in principle be four rounds.

The participants will, in setting their timetable, take due account of the practical needs of all delegations, including those participating in other negotiations within the framework of the CSCE process.

III. Working Methods

With the exception of the formal opening, all business under the agenda will—unless otherwise agreed—be dealt with in closed plenary and in such subsidiary working bodies as are established by the plenary. The work of such subsidiary bodies will be guided by the plenary.

Decisions shall be taken by consensus of the participants. Consensus shall be understood to mean the absence of any objection by any participant to the taking of the decision in question.

The proceedings of the negotiation shall be confidential unless otherwise agreed at the negotiation.

Unless otherwise agreed, only accredited representatives of the participants shall have access to meetings.

During the plenary meetings all participants shall be seated in the French alphabetical order.

IV. Languages

The official languages of the negotiation shall be: English, French, German, Italian, Russian and Spanish. Statements made in any of these languages shall be interpreted into the other official languages.

V. Role of the Chairman

The chairman of the first plenary will be the representative of Poland. The chair thereafter will rotate weekly according to the French alphabetical order.

The chairman of each meeting shall keep a list of speakers and may declare it closed with the consent of the meeting. The chairman shall, however, accord the right of reply to any representative if a speech made following closure of the list makes this desirable.

If any representative raises a point of order during a discussion, the chairman shall give that representative the floor immediately. A representative raising a point of order may not speak on the substance of the matter under discussion.

The chairman shall keep a journal which shall record the date of the plenary, and the names of the chairman of the plenary and of speakers in the plenary. The journal shall be handed from chairman to chairman. It shall be made available only to participants.

VI. Decisions, Interpretative Statements, and Proposals and Related Documents on Matters of Substance

Decisions on matters of substance shall be attached to the journal. Interpretative statements, if any, shall be attached to the journal at the request of the originator.

Formal proposals and related documents on matters of substance and amendments thereto shall be submitted in writing to the chairman and shall be registered at the request of the originator. They shall be circulated in writing to the participants.

VII. Financial Issues

The following scale of distribution has been agreed for the common expenses of the negotiation subject to the reservation that the distribution in question concerns only this negotiation and shall not be considered a precedent which could be relied on in other circumstances:

- 9.95% for France, Federal Republic of Germany, Italy, Union of Soviet Socialist Republics, United Kingdom, United States of America
- 6.25% for Canada
- 5.0% for Spain
- 3.85% for Belgium, German Democratic Republic, Netherlands, Poland
- 2.25% for Czechoslovakia, Denmark, Hungary, Norway
- 0.85% for Greece, Romania, Turkey
- 0.65% for Bulgaria, Luxembourg, Portugal
- 0.15% for Iceland

Payment of contributions by the participants shall be made into a special account of the negotiation. Accounts shall be rendered by the host country in respect of each round or at intervals of 3 months, as appropriate. Accounts shall be expressed in the currency of the host country and shall be rendered as soon as technically possible after the termination of a billing period. Accounts shall be payable within 60 days of presentation in the currency of the host country.

VIII. Host Country Support

The government of Austria shall provide security and other necessary support services for the negotiation.

The host country shall be asked to appoint an administrator, agreed by the participants, to make and manage arrangements for the negotiation. The administrator shall be a national of the host country. The task of the administrator shall include, in liaison with the appropriate host country authorities:

- a. to arrange accreditation for the participants,
- b. to manage the facilities of the negotiation,
- c. to ensure the security of, and control access to, the facilities and meetings,
- d. to employ and manage interpretation staff,
- e. to make available appropriate technical equipment,
- f. to ensure the availability of translation services in all official languages; the practical arrangements for their use being agreed at the negotiation,
- g. to deal with financial matters,
- h. to make available to participants as necessary facilities for press briefings and to arrange appropriate media accreditation.

The administrator shall act at all times in conformity with these rules of procedure. Liaison between the administrator and the plenary will be effected by the chairman.

WORK PROGRAMME

	Thursday	Friday	Monday	Tuesday	Wednesday
a.m.			PL		
p.m.	PL *				

	Thursday	Friday	Monday	Tuesday	Wednesday
a.m.	PL		PL	Information Meeting	
p.m.					

Annex 2

MODALITIES FOR MEETINGS TO EXCHANGE VIEWS AND INFORMATION CONCERNING THE COURSE OF THE NEGOTIATION ON CONVENTIONAL ARMED FORCES IN EUROPE

The participants have, for their part, agreed the following modalities for the meetings which are to be held between participants in the Negotiation on Conventional Armed Forces in Europe and other CSCE participating States.

Unless otherwise agreed, meetings will take place at least twice in the course of each round of the negotiation.

* If further meetings are required in the initial 14 days the plenary will so decide.

Meetings will not be extended beyond the day on which they convene, unless otherwise agreed.

The chair at the first meeting will be taken by the delegation chosen for this purpose by lot. The chair will then rotate among the 35 States represented in alphabetical order according to the French alphabet.

Further practical arrangements may, if necessary, be agreed by consensus, taking due regard of relevant precedents.

Statement of the Representative of Denmark

On behalf of the government of Denmark, I wish to confirm that the Faroe Islands are included in the area of application for the Negotiation on Conventional Armed Forces in Europe.

Statement of the Representative of Norway

On behalf of the government of Norway, I confirm that Svalbard including Bear Island, is included in the area of application for the Negotiation on Conventional Armed Forces in Europe.

Statement of the Representative of Portugal

The islands of Azores and Madeira have by right the status of European Islands. It has been agreed in the mandate that all the European island territories of the participants are included in the area of application. I can therefore state on behalf of my government that the Azores and Madeira are within the area of application for the Negotiation on Conventional Armed Forces in Europe.

Statement of the Representative of Spain

On behalf of the government of Spain, I confirm that the Canary Islands are included in the area of application for the Negotiation on Conventional Armed Forces in Europe.

Statement of the Representative of the Union of Soviet Socialist Republics

On behalf of the government of the Union of Soviet Socialist Republics, I confirm that Franz Josef Land and Novaya Zemlya are included in the area of application for the Negotiation on Conventional Armed Forces in Europe.

This statement will be an Annex to the Concluding Document of the Vienna Meeting and will be published with it.

12. Multilateral arms control efforts

HEINZ GÄRTNER

I. Introduction

After the signing of the US–Soviet INF Treaty in 1987—eliminating all intermediate-range and shorter-range nuclear missiles in Europe—many of the members of the Conference on Disarmament (CD) in Geneva had expected that a convention on chemical disarmament would be concluded by the end of 1988. However, although there was some progress in the negotiations the nations represented at the CD again failed to reach an agreement. Many problems must be solved before a convention can be signed, for example, the need for concrete solutions to the problems of ensuring effective verification, as agreed upon by General Secretary Gorbachev and President Reagan at the Moscow summit meeting on 29 May–2 June 1988.

Concerning nuclear tests, US Secretary of State George Shultz and Soviet Foreign Minister Eduard Shevardnadze signed the Joint Verification Experiment (JVE) Agreement at the Moscow summit meeting. In order to find ways to verify compliance with the 1974 US–Soviet Threshold Test Ban Treaty (TTBT) and the 1976 Peaceful Nuclear Explosions Treaty (PNET), both of which limit underground nuclear explosions to a maximum of 150 kt, observed tests took place in Nevada on 17 August and in Semipalatinsk on 14 September 1988. On the multilateral level, the CD was still unable to reach consensus on a negotiating mandate for a comprehensive test ban.

From the wide agenda of the CD in 1988,¹ this chapter examines the events concerning the chemical weapons convention and the limitation of nuclear tests.

II. Chemical disarmament

Framework

A convention prohibiting the development, production, acquisition, stock-piling, retention, transfer and use of chemical weapons (the CW convention) has been on the arms control agenda since 1969, then together with biological weapons. Since 1971, when a separate convention on biological weapons was worked out, the question of chemical weapons has been independently considered in the multilateral negotiating body in Geneva, and in March 1980 the *Ad Hoc* Working Group on Chemical Weapons of the CD began work on a convention banning chemical weapons. In 1984 the *Ad Hoc* Committee of the CD was set up with a negotiating mandate but without a mandate to draw up the final draft convention. As of April 1988, the Geneva negotiators had worked out general provisions covering many of the major elements of a convention. These have been incorporated in a 'rolling text', that is, the text of

an informal agreement that is expanded and refined from session to session but without legal status until formally agreed upon.²

At the time of writing it was not clear how President Reagan's call at the UN General Assembly in September 1988 for an international conference to discourage the use of chemical weapons would mesh with the Geneva negotiations. The declared aim of the Paris Conference, held on 7–11 January 1989, was to reaffirm the Geneva Protocol of 1925, outlawing the use of chemical weapons, but it was also intended to strengthen the negotiations in Geneva on the possession and manufacture of chemical weapons.³

So far the parties to the Geneva CD negotiations have agreed that a CW convention should: (a) prohibit the acquisition, production, possession and use of chemical weapons; (b) eliminate present stocks and production facilities within a 10-year period (beginning one year after the convention enters into force); (c) control chemical facilities producing toxic chemicals for purposes not prohibited by the convention in order to ensure that no new chemical weapons are produced, while permitting the production of chemicals for non-hostile purposes (industrial, agricultural, research, medical, law enforcement or other peaceful purposes); and (d) set up a consultative committee or general conference to administer and control these undertakings, including verification and inspection (all chemical weapons and facilities would have to be declared to an international verification body).⁴

Bilateral US–Soviet negotiations took place between 1976 and 1980 and have continued since then, in connection with the CD talks. At the 1988 Moscow summit meeting General Secretary Gorbachev and President Reagan agreed on the need for concrete solutions to the problems of ensuring effective verification and undiminished security for all convention participants. The two leaders emphasized the need for close co-ordination on a multilateral basis in order to ensure the participation of all chemical weapon-possessing and chemical weapon-capable states in the convention. Both sides also strongly condemned the dangerous spread and use of chemical weapons in violation of the Geneva Protocol.

Negotiations in the field of chemical weapons have been characterized by increasing emphasis on verification and compliance. The Geneva Protocol, which prohibits the use of chemical and biological weapons, does not provide verification measures.

Since the USSR declared on 6 August 1987 that it would accept challenge on-site inspection with no right of refusal, it seems that the main obstacle to a CW convention has been removed. The adoption of the principle of mandatory challenge inspections in all possible cases after many years of suspicion goes further than the British proposal of 15 July 1986 which, in some limited circumstances, provided alternative arrangements to direct inspection. In November 1987 the USSR declared willingness to exchange data on its chemical weapons and production facilities even before a convention is signed.⁵

New proposals

In February 1988 the USSR proposed a multilateral exchange of data on chemical weapons.⁶ The proposal was first made by the UK in 1983, and in 1987 Australia called for declarations on chemical weapons by all CD members. Under the terms of the Soviet proposal, every state participating in the negotiations should submit, at a time to be agreed upon, information on the size of its stockpiles, past transfers or acquisitions of chemical weapons, technology and equipment for production, the number of production facilities, development laboratories and commercial facilities for the production of key precursors and so forth. In addition, participants should each designate one facility at which a specially established group of international experts could test the procedure of international verification of non-production.⁷

In response to the Soviet proposal the USA echoed British concerns that data on the total size of chemical weapon stocks were not the only important information required—they would also require details of the number and location of Soviet chemical weapon production facilities and storage sites. Much of the information provided by the USA, however, is presented in terms of percentages of the overall stockpile;⁸ additional data on its size would reveal the exact quantities of stocks in each of the depots listed.

An attachment to a US proposal⁹ gave detailed information on each weapon in the US chemical arsenal, which had already been shown to the USSR in November 1987. The USA agreed to data exchange¹⁰ based on an April 1988 proposal from the Federal Republic of Germany,¹¹ which requires multilateral provision of essential data prior to the signing of the convention. The proposal also says that exchanges of additional relevant data could be a matter for bilateral arrangements between interested states. The UK, which also supported the West German proposal, indicated that there was no need for negotiations on data exchange. Each state should provide unilaterally as much data as possible as soon as possible.¹² Hungary declared that expecting all states to provide all their data would not be justifiable in a preliminary data exchange.¹³

At least 20 states have declared that they do not possess chemical weapons.¹⁴ A number of countries known to have significant chemical industries have not yet indicated whether or not they have industrial facilities that would be subject to the convention's monitoring provisions.¹⁵ Two states, the USA and the USSR, have declared that they have chemical weapons. In July 1988, for the first time, the USA officially announced its five chemical weapon production facilities.¹⁶ In August the FRG presented data based on information voluntarily supplied by chemical companies and compiled by the Chemical Industry Association of the FRG.¹⁷ The Netherlands¹⁸ and the UK¹⁹ presented similar data on chemicals to be regulated.²⁰

In the eighth round of US–Soviet bilateral negotiations in March 1988 both sides agreed that future data exchange would be accompanied by three inspections of designated sites per year, and three other inspections. In April 1988 they also agreed on a text on the destruction of production facilities. Previously the USSR had wanted to convert some facilities so that they could

not be used to produce chemical weapons. The joint text did not define a chemical weapon production facility, but it permitted delegates to reach basic agreement on the language in the rolling text leading to a definition. The text excluded small facilities²¹ and permitted a single small-scale facility for production for defensive research.²²

The USSR agreed to include in the agreement the principle of levelling out participants' stocks by the penultimate year of the destruction process,²³ but said that if the convention demanded that countries with the largest stocks destroy their stocks first, it must be known which states had the largest stocks.²⁴ The USA said in April 1988 that it still considers it important that all states possessing chemical weapons begin destruction within a year of the convention entering into force. The rolling text requires all states simultaneously to destroy chemical weapon stocks, beginning not later than 12 months and finishing not later than 10 years after the convention enters into force. A solution should be reached to ensure the continued security of all state parties during the entire destruction period. France wanted its proposal for the right to a security stockpile to be included in the rolling text.²⁵ The CD did not accept this, which provoked a proposal from the USA²⁶ and the USSR²⁷ that all stockpiles be levelled off over eight years, and one from the FRG and Italy that this be done over five years.²⁸ Neither the USA nor the USSR supported the latter proposal.

President François Mitterrand told the UN General Assembly in September 1988 that France would drop its demand for the right to store chemical weapons for 10 years and maintain a production facility, if all countries agreed to close their chemical weapon plants when the convention entered into force and to open them to international inspection. The French plan was originally intended to protect countries without chemical weapons or with only small supplies, which would otherwise be left at the mercy of those with large stockpiles during the 10-year period. Mitterrand also declared French readiness to renounce any possibility of producing chemical weapons as soon as the convention enters into force.²⁹

According to the USA further work is needed on the technical issue of how to compare binary and unitary weapons, on the level at which stockpiles should be levelled off and on whether more than one annual production threshold will be needed, assuming that more states will declare possession of chemical weapons.³⁰

In September 1988 the negotiators agreed to trial inspections before the convention enters into force. They are to begin in 1989 with national trial inspections in several states and, later, continue with inspections of plants by an international team.³¹ Each nation is to conduct inspections of its own facilities on the basis of which guidelines will be prepared for international inspection; these could prove impracticable, however, if different countries propose different inspection methods. The Netherlands³² noted that it had conducted such national trial inspections two years previously; the GDR³³ announced that it would be prepared for a national experiment before the end of the year; Czechoslovakia³⁴ noted its intention to participate; and Bulgaria³⁵ noted that because it does not produce any of the precursors listed in schedule 2 (see

below) it has no installations that would be subject to routine international verification.

Remaining issues

Many unresolved problems remain. No agreement has been concluded on the lists of 'super-toxic lethal chemicals' (schedule 1) and 'key precursors' (schedule 2). The list of 'chemicals produced in large commercial quantities and which could be used for chemical weapons purposes' (schedule 3) also remained incomplete and was difficult to add to. For chemicals already on this list, possible cheating in a future convention cannot be excluded. A fourth schedule was added under which chemicals would be regulated on the basis of their toxicity, regardless of their effectiveness as weapons. It refers to super-toxic lethal chemicals not currently used in chemical weapons and, therefore, not listed in schedule 1. The USA supported such a list as a means of obtaining details of production capacity. The USSR expressed fears that these chemical agents could become weapons in the future. This list would not be necessary if there were a good system of updating and amending the other schedules.

The definition of chemical weapons is one of the issues not yet agreed upon. Chemical weapons include toxic chemicals, munitions and related equipment. The CD has so far failed to distinguish between super-toxic lethal chemicals produced for strictly commercial use and those suitable for military purposes. Rolf Ekeus, former chairman of the *Ad Hoc* Committee, expressed concern: 'An awareness of the missing elements has developed sharply. We do not yet even have an agreed definition of a chemical weapon; similarly, although we define toxicity in terms of toxic to humans or animals, we have not yet defined which animals we mean.'³⁶

There is still no common view on whether and how binary chemical weapons should be covered. The USSR wants to include the component chemicals of binary weapons,³⁷ that is, components which are relatively non-toxic compounds and form a nerve gas only on the way to the target.

Chemical weapon agents can also be characterized according to their intended use. Some parties want riot control agents to be included as chemical weapons; the USA and other states argue that certain military uses of chemicals such as tear gas and herbicides should be permitted. The inclusion of herbicides or riot control agents as chemical weapons is still not decided upon. Similarly, there is no final view on how 'dual-purpose' chemicals, usable for both peaceful and military purposes, should be covered. A variety of chemicals can be used not only as chemical weapons but also in the chemical industry. Many ingredients of poison gases are essential in peaceful applications. Any nation capable of producing chemical pesticides can manufacture some form of poison gas, which means that most armies in the world could have at least crude chemical weapons if their governments decided to produce them.

Other unsolved problems include plants that could easily switch from producing an innocuous chemical to producing a toxic chemical.

Verification

International verification of compliance with and alleged violation of the CW convention would apply to four main areas: (a) declaration of possession; (b) elimination; (c) development, acquisition, transfer, production and non-production; and (d) use of chemical weapons.

Verification remains the most difficult problem with regard to chemical weapons.³⁸ In the past the main obstacle to adequate verification seemed to be getting agreement on on-site inspection, but now that the USSR has accepted challenge inspections with no right of refusal, lack of political will is no longer the problem. It is particularly difficult to verify activities related to chemical weapons because so-called national technical means are unable to verify what is happening inside a building or what agent is contained within a weapon. Many US officials have expressed the opinion that on-site inspection cannot effectively verify a CW convention, because of the possibility of undeclared production or storage sites.³⁹

In April 1988 the USA proposed thresholds for the monitoring regimes of the first three schedules.⁴⁰ Some delegations expressed concern that laboratory amounts of schedule-1 chemicals would not be subject to international monitoring. The USA said that monitoring would be ineffective and that the concern about laboratory synthesis was really a concern about new agents.⁴¹ The USSR proposed that a production threshold be set at 1 ton per year for declared facilities.⁴²

The USA and the other Western countries want to permit an unlimited number of laboratories to synthesize small amounts of chemicals, such as nitrogen mustard, for medical and research purposes. The USSR and the other Eastern countries still call for exceptions to the single small-scale facility for both military and commercial research. The USSR might be open to an alternative approach if the West agreed to stricter verification in laboratories. As a compromise Mongolia suggested that, as a special exception in the convention, the production of nitrogen mustard be allowed outside the small-scale facility, provided that its production facilities be subject to the same stringent verification regime envisaged for the permitted small-scale facility.⁴³ The GDR⁴⁴ suggested that an exception be made for special pharmaceutical needs, and another to cover fundamental research or medical purposes. Verification should guarantee that the products are used only for these purposes. Laboratories should be government-licensed and their production should be declared to the proposed technical secretariat.

The degree of verifiability varies; different activities require different technical means. It will ultimately be difficult to verify the non-production, secret stockpiling and transfer of chemical weapons. Verifying non-production is of limited effectiveness and can only be applied to declared production sites. Sweden⁴⁵ noted that the first stages of research and development of chemicals for weapon use in laboratories cannot be distinguished from legitimate research, for example for environmental protection, industrial safety, medical or agricultural purposes. Verification becomes meaningful only at a stage in the development process at which a violation of the convention might conceivably

be demonstrated. This would hardly be possible before research and development have given way to a pilot-plant or weapon-testing phase.

Clandestine transfer of chemical weapons is fairly difficult to verify, unless production and stockpiling are monitored at the earlier stages. It is fairly easy to verify that declared production facilities are dismantled and that declared stockpiles are destroyed, although the order of destruction is an unresolved problem. If any convention is to be concluded verification of non-production needs to be applicable under many different circumstances and must, therefore, be formulated to allow flexibility. The greater the flexibility, however, the greater the opportunity for loopholes.

Although much has already been done to deal with the problems of commercial and business secrets this type of inspection could prove to be a burden on civilian industry since, in order to prevent the civilian chemical industry from producing chemical weapons, control would have to cover all stages of production.

The 1984 US draft convention⁴⁶ provided for special international inspections that permit unimpeded access to any relevant location or facility owned or controlled by the government of the party concerned, including military facilities. The USA later modified the draft, noting that on-site inspections should take place regardless of the political system of the parties.⁴⁷ According to this amendment, systematic international on-site inspection would include any military location or facility owned by the government of a party and any type of privately owned facility providing goods and services to the government of a party.⁴⁸ Wholly private companies without government contracts may have the right to refuse access for verification because the US Constitution permits a private party to refuse a search of the premises without good cause.⁴⁹ This is a legal problem for private industry not only in the USA but in other countries too. The UK would also like to retain the possibility of refusing access to some areas and providing alternative methods to demonstrate compliance.⁵⁰ The USSR, however, still considered the US proposal discriminatory against parties with state-owned industries.⁵¹ At the December 1987 Washington summit meeting Gorbachev said it was unfair that the USA proposed to ban chemical weapons only at state-owned factories and not private ones.⁵² On 2 February 1988 at the opening of the CD the USSR reiterated this concern.⁵³

Chemical industry representatives from the USA, Canada, Japan and European countries met informally with CD negotiators in Zürich in January 1988 and in Geneva in July 1988.⁵⁴ Several areas in which the chemical industries could advise the negotiators were identified: protection of confidential business information; protocols for inspections; data-reporting methodology for relevant commercial chemicals, including the role of users; technical requirements for an international inspectorate; and monitoring devices and techniques.

In his declaration at the CD on 14 April 1988, Austrian Foreign Minister Alois Mock said that for the purposes of studying the verification requirements of a future monitoring organization and its consequences for the chemical industry, some Austrian chemical enterprises had indicated their interest and readiness to serve as model facilities.⁵⁵

So far, however, the chemical industries have not accepted the idea of unlimited access to their production sites in any country. If a convention should be concluded, the chemical industries would prefer national control with the participation of their experts. For example, chemical manufacturers proposed at a meeting in New York on 19 October to retain only schedule 1 and to keep the inspectors for schedules 2 and 3 out of the plants.⁵⁶ A large number of facilities would remain undeclared. In order to close this 'verification gap', the FRG proposed *ad hoc* checks.⁵⁷ According to this proposal, the international inspectorate would be entitled to carry out routine on-site inspections in all production facilities of the chemical industry, selected at random. Britain and other countries had been discussing a quota system of *ad hoc* checks for undeclared facilities. This would permit inspection of suspicious areas without becoming as controversial as the challenge-inspection procedure.⁵⁸

Some non-aligned countries are concerned about the amount of overseeing required. India, for example, has emphasized the principle of 'universality' and 'non-discrimination': verification measures should not interfere with the development of a peaceful chemical industry for developing countries.⁵⁹ Brazil⁶⁰ and Argentina⁶¹ have repeatedly made similar statements. These countries are rapidly developing their chemical industries and are worried that inspection regimes may harm this development. Some countries would like a requirement that advanced countries provide technical assistance to less-developed countries, similar to the Non-Proliferation Treaty (NPT). The USA resists this on the grounds that a CW convention 'is a security treaty and not a foreign aid agreement'.⁶²

An international verification body

To verify compliance with a CW convention an international verification authority would be needed, with qualified experts and advanced verification technology. Most past proposals for a CW convention supported a combination of national and international verification measures.⁶³ For example, on 25 January 1988 the FRG proposed a system of *ad hoc* checks to verify non-production, in which challenge inspections would be initiated by an international authority.⁶⁴ There seems to be broad agreement on the need for and even the broad structure of an international institutional arrangement. Its detailed composition, procedure and decision mechanisms, however, have yet to be determined.

An international 'consultative committee' or 'general conference' would be composed of representatives of all parties to the convention. It would oversee the destruction and dismantling of declared means of production of chemical weapons and would be empowered to conduct on-site inspections to verify compliance. Since it would only meet annually, a smaller 'executive council' would act on behalf of the committee between its sessions. A 'technical secretariat', to administer and implement the verification process on behalf of the committee, would include an 'international inspectorate'. The rolling text already projects that substantial demands will be placed upon the proposed technical secretariat: 'the international inspectorate shall be part of the

technical secretariat and carry out activities relating to the execution of the international verification measures provided for in this Convention'. A Canadian paper submitted to the CD in March 1988 conducted an initial probe into the resource implications, both in terms of personnel and equipment, that underlie the general language of the rolling text.⁶⁵ No decision has yet been made on a 'fact-finding panel', which would be responsible for conducting inquiries and considering reports on special on-site inspections. National monitoring agencies could assist the consultative committee and implement and verify the provisions of the convention.

In terms of expertise, the executive council would be the most influential authority. Its composition has not yet been decided upon, but, according to earlier proposals, it would be limited to a subset of about 15 parties⁶⁶ (though other numbers have been discussed). This limitation is supported by the complexity of the task. The problem is to find a balance between an adequate and an effective representation.⁶⁷ The USA, the USSR and other major nations want at least the main chemical manufacturing countries to sit on the council as permanent members, supporting the claim that those states which produce or supply chemicals (which include states such as South Africa and South Korea) should be given the highest portion of seats. In effect the states which are responsible for chemical weapon production would control their own facilities. In April 1988 the USA supported the suggestion of the FRG⁶⁸ that further attention should be given to a possible role for a representative of the requesting party in the challenge inspection. After evaluation of the inspection report, the challenging state should notify the executive council as to whether or not it considers a violation to have taken place.

No agreement has been reached as to whether the decisions should be made on the principle of majority or by consensus. India suggested a two-thirds majority for an executive council composed of 6 seats for the West, 6 for the East and 12 for the non-aligned states. Other countries, such as Venezuela, see no reason to contribute to such an organization since they have no chemical weapons and do not wish to share the cost of getting rid of them.⁶⁹

Entry into force

Despite the pronouncements of many diplomats over the years, a CW convention is not just around the corner. Some observers say that another two years are required.

Most countries agree that 60 ratifications would be required. Others, such as the USSR, consider that only 30–40 states need ratify the convention. Egypt proposed that certain key countries, including all those in the so-called 'hot' regions, should become parties simultaneously. The non-accession of some states 'could well be the rock upon which the convention would come to grief'.⁷⁰

Conclusion

There are still a number of formidable obstacles to a CW convention. Verification remains the most thorny problem: it will be difficult to verify the

non-production, secret stockpiling or transfer of chemical weapons. Verification is really only possible in cases where declared production facilities and stockpiles are destroyed. Provisions for the verification of non-production will be less restrictive; states party to the convention might have to accept a low degree of verification reliability and accept more on trust. Some countries have already emphasized the right of refusal of access to certain areas.

The composition of an international verification body remains an open question. It could only conduct verification procedures several years after the signing of the treaty. A CW convention is both a bilateral and a multilateral issue, and progress on both levels can be blocked from either side. Compromise is not always the best solution; in the words of a US statement: 'We do not believe security is compromisable. We are negotiating a treaty to increase our security, not to reach a compromise for the sake of a convention.'⁷¹

III. Nuclear test ban

Framework

A comprehensive test ban (CTB) would prohibit all nuclear testing by all states and in all environments. Advocates of such a treaty, and those of limiting nuclear testing, assert that it would prevent the development and modernization of nuclear weapons and would be an additional obstacle to the acquisition of nuclear weapons by countries which do not have them.

The Reagan Administration has argued that as long as the USA depends on nuclear weapons to keep the peace, old ones need to be replaced by new ones, and the new weapons have to be tested. Another argument the US Government uses to justify the occasional explosion of stockpiled nuclear weapons is to ensure their reliability. One of the most frequently used US Government arguments against a CTB is that it cannot be verified and that the Soviet Union could cheat on a ban and get away with it.

The five acknowledged nuclear weapon states seem to agree that testing is an indispensable part of the development of their new-generation nuclear weapons, and that even the most sophisticated computer simulations are not sufficient for the task. Experts outside the US Government, however, have repeatedly questioned the need for test explosions to ensure the reliability of stockpiled nuclear weapons, saying that a high degree of confidence in the reliability of the existing stockpile is justified and, therefore, explosive testing is simply unnecessary.

Advocates of a low-threshold test ban (LTTB)—with some exceptions, proposing a threshold of about 1 kiloton—say that a ban on larger nuclear explosions would allow research testing to continue while precluding the larger detonations considered necessary to develop new generations of nuclear weapon. A September 1988 US Government report determined that a low limit of 10 kt is 'almost certainly' unacceptable.⁷² Experts of the Lawrence Livermore National Laboratory verification team expressed concerns about an LTTB because explosions of 1–3 kt are very significant for weapon development.⁷³

Development of negotiations

At the 1988 Moscow summit meeting, General Secretary Gorbachev and President Reagan reaffirmed a commitment to conduct full-scale, stage-by-stage negotiations on the issues relating to nuclear testing. A mandate for these talks was agreed upon in the autumn of 1987. As a first step the two sides agreed to seek effective verification measures that would enable ratification of the TTBT and the PNET. They would then proceed to negotiate towards further limitations on nuclear testing, which could lead to the ultimate objective of complete cessation of nuclear testing as part of an effective disarmament process.

A step-by-step approach to banning nuclear tests was introduced by Japan in 1984 and the Netherlands in 1985. This approach was criticized since it would not preclude the modernization of nuclear weapons and might delay a CTB. Additionally, it could be interpreted as 'legitimizing' a certain number of nuclear explosions below an agreed threshold. At the 43rd UN General Assembly the neutral states that voted in favour of a CTB (Austria, Finland, Ireland and Sweden) were among the 21 states that abstained, as in previous years, on a resolution to convert the 1963 Partial Test Ban Treaty (PTBT) into a CTB.⁷⁴ They did not want to change existing treaties which work successfully and did not see amending the PTBT as an appropriate route to a CTB. On the one hand, a gradual approach to a CTB gives both sides time to learn to deal with technical problems. On the other hand, it may become an excuse for not achieving a CTB.

The Geneva CD has so far failed to establish a negotiating mandate for an *Ad Hoc* Committee on a CTB and could not reach consensus on the mandate recommended by the 1986 UN General Assembly. The non-aligned members of the CD, supported by the socialist delegations, insist on a negotiating mandate, whereas the USA only accepts a non-negotiating mandate. On 19 April 1988 the group of 21 introduced a draft mandate for an *Ad Hoc* Committee⁷⁵ 'with the objective of carrying out the multilateral negotiation of a comprehensive nuclear test ban treaty'. The *Ad Hoc* Committee would set up two Working Groups to deal with interrelated topics, the first to deal with the contents and scope of the treaty, and the second to focus on compliance and verification questions. The USA said that the mandate was not new but had been introduced in July 1987⁷⁶ and noted that the Western countries had already indicated that they could not accept it. The West continued to support its own draft mandate⁷⁷ which, Australia noted, called for 'substantive examination of specific issues relating to a comprehensive test ban including the issue of scope as well as those of verification and compliance with a view to negotiation of a treaty on the subject'. It also requested the CD 'to examine the institutional and administrative arrangements necessary for establishing, testing, and operating an international seismic monitoring network as part of an effective verification system'.⁷⁸ The USSR renewed its suggestion of 1987⁷⁹ to establish a special group to prepare proposals on verification, including methods other than teleseismic.⁸⁰

The *Ad Hoc* Group of Scientific Experts, set up by the CD to 'consider

international co-operative measures to detect and identify seismic events', continued to discuss exchange of waveform (Level II) data (i.e., original recordings) and parameter (Level I) data and the processing of such data at international data centres. This co-operative international effort would have three elements: (a) systematic improvement of the observations reported from a global network of more than 50 seismological observatories; (b) international exchange of these data over the global telecommunications system of the World Meteorological Organization; and (c) processing of the data at special international data centres for the use of participating states.

The overall purpose of such an international verification system is to assist verification by states party to a test ban treaty by providing data collection on a global scale.⁸¹ In the envisaged global system, national seismic data centres in the participating states would transmit data to international data centres, which would in turn send back the resulting information. 'Warm-up' experiments started in autumn 1988.⁸²

In a joint verification project the Soviet Academy of Sciences and the Natural Resources Defense Council (NRDC), a private US group, take seismological measurements around the principal nuclear weapon test sites in the USA and the USSR. This project will support international Level-II seismic data exchange. No regular exchange of views or contacts between the Geneva experiment and the NRDC has yet been established, but data from the project are currently available to the seismological community.

An international verification body

A verification system for nuclear test limitation would ideally be controlled by an international body. Such a political body does not yet exist, however; and the participating countries are not yet decided upon.

According to the discussions within the CD, an institutional verification structure would consist of three organs. A consultative committee of parties to the treaty would be responsible for political decision making, an executive group would conduct the business of the committee between meetings and a committee of experts would be responsible for all scientific/technical aspects of the monitoring system. In the transitional period, the *Ad Hoc* Group of Scientific Experts of the CD should supervise the implementation of the system, recommend improvements in the seismic equipment, and co-ordinate the work of the national and international data centres and the World Meteorological Organization.

Conclusion

Several experiments, such as the NRDC-Soviet Academy of Sciences project, have proved that technical implementation of verification is not the main obstacle to a treaty. Verification of an LTTB appears to be well within the capabilities of present seismic monitoring technology.⁸³ Neither science nor technology stand in the way of a mutually verified agreement to limit testing; the problems are political. The main political obstacle to the conclusion of a

CTB is that some nuclear weapon countries would find it undesirable as long as they claim to depend on nuclear weapons for national security and international stability. As long as there are nuclear weapons, the governments which have them may see a need to conduct tests to maintain and modernize the stockpile.

IV. Obstacles to and opportunities for a CW convention and a CTB

The main obstacles to the conclusion of CTB agreement are not of a technical but of a political nature. If an agreement were concluded to limit nuclear tests, the verification opportunities for a sort of 'advanced' or 'low-threshold' test ban are considerable.

The obstacles to the conclusion of a CW convention, however, now include more technical aspects. Although there are still political differences to be resolved before the conclusion of a treaty both definition and verification still present a number of important technical problems.

A CW convention would demand, and a CTB would best be served by, a multilateral verification system.

Notes and references

¹ The CD agenda in 1988 covered the nuclear test ban; cessation of the nuclear arms race and nuclear disarmament; prevention of nuclear war, including all related matters; chemical weapons; prevention of an arms race in outer space; effective international arrangements to assure non-nuclear-weapon states against the use or threat of use of nuclear weapons; new types and systems of weapons of mass destruction and radiological weapons; the comprehensive programme of disarmament; consideration and adoption of (a) the special report to the third UN special session devoted to disarmament; and (b) the annual report to the 43rd session of the UN General Assembly. See the Report of the Conference on Disarmament to the General Assembly of the United Nations, Conference on Disarmament document CD/875, 20 Sep. 1988.

² Bracketed words and phrases in the rolling text signify lack of consensus in many areas. The latest version of the rolling text for the preliminary structure of a CW convention is contained in Conference on Disarmament document CD/874, 12 Sep. 1988.

³ See also chapter 4 in this *Yearbook*.

⁴ Outlined in Conference on Disarmament document CD/727, 1986, appendix.

⁵ Deputy Head of UN Delegation V. F. Petrovsky at a press conference in Moscow on 10 Nov. 1987, quoted in *Krasnaya zvezda*, 11 Nov. 1987 (in *FBIS-SU*, 11 Dec. 1987).

⁶ Conference on Disarmament document CD/808, 18 Feb. 1988.

⁷ DC/1525 (CD press release), 18 Feb. 1988.

⁸ Conference on Disarmament document CD/711, 1986.

⁹ Conference on Disarmament document CD/830, 19 Apr. 1988.

¹⁰ Text from the US mission, in *Arms Control Reporter*, 29 Apr. 1988, pp. 704.B. 287-88.

¹¹ Conference on Disarmament document CD/828, 12 Apr. 1988 and DC/1542 (CD press release), 14 Apr. 1988.

¹² DC/1544 (CD press release), 19 Apr. 1988.

¹³ DC/1536 (CD press release), 15 Mar. 1988.

¹⁴ According to Soviet calculations over 20 countries have stated this; see Conference on Disarmament document CD/PV. 448, 15 Mar. 1988. For a list of states that have made such declarations to the CD, see chapter 4 in this *Yearbook*.

¹⁵ According to US Ambassador Max Friedersdorf, in *Wall Street Journal*, 29 July 1988. Conference on Disarmament document CD/PV.482, 15 Sep. 1988.

¹⁶ Rocky Mountain Arsenal, Colorado; Newport Army Ammunition Plant, Indiana; Pine Bluff Arsenal, Arkansas; Muscle Shoals, Alabama; Aberdeen Proving Ground, Maryland. Conference on Disarmament document CD/849, 28 July 1988.

¹⁷ DC/1567 (CD press release), 16 Aug. 1988.

¹⁸ Conference on Disarmament document CD/CW/WP.203, 10 Aug. 1988.

¹⁹ Conference on Disarmament document CD/CW/WP.206, 10 Aug. 1988.

²⁰ These data were on chemicals listed in schedules 2 and 3. The chemicals to be regulated will be subject to different verification regimes according to four schedules, details of which can be found in the rolling text. The problem of reaching agreement on the schedules is discussed here under the heading 'Remaining issues'. See also Conference on Disarmament document CD/PV.474, 16 Aug. 1988.

²¹ Facilities that could synthesize no more than 1–2 metric tonnes.

²² Included in Appendix II of Conference on Disarmament document CD/831, 27 Apr. 1988.

²³ Conference on Disarmament document CD/PV.448, 15 Mar. 1988.

²⁴ DC/1544 (CD press release), 4 Apr. 1988.

²⁵ Conference on Disarmament document CD/757, 1987; DC/1525 (CD press release), 18 Feb. 1988.

²⁶ Text from US mission in *Arms Control Reporter*, 27 Apr. 1988, p. 704.B.282.

²⁷ Conference on Disarmament document CD/CW/WP.211 (the Soviet response to the French proposal).

²⁸ Conference on Disarmament document CD/822. See also documents CD/791 and CD/792, 25 Jan. 1988.

²⁹ Statement by President Mitterrand at the 43rd Session of the General Assembly of the United Nations on 29 Sep. 1988.

³⁰ Text from US mission, *Arms Control Reporter*, 14 Apr. 1988, p. 704.B.284–285.

³¹ Conference on Disarmament document CD/CW/WP.213, 19 Sep. 1988.

³² Conference on Disarmament document CD/PV.481, 13 Sep. 1988.

³³ Conference on Disarmament document CD/PV.481, 13 Sep. 1988.

³⁴ Conference on Disarmament document CD/477, 25 Aug. 1988.

³⁵ Conference on Disarmament document CD/PV.478, 30 Aug. 1988.

³⁶ Quoted in *Arms Control Reporter*, 28 Mar. 1988, p. 704.B.277.

³⁷ DC/1120 (CD press release), 10 Mar. 1983. Conference on Disarmament document CD/636, 1985.

³⁸ See also chapter 4 in this *Yearbook*.

³⁹ US officials argue that any global ban on chemical weapons cannot be fully verified despite the fact that the USSR accepted challenge on-site inspections of undeclared production sites; *New York Times*, 16 Nov. and 11 Dec. 1987; The Commission on Integrated Long-Term Strategy, *Discriminate Deterrence* (US Government Printing Office: Washington, DC, Jan. 1988), p. 42 said that 'A ban on chemical weapons could not be verified'; *Washington Post*, 9 Jan. 1988; James Leonard, former US Ambassador to the CD 1969–71, in *Arms Control Reporter*, 28 Mar. 1988, pp. 704.B.278–79; *Newsweek*, 16 Jan. 1989.

⁴⁰ Conference on Disarmament document CD/802, 29 Apr. 1988. Below 100 grams no inspection, no notice and no data reporting would be required.

⁴¹ Conference on Disarmament document CD/PV.482, 15 Sep. 1988.

⁴² Conference on Disarmament document CD/PV.448, 3 Mar. 1988.

⁴³ Conference on Disarmament document CD/PV.477, 23 Aug. 1988.

⁴⁴ Conference on Disarmament document CD/PV.481, 13 Sep. 1988; and Conference on Disarmament document CD/CW/WP. 195, 22 Mar. 1988.

⁴⁵ Conference on Disarmament document CD/PV.481, 13 Sep. 1988.

⁴⁶ Conference on Disarmament document CD/500, 1984.

⁴⁷ Compare Goldblat J., 'Multilateral arms control efforts', SIPRI, *SIPRI Yearbook 1987: World Armaments and Disarmament* (Oxford University Press: Oxford, 1987), p. 386.

⁴⁸ Conference on Disarmament document CD/685, 1986.

⁴⁹ Lynn Hansen, Assistant Director of the US Arms Control and Disarmament Agency presentation on 22 Nov. 1988 at the Institute for East–West Security Studies.

⁵⁰ Outline of the convention, in *Arms Control Reporter*, 28 Apr. 1988, p. 704.D.124.

⁵¹ DC/1520 (CD press release), 2 Feb. 1988.

⁵² *Boston Globe*, 11 Dec. 1987.

⁵³ DC/1520 (CD press release), 2 Feb. 1988; *Isvestiya*, 2 Feb. 1988, in *FBIS-SU*, 2 Feb. 1988.

⁵⁴ Conference on Disarmament document CD/PV.469, 22 July 1988.

⁵⁵ DC/1542 (CD press release), 14 Apr. 1988. Mock repeated this suggestion in his statement at the United Nations General Assembly's Third Special Session on Disarmament, New York, 2 June 1988; see UN document A/S-15/PV.5, 3 June 1988. He mentioned neither the number nor the names of the factories nor the kind of chemicals they are producing. Furthermore, Mock did not refer to it in his statement at the 43rd Session of the UN General Assembly, 30 Sep. 1988; see

UN document A/43/PV.13, 4 Oct. 1988. One Austrian factory has already refused a trial inspection on the grounds of 'espionage': see *Standard*, 11 Jan. 1988.

⁵⁶ *Arms Control Reporter*, 19 Oct. 1988, pp. 704.B.321-22.

⁵⁷ Conference on Disarmament document CD/869, 6 Sep. 1988. See also Conference on Disarmament document CD/791 and CD/792, 25 Jan. 1988.

⁵⁸ *Arms Control Reporter*, 20 Sep. 1988, p. 704.B.311.

⁵⁹ DC/1545 (CD press release), 21 Apr. 1988.

⁶⁰ See, for example, DC/1500 (CD press release), 1987.

⁶¹ See, for example, DC/1530 (CD press release), 8 Mar. 1988.

⁶² *Arms Control Reporter*, 28 Mar. 1988, pp. 704.B.277-78.

⁶³ See, for example, British working paper, Conference on Disarmament document CD/244, 1982.

⁶⁴ Conference on Disarmament document CD/791, 25 Jan. 1988.

⁶⁵ Conference on Disarmament document CD/823, 31 Mar. 1988.

⁶⁶ For example, the US proposal, see Conference on Disarmament document CD/500, 1984.

⁶⁷ See Sims, N. A., *International Organization for Chemical Disarmament*, SIPRI Chemical and Biological Warfare Series no. 8 (Oxford University Press: Oxford, 1987).

⁶⁸ Conference on Disarmament document CD/CW/WP.191, 11 Mar. 1988.

⁶⁹ *Arms Control Reporter*, 28 Mar. 1988, p. 704.B.279.

⁷⁰ Conference on Disarmament document CD/PV.480, 6 Sep. 1988.

⁷¹ Conference on Disarmament document CD/PV.448, 15 Mar. 1988.

⁷² Office of the President, *Relationship Between Progress in Other Areas of Arms Control and More Stringent Limitations on Nuclear Testing* (Executive Office of the President: Washington, DC, Sep. 1988), 7 pp. Cited in *New York Times*, 30 Sep. 1988.

⁷³ *Report of the Verification Technology Information Centre of London (VERTIC)*, 2/88, London, 29 Jan. 1988.

⁷⁴ UN Resolution 43/63/B, 7 Dec. 1988. Abstaining countries: Australia, Austria, Belgium, Canada, Denmark, Finland, FRG, Greece, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Turkey. Against: France, UK, USA.

⁷⁵ Conference on Disarmament document CD/829, 19 Apr. 1988.

⁷⁶ Conference on Disarmament document CD/772, 1987.

⁷⁷ Conference on Disarmament document CD/521, 1984.

⁷⁸ DC/1545 (CD press release), 21 Apr. 1988.

⁷⁹ DC/1498 (CD press release), 1987.

⁸⁰ DC/154 (CD press release), 12 Apr. 1988.

⁸¹ Dahlman, O., 'Verification of a Nuclear Test Ban', in ed. H. Spitzer, *Scientific Aspects of the Verification of Arms Control Treaties, Part I, Nuclear and Chemical Weapons* (Institut für Friedensforschung und Sicherheitspolitik: Hamburg, 1987), p. 26.

⁸² Conference on Disarmament document CD/818, 18 Mar. 1988 and DC/1535 (CD press release), 24 Mar. 1988.

⁸³ The issue of verifying low-level testing is covered in Goldblat, J. and Cox, D. (eds), *SIPRI, Nuclear Weapon Tests: Prohibition or Limitation* (Oxford University Press: Oxford, 1988).

Part IV. Special features

**Chapter 13. Conflict resolution in 1988:
the role of the United Nations**

**Chapter 14. The SIPRI 1988 Olof Palme Memorial Lecture—
'Arms control and arms reduction: the agenda ahead'**

13. Conflict resolution in 1988: the role of the United Nations

BRIAN URQUHART

I. Overview of events in 1988

In 1988 *détente* emerged as a key theme in international politics. The Soviet announcement in February that Soviet forces would begin their withdrawal from Afghanistan seemed to lend impetus to the peaceful management of other conflicts around the globe. In subsequent months, several protracted regional conflicts began winding down. In March 1988, there was a cease-fire in Nicaragua; in July, after almost eight years of turbulent and bloody warfare, Iran and Iraq agreed to end hostilities. In August, a sudden breakthrough occurred in one of Africa's longest conflicts in Angola and Namibia. Also in August, Morocco and the Polisario Front accepted in principle a peace plan to end 13 years of conflict in the Western Sahara. Turkish and Cypriot leaders went back to the conference table; and there were promising moves concerning the future of Kampuchea.

Long-time adversaries have undertaken a series of diplomatic initiatives to restore ties severed for decades. A summit meeting is scheduled for 1989 between the USSR and China, and there is a move to resume diplomatic dialogue between the USSR and Israel. There is also talk of restoring relations between India and China and between North and South Korea. South Africa is pushing for better ties with neighbouring African states, and Viet Nam for better relations with the United States. Libya and Chad, after a 15-year war, have restored diplomatic relations. The year ended with the announcement by the United States that it would engage in substantive dialogue with the Palestine Liberation Organization (PLO) on peace in the Middle East.

II. Improved US-Soviet relations: catalyst for change

One compelling element in the improvement of the international climate is the change in US-Soviet relations. A warming trend between the two superpowers is undoubtedly a crucial factor in creating a global context in which peaceful settlement of disputes can take hold—and survive: a climate in which the United Nations Security Council may work more effectively. Against a backdrop of summit meetings since 1985, General Secretary Gorbachev and President Reagan have made significant progress in developing a framework for positive dialogue between the two nations. In 1988, the two powers reached significant substantive agreements in the areas of arms control, regional policy and bilateral co-operation. They ratified the 1987 INF Treaty,¹ a focal point of controversy between the United States and the Soviet Union for nearly a decade, and have taken preliminary steps in the Strategic Arms Reduction Talks (START) towards an agreement to reduce strategic nuclear arsenals by

50 per cent. Moscow and Washington are also committed to talks on, among other things, conventional force reductions in Europe.

At the Moscow summit meeting of 29 May–2 June 1988, Ronald Reagan and Mikhail Gorbachev agreed to discuss a broad range of divisive issues that included problems of conflict in South Asia, the Middle East, Central America and Southern Africa.² As 1988 drew to a close, the two leaders, together with President-elect George Bush, met a fifth time for informal talks. Gorbachev took the opportunity of an address to the UN General Assembly on 7 December 1988³ to announce a unilateral Soviet withdrawal over the next two years of 50 000 men and 10 000 tanks from Europe. When compared with the rancorous disagreement that has tended to characterize recent US–Soviet relations, such events are indeed ‘cause for shaking the head in wonder’, to borrow a phrase from President Reagan’s final speech to the General Assembly on 26 September 1988.⁴

III. Soviet foreign policy and the trend towards peace

Much of the improvement in the international climate must be credited to General Secretary Gorbachev’s active diplomacy and his drastic reformulation of Soviet foreign policy. Gorbachev’s bold proposals for ‘new rules of coexistence’ were set out in his statement of 17 September 1987⁵ in which he called for an expanded United Nations role to deal more effectively with international problems. Moscow’s shift of direction in regional policy was demonstrated in a practical manner by its military pull-back in Afghanistan, its encouragement of the projected Vietnamese withdrawal from Kampuchea, and its support, especially with Angola and Cuba, of the US-sponsored negotiations on Namibia and Angola.

Gorbachev’s foreign policy changes reflect a recognition of the general proposition that prolonged regional wars with no foreseeable conclusive military outcome have become a costly proposition for all concerned. They are particularly devastating to the economies of Third World countries in conflict areas, where manpower and budget allocations for defence take priority over essential social and economic development. Unilateral involvement of either of the superpowers in such regional conflicts has also proved to be politically and financially expensive for the superpowers as well as exacerbating the regional conflict itself. All of these elements have presumably played a part in new Soviet thinking and policy in the United Nations.

IV. US foreign policy and the trend towards peace

US foreign policy has also figured prominently in shaping recent international developments, which to a certain extent reflect the realization of certain established policy objectives. Western proposals on intermediate-range nuclear missiles, for example, are long-standing, and peace processes in Angola and Kampuchea have begun on terms close to those long sought by Washington. President Reagan has from the beginning emphasized the importance to East–West relations of direct dialogue and negotiation on

regional issues. In 1984, regional problems were discussed at both the summit and ministerial levels, and in 1985, at their first summit meeting, President Reagan told General Secretary Gorbachev that 'Soviet-fueled regional conflicts stood in the way of good superpower ties'.⁶ The USA—no doubt caught in the tension between hope and scepticism—has tended to be slow to respond to Moscow's radical shifts in international and regional policy.

V. The UN and the trend towards peace

The new prominence and success of the United Nations in dealing with regional conflicts have certainly owed much to the improving relations of the superpowers, but they are also the long-awaited yield of seeds planted by the Secretary-General in the unproductive era of the early and mid-1980s. Despite the vagaries of global politics, the UN Organization and its Secretary-General have made constant and committed efforts to unravel some of the world's most intractable conflicts. UN peace-keeping forces in regional hot-spots have made a major, if sometimes unnoticed, contribution to reducing international tensions—for which they were awarded the 1988 Nobel Peace Prize. Conflicts where at least the hostilities have ceased—Afghanistan, Iraq–Iran, Namibia, Western Sahara and Cyprus—have been major items on the Secretary-General's negotiating programme for many years past. The role of the Secretary-General as an impartial honest broker with whom governments in conflict can negotiate without losing face has never been more important. The Secretary-General's close relationship with a newly unanimous Security Council greatly enhances this role.

Thorough familiarity with all aspects of each regional situation and good diplomatic positioning have enabled the Secretary-General to act immediately to begin the negotiating process once an opportunity presents itself. The Soviet pull-back from Afghanistan, for example, came after many years of UN-sponsored talks and is on a schedule and under an agreement negotiated by the Secretary-General and his Personal Representative.⁷ In the Iraq–Iran conflict, the 10-point proposal of UN Security Council Resolution 598 (20 July 1987) and subsidiary proposals by the Secretary-General provide the framework both for the cease-fire and for ongoing negotiations on a settlement. In Angola, talks held under US auspices are expected to lead to independence for Namibia on the basis of UN Security Council Resolution 435 (29 September 1978). A joint plan of the Organization for African Unity (OAU) and the UN⁸ for the Western Sahara provides the basis for negotiations which will be overseen by a special UN mediator and for an internationally supervised referendum. In Cyprus, promising signs for a negotiated settlement follow many years of intensive good offices by the Secretary-General,⁹ while the situation on the ground is stabilized by the United Nations Peacekeeping Force in Cyprus (UNFICYP).

The Office of the Secretary-General has increasingly become an invaluable third-party negotiator in sensitive or controversial issues. A negotiating process is an important stabilizing element in any conflict situation and provides some protection against escalation and outside interference even if it

does not immediately solve the basic problem. It also tends to discourage extremism and encourage moderate elements. The Secretary-General's good offices have also proved particularly useful in a situation involving one of the superpowers—as, for example, in Afghanistan. It must be noted, however, that the Israeli-Arab-Palestinian problem has so far proved totally resistant to such efforts.

In Africa, the Secretary-General and his aides were joint mediators (with the OAU) in the Western Sahara conflict between Morocco and the Popular Front for the Liberation of Saguia el Hamra and Rio de Oro (POLISARIO). Elsewhere, the Secretary-General has tried to avert the eruption of an open international dispute between India and Sri Lanka over the guerrilla war being waged by the Tamil minority. The Secretary-General and his representative¹⁰ have been actively engaged in negotiations involving Kampuchea and East Timor.

VI. Enhanced effectiveness of the UN

Improved relations between the superpowers and an expressed willingness by both powers to use the United Nations as an instrument for peace considerably enhance the possibility for the UN Organization to be used as its founders intended—as a centre for harmonizing the actions of nations in the attainment of common ends. Renewed interest by both leaders in the world body, reflected by their statements on the need to place strong emphasis on strengthening the United Nations in particular and international organization in general, comes after a long period in which multilateralism figured only marginally in the foreign policy of the great powers, subordinated in most instances to bilateral concerns and to short-term national interests. The trend away from multilateralism was particularly marked in the early years of the Reagan Administration, which apparently perceived the United Nations as hostile to the interests of the United States. In his final speech to the 43rd General Assembly on 26 September 1988, however, Reagan praised the United Nations and called for a larger role for international institutions: 'The United Nations is a better place than it was eight years ago and so too is the world. . . . We see not only progress, but also the potential for an increasingly vital role for multilateral efforts and institutions like the United Nations.'¹¹ The theme of a stronger United Nations has received special emphasis from Gorbachev, who in his 17 September 1987 statement¹² urged that the Security Council play a more active role in settling conflicts and that UN peace-keeping capabilities be strengthened. Gorbachev also suggested the reactivation of the Military Staff Committee of the Security Council—the linchpin of the system of peace enforcement envisaged in the Charter¹³—in resolving regional issues, and made unprecedented payments of arrears in contributions to peace-keeping after years of non-payment. The USA has also made partial payment of arrears and a promise to pay up on its assessed contribution.

Renewed superpower confidence in the international system is further evidenced by Gorbachev's suggestion that the five permanent members of the Security Council should accept the binding jurisdiction of the International

Court of Justice (ICJ) in mutually agreed areas of international law.¹⁴ The Reagan Administration—which argues that the Court should not rule in instances involving the use of force—has also indicated interest in a larger role for the ICJ in certain specified areas of international law.¹⁵

VII. Lack of superpower co-operation and effectiveness of the UN

The Security Council

The ability of the United Nations to play an effective role in resolving regional conflicts is directly related to the relationship between the major powers and their commitment to international organization. In their roles as major actors on the world stage for the past four decades, the United States and the Soviet Union have had a profound impact on the environment of peace and security. Disagreement between these two world powers has been a dominant and troubling theme in the history of the United Nations, especially in the Security Council, the organ bearing the 'primary' responsibility for the maintenance of international peace and security, and has often paralysed UN efforts to bring about peace. The founders of the United Nations apparently hoped that the allies of World War II would co-operate in peace as they had in war. Only a short time after its inception, however, the United Nations, intended as a forum for peaceful settlement, became an arena of ideological struggle. Growing doubts about the ability of the Organization to function effectively were often the direct, though seldom admitted, outcome of East-West antagonism.

Lacking the basic consensus needed to do its work effectively, the Security Council was diverted from its primary purpose as the major international organ for peace and security. Instead of acting to prevent conflict, it was usually able to step in only after fighting had begun, to prevent further escalation. The work of the Organization was often further complicated by the indirect involvement of the superpowers in regional conflicts with which it was trying to deal. Such regional conflicts were sometimes effectively 'proxy wars'—waged by local forces armed and encouraged by rival superpowers.

Despite these limitations, the United Nations has played a useful role especially in avoiding the worst—a nuclear confrontation between the superpowers. It has also often been effective in containing and de-escalating regional conflicts. The inability of the Security Council to perform as prescribed in Chapters VI and VII of the UN Charter has given rise to other expedients of a more or less improvised nature designed to de-escalate and contain conflict—peace-keeping, good offices, conciliation, a much larger role for the Secretary-General, and the general process of time-gaining and face-saving which have often assisted governments in a crisis to change course to a less violent and dangerous direction.

The Secretary-General

The absence of consensus in the Security Council, the major political organ of the UN Organization, has both increased the Secretary-General's political workload and seriously hampered some of his efforts. Although empowered by Article 99 of the UN Charter to bring to the attention of the Security Council matters which may threaten international peace and security, the Secretary-General has exercised this right relatively seldom. In order to be effective, a Secretary-General must have the support and co-operation of the major powers and the non-permanent members of the Security Council as well as a reasonable degree of co-operation from the parties in conflict. To invoke Article 99 without such support very often means alienating the very powers whose co-operation he seeks, and thereby reducing or destroying his usefulness as a negotiator.

In his first annual report to the General Assembly in 1982,¹⁶ Secretary-General Perez de Cuellar addressed the problem of the effect of the various political influences impinging on the work of the Security Council and the failure of that organ to be preventive rather than merely reactive. He said that the Council should develop a more effective means of fact finding and data gathering in order to respond to crises as they develop, not after hostilities have already started. Further, he suggested a more systematic and forthright role for the Secretary-General 'in bringing potentially dangerous situations to the attention of the Council' and the world community.¹⁷ He also asked for swifter procedures for establishing a UN presence in potential conflict areas, and for member governments to strengthen their support for UN peace-keeping operations.

The present political climate would seem to make these recommendations a practical possibility. Indeed, in 1988 the Soviet Union put forward proposals for action on most of them.¹⁸

How far the improvement of the international climate has affected the treatment of actual international disputes can best be judged by the following brief account of five such cases.

VIII. The international climate and conflicts

Afghanistan

On 5 January 1980, the UN Security Council was called into session to consider the situation in Afghanistan, following Soviet military intervention in late December 1979. Afghanistan, declaring it had invited the Soviet Union for protection against 'foreign threats', objected to the Security Council taking the matter under consideration. A Soviet veto prevented the adoption of a draft resolution condemning the action and calling for the immediate and unconditional withdrawal of foreign troops. On 14 January 1980, the General Assembly, at an emergency special session called by the Security Council, voted overwhelmingly for the immediate and unconditional withdrawal of foreign troops, the first of many similar resolutions in the years to follow.

The diplomatic process leading to negotiation on the situation in Afghanistan began in February 1981, when Javier Perez de Cuellar, then Under-Secretary for Special Political Affairs, was appointed Personal Representative of the Secretary-General on Afghanistan. He travelled twice to Kabul and Islamabad for preliminary consultations on the content and format of the negotiations.

After his appointment in 1982 as Secretary-General, Perez de Cuellar appointed Diego Cordovez, an Ecuadorean Secretariat official, as his successor as Personal Representative. In April, Cordovez went to Kabul and to Islamabad, the first leg of shuttle diplomacy that would carry him in the following six years to Kabul, Islamabad and Tehran, as well as to Moscow and Washington. At these meetings, agreement was reached on a basis for future discussion. The four issues accepted for consideration were: (a) withdrawal of foreign troops; (b) non-interference in the internal affairs of states; (c) international guarantees; and (d) voluntary return of refugees. Because these issues were interrelated, a comprehensive settlement was essential. During 1982 and 1983, Cordovez engaged in consultations and served as intermediary between the interlocutors in indirect negotiations. In August 1984, the group began 'proximity' talks, also through the intermediary of Cordovez.

Three rounds of talks were held in 1985. Following the June 1985 round, draft declarations on international guarantees were conveyed to the governments of the Union of Soviet Socialist Republics and of the United States of America, which appointed two high-level officials to carry out regular discussions with Cordovez during the negotiations. Before the end of the year, both governments had agreed in principle to act as co-guarantors. In August 1985, however, an impasse developed regarding the format of discussions.

Although three rounds of proximity talks in 1986 significantly advanced the process toward settlement, by the end of the year certain essential elements remained unresolved, one of which concerned the time-frame for withdrawal of Soviet troops. Several rounds of talks in 1987 significantly narrowed the gap in positions on the time-frame. Following consultations in Washington after the 1987 US-Soviet summit meeting, Cordovez resumed intensive negotiations between Islamabad and Kabul.

Events began to move quickly in 1988. On 8 February, Gorbachev declared that Soviet troops would begin to leave Afghanistan on 15 May, and would complete their withdrawal within 10 months of a settlement being reached in UN-sponsored peace talks. The Soviet leader said that his latest offer was contingent on an agreement being signed in Geneva no later than 15 March. On 2 March, following three weeks of intensive consultations, Cordovez convened a new round of proximity talks in Geneva. On 8 April 1988, talks ended. The Geneva Accords¹⁹ were signed on 14 April; they entered into force on 15 May, and troop withdrawals began.

The conclusion of the Geneva Accords is the first instance of the world's two most powerful states becoming co-guarantors of an agreement negotiated under the auspices of the Secretary-General. The negotiations offer a compelling example of an exceedingly difficult and long, step-by-step process

of UN conflict resolution in a situation in which others could not or did not wish to act.

Immediately after the settlement, the United Nations Good Offices Mission for Afghanistan and Pakistan (UNGOMAP) came into being. Although technically not a peace-keeping operation but an extension of the Secretary-General's good offices, UNGOMAP is currently monitoring the implementation of the Geneva Accords, including the withdrawal of foreign troops from Afghanistan. In the framework of the UN accord, the Soviets are due to end their eight and one-half years' presence in Afghanistan on 15 February 1989.

Negotiations in various forms, including efforts by the Secretary-General, continue in the effort to define the nature of a political settlement which would allow all the people of Afghanistan to address the appalling problem of repatriation and reconstruction. A massive United Nations operation for this purpose (Operation Salam) is being conducted under the leadership of Prince Sadruddin Aga Khan.

Iraq-Iran²⁰

The Iraq-Iran War has been an important test of the limits of the capacity of the United Nations, and especially of the Security Council, to maintain international peace and security. The conflict has demonstrated once again that the activities of the Security Council cannot be insulated from the relations between its permanent members nor from the foreign policy objectives of any one of its members. It has also underlined the fact that the effectiveness of the United Nations in stabilizing situations of conflict depends on the attitudes of the parties to the dispute as well as of the members of the Security Council.

At the outset of the war there was little or no co-ordinated effort by the five permanent members of the Council. In September 1980, following a long period of tension and border clashes, Iraq invaded Iran, and open hostilities broke out between the two countries. Since neither of these member states elected to bring the dispute to the attention of the Security Council, which is responsible for the maintenance of peace and security, the responsibility for taking up the matter reverted to the Council itself. On 22 September 1980 Secretary-General Kurt Waldheim appealed to both sides to seek a peaceful solution to the Iraq-Iran dispute and offered his personal good offices. He also requested an urgent Security Council meeting, and the President of the Security Council issued a statement supporting the Secretary-General's offer and calling upon the parties to settle their dispute peacefully. In spite of these statements, the Security Council did not meet formally until 26 September, two days after which the Council adopted Resolution 479, which called for an immediate end to the use of force and peaceful settlement of the dispute, and urged both sides to accept any appropriate offer of mediation. To the indignation of Iran, no reference was made to the Iraqi invasion, nor did the resolution call for the withdrawal of forces to internationally recognized boundaries. The Council took no further action on the question for almost two years, leaving the task of trying to end the war to the Secretary-General and his Special Representative, Olof Palme of Sweden.

Upon assuming office in 1982, Perez de Cuellar inherited a seemingly impossible situation—a stalemated war rooted in centuries of cultural and historical differences, and a mutually suspicious and uncertain Council which had totally alienated one party to the conflict, Iran. He immediately reappointed Olof Palme and subsequently dispatched fact-finding missions, appealed directly to the parties, and held meetings at the ministerial level with both countries. The Security Council, in July and October 1982, called for an immediate cease-fire and withdrawal of forces to recognized international borders. Initiatives were also undertaken by the Islamic Conference Organization, the Government of Algeria, and other groups and individuals. The war continued.

By mid-1984 attacks—mainly Iraqi—on cities and on tankers in the Gulf were escalating, and Secretary-General Perez de Cuellar addressed the Presidents of Iran and Iraq, urging them to cease such actions. A moratorium on civilian attacks monitored by UN observer teams lasted from June 1984 to March 1985, after which attacks on civilian targets were resumed by both sides. In April 1985, the Secretary-General visited Tehran and Baghdad to discuss with the governments his eight-point plan for an end to the conflict. The Security Council continued to adopt resolutions demanding the cessation of hostilities and to issue presidential statements referring to issues such as the right of free navigation in the Gulf, attacks on merchant shipping and the use of chemical weapons.²¹

The situation in the Gulf none the less continued to deteriorate. On 9 January 1987, Iran mounted a major offensive around Iraq's southern port city of Basra which developed into one of the bloodiest and most sustained operations in the then six-year-old Persian Gulf War. On 13 January, the Secretary-General held a press conference at which he called for a new approach to the conflict—namely, a more determined joint effort by members of the Security Council, and in particular the five permanent members. By mid-1987 a new international dimension had been added with the naval involvement of outside powers, including the United States and the Soviet Union, in efforts to protect shipping in the Gulf. This new dimension, with all its implicit risks, gave momentum to the new effort to bring an end to the war.

On 20 July 1987, following intensive consultations, the Security Council unanimously adopted Resolution 598, which demanded an immediate cease-fire and the immediate withdrawal of all forces to internationally recognized boundaries. There was agreement in principle that a second resolution invoking enforcement measures would be considered if the cease-fire was rejected by either party. An important element of this resolution was the proposal for an impartial body to identify the responsibility for the conflict—a gesture to Iran. This resolution was also a harbinger of more effective and co-operative action in the Council by the permanent members. Once again, however, the main responsibility for implementing the Security Council's resolution devolved on the Secretary-General.

Neither Iran nor Iraq rejected Resolution 598. Iraq announced that it welcomed it and wished to co-operate in its implementation. Iran refused formally to accept the cease-fire without assurance of action on other parts of

the resolution. Although the negotiating capacity of the Secretary-General was considerably enhanced by the support of a united Council, contacts with both sides during July and August 1987 failed to move forward the process. Talks held by the Secretary-General in September 1987 in Tehran and in Baghdad, at which he presented a plan for the implementation of Resolution 598, resulted in a stalemate, but the efforts of the Secretary-General continued in close consultation with the Security Council.

On 3 July 1988 a US Navy ship mistakenly downed an Iranian airliner, killing all 290 passengers. On 17 July, Iran informed the Secretary-General of its formal acceptance of Resolution 598. Iraq defined its position as total acceptance. On 20 August 1988, after negotiations by the Secretary-General, a UN-sponsored cease-fire took effect, ending one of the longest and bloodiest conflicts of the century. A United Nations Iran–Iraq Military Observer Group (UNIIMOG) was deployed to monitor the cease-fire.

The next phase of the Secretary-General's mandate began in Geneva on 25 August 1988, involving complex direct negotiations between the two sides. Peace talks on ministerial and expert levels continued in Geneva, under the auspices of the Secretary-General or his Personal Representative, Jan K. Eliasson of Sweden, with the aim of implementing the comprehensive peace plan outlined in Security Council Resolution 598. In November 1988, the fourth round of talks ended in disagreement over essential elements of the plan such as troop withdrawal and the exchange of prisoners, freedom of navigation in the Gulf and the Strait of Hormuz, and the clearing of the Shatt-al-Arab waterway. In Geneva in mid-December, the Secretary-General met once again with representatives of Iran and Iraq. Talks were expected to resume in early 1989.

Namibia

The United Nations has been seized with the problem of Namibia since the very first session of the General Assembly in 1946, at which time efforts were made to bring Namibia under the United Nations Trusteeship System which was to replace the Mandate System of the League of Nations. Since that time, South Africa—which has administered the territory of Namibia (also known as South West Africa) since 1920—has disregarded a number of UN resolutions and defied an advisory opinion of the International Court of Justice. In 1966 the General Assembly branded South Africa as an illegal occupying power and terminated its mandate over Namibia, subsequently establishing the UN Council for Namibia to organize the transitional process to election—scheduled for 1968. South Africa refused to co-operate with the Council for Namibia.

During the course of the following years, UN involvement in dialogue and negotiations on Namibia intensified. In 1975 South Africa convened the Turhalle Conference, which agreed on the establishment of an interim government and decided that independence should be achieved by 31 December 1978. In 1975 the Security Council adopted Resolution 385, setting the basis for Resolution 435 (1978), which reiterates the UN view that South

Africa's presence in Namibia is illegal and provides a detailed plan for UN supervision of free elections in Namibia. The plan, formulated by the Western 'Contact Group' (Canada, France, the Federal Republic of Germany, the UK and the USA), was accepted in principle by both South Africa and the South West African People's Organization (SWAPO).

Negotiations between the United Nations and South Africa on the implementation of Resolution 435 continued from 1978 through 1980, but came to a virtual halt with the failure of the Pre-Implementation Meeting in Geneva in January 1981. Progress in resolving the question of Namibia was further complicated by new political developments. In 1982, South African troops, ostensibly to curb SWAPO, attacked Angolan and Cuban troops inside Namibia. The incident marked the first reported clash between South Africa and Cuban troops since South Africa first invaded Angola in 1975, the year of Angola's independence. Cuban forces had come after independence to aid the new government of the Popular Liberation Movement of Angola (MPLA) in its fight against the insurgent National Union for the Total Independence of Angola (UNITA), backed by South Africa and the United States.

After 1982, the United States, which had assumed responsibility for a new round of negotiations, began to demand, together with South Africa, the withdrawal of Cuban troops in Angola as a precondition for South Africa's withdrawal from Namibia. The United Nations took the position that the matter of foreign troops invited by a sovereign nation was an internal issue and separate from the independence of Namibia. The so-called 'linkage' problem appeared to be a major obstacle to progress, since the Cuban presence was directly related to South Africa's activities from Namibia against Angola. The US-sponsored talks continued, however, throughout the period 1982-88. In 1988, with the co-operation of the Soviet Union and the active participation of Cuba and South Africa, the talks began at last to make remarkable progress.

On 22 December 1988 in New York, after a series of talks that began the previous May, Angola, Cuba and South Africa concluded an agreement²² on the withdrawal of 50 000 Cuban troops from Angola over a two-year period, and on the Namibian independence process, in accordance with the framework established in UN Security Council Resolution 435, to start on 1 April 1989.

The recent US diplomatic initiative in South West Africa occurred against a backdrop of shifting political and economic realities. The successful outcome of these negotiations offers a compelling example of how a moribund negotiating process may be revived when superpowers agree to work together and to exert pressure on opposing sides in a regional conflict. Bilateral talks between the superpowers on a regional peace settlement in South West Africa were held before, during and after the 1988 Moscow summit meeting, at which it was agreed that both powers had an interest in establishing peace in the region.

The Secretary-General and his staff are responsible for all administrative and practical details concerning implementation of Resolution 435. In late September 1988, Perez de Cuellar visited the region to hold high-level talks with South African Government officials and Namibian internal party leaders concerning the implementation of Resolution 435. The United Nations Transition Group (UNTAG), a 7500-member peace-keeping unit and a civilian

unit, will supervise free elections in Namibia. A small UN observer force will monitor the withdrawal of Cuban troops from Angola.

Western Sahara

Although receiving far less international attention than the problems of Southern Africa, another important problem on the African continent has been the target of a continuous negotiating effort by the United Nations. The Western Sahara conflict erupted in 1975, when Spain transferred administrative responsibility for the former Spanish Sahara to Mauritania and Morocco, both of which made territorial claims to this mineral-rich region. On 27 February 1976, the Polisario Front, a resistance movement assisted by Algeria, formally proclaimed a government-in-exile of the Saharawi Arab Democratic Republic (SADR), and took up arms against Mauritania and Morocco. Morocco broke off relations with Algeria in 1976. Mauritania withdrew from the conflict in 1979.

At a June 1981 summit meeting of the OAU in Nairobi, a plan was devised calling for a cease-fire and a referendum on the region's future under UN auspices, to be preceded by direct negotiations. Chances for settlement collapsed when Morocco withdrew from the OAU in 1984, in protest over the seating of SADR as a full member. Meanwhile, a war of attrition forced as many as 165 000 Saharan refugees into temporary camps across the border in Algeria.

UN Secretary-General Perez de Cuellar has actively sought to promote talks between Morocco and the Polisario Front over the future of the Western Sahara. In 1985 the Secretary-General addressed a summit meeting of the OAU at Addis Ababa, where he held talks with the Secretary-General of the Polisario Front and high-level Algerian and Mauritanian officials, and subsequently talked with the Moroccan head of state. In December 1985, the General Assembly—which has since the start of the war adopted successive resolutions on this question—adopted Resolution 40/50, inviting the Chairman of the OAU and the UN Secretary-General to exert every effort to persuade the parties to the conflict to negotiate the terms of a cease-fire and the modalities for a referendum. In carrying out this mandate, the Secretary-General embarked upon a good-offices mission, in the course of which he travelled several times to the African continent for official talks and, aided by his staff, held extensive consultations with all of the relevant parties.

In May 1988, the Secretary-General attended an OAU summit meeting, where he had talks with the heads of state of Algeria and Mauritania, the Secretary-General of the Polisario Front, and OAU officials. In June, impetus to the peace process was provided by *rapprochement* between Morocco and Algeria, the primary backer of the rebels. In New York in August 1988, Secretary-General Perez de Cuellar, in the presence of an OAU official, put forward a peace plan, which was accepted in principle by both sides in Geneva on 30 August. The plan calls for a UN-supported cease-fire followed by a referendum in which the disputed territory would choose between independence and integration with Morocco. A Special Representative, Hector Gros

Espiell, a national of Uruguay, was appointed on 19 October to follow up on these matters. Although the 13-year-old dispute seems to have entered a new phase, the two sides must reach political agreement on a formula for a referendum before the plan can proceed. The Secretary-General held a series of talks with all concerned parties in Geneva on 15 December 1988.

Cyprus

The difficult recent history of the Republic of Cyprus has been shaped by the conflicting aspirations and ethnic loyalties of the Greek and Turkish Cypriot communities. Cyprus is also connected to the larger problem of strained relations between Turkey and Greece, which gives the problem an international dimension involving the whole delicate strategic balance of the eastern Mediterranean and the south-eastern flank of NATO.

In spite of complex constitutional arrangements to balance the interests of both communities of Cyprus, which became independent in 1960, violent intercommunal strife broke out at the end of 1963. On 4 March 1964, the Security Council unanimously recommended the establishment of the United Nations Peacekeeping Force in Cyprus, to prevent a recurrence of the fighting and to help maintain law and order. Although intended as a temporary measure to enable reason to prevail, 24 years later the United Nations force is still there, its mandate extended for periods of six months at a time.

In the extraordinary complications of the Cyprus problem the United Nations has been outstandingly successful in keeping the peace. The UN peace-keeping operation can thus be seen as a stabilizing operation for the region as a whole. Since the end of 1964 there has been virtually no loss of life except in one incident in 1967 and during the tragic Greek-inspired coup against the president, Archbishop Makarios, and the resulting Turkish intervention in 1974, an event completely outside the mandate of UNFICYP. When fighting ended, the island was split in two. The United Nations now mans a buffer zone between the Turkish Cypriot area to the north and the Greek Cypriot area in the south.

At various times between 1965 and the disaster of 1974, an overall package deal for a settlement appeared to have been achieved, but invariably one side or the other pulled the rug out from under it at the last moment. The mediation and negotiation process in Cyprus, through no lack of effort on the part of those concerned, has not been as successful as the peace-keeping effort. The actual function of mediator lapsed in 1965; since 1968, within the framework of the good offices of the Secretary-General, the negotiating process has continued in intercommunal talks conducted by the Secretary-General or his Special Representative to Cyprus. Since 1975 the General Assembly has reiterated its call on all states to respect the sovereignty of Cyprus and requested the withdrawal of all foreign troops and the safe return of all refugees. With the help of the Secretary-General, whose good offices represent the whole negotiating mechanism between the two sides, representatives of the two communities met on an almost yearly basis from 1977 to 1983, when talks abruptly ended after the Turkish-Cypriot community declared independence.

In pursuing his mission of good offices towards a just and lasting settlement in Cyprus, Perez de Cuellar has undertaken several initiatives to generate dialogue between the two communities. In 1984, following three rounds of 'proximity talks' between the two sides, the Secretary-General presented each side with documentation resulting from the working points agreeable to both sides. In March 1986, after agreement had still not been reached, the Secretary-General presented to both sides a draft framework agreement which preserved all points on which agreement had been reached over the past two years and suggested possible solutions to remaining areas of disagreement. The proposal was accepted by the Turkish Cypriots, but not by the Greek Cypriots, who called for the withdrawal of Turkish troops as a precondition.

Efforts by the Secretary-General in pursuing his mission of good offices culminated on 24 August 1988, in renewed contacts between leaders of the two communities. Talks under the auspices of the Secretary-General and his Special Representative resumed on 15 September in Nicosia, where the two parties agreed to the programme and procedures which the Secretary-General proposed for a second round of talks. At meetings with the Secretary-General in New York in November, the leaders of the two sides agreed to a further round of talks in Nicosia to begin on 19 December and to meet again with the Secretary-General in March 1989. This was the first time in 25 years that the leaders of the two communities had committed themselves to such a personal and sustained effort towards an overall settlement.

Kampuchea

The Security Council first considered the question of Kampuchea in January 1979, following Viet Nam's invasion of Kampuchea at the end of December 1978, toppling the three and one-half year-old Khmer Rouge regime. Meeting at the request of Kampuchea, the Security Council considered a draft resolution demanding strict adherence to the principle of non-interference in the internal affairs of states and the withdrawal of Vietnamese forces from Kampuchea. The resolution²³ was vetoed by the Soviet Union. At the request of the member states of the Association of South-East Asian Nations (ASEAN), the issue was taken up by the General Assembly in 1979. In November the Assembly called for an end to hostilities and the withdrawal of all foreign troops.²⁴ It appealed to all states to refrain from interfering in Kampuchea's internal affairs. An international conference on Kampuchea was convened in New York by the Assembly the following year.

From the outset of the conflict, the Office of the Secretary-General has made efforts to assist in the resolution of the situation in Kampuchea. Secretary-General Perez de Cuellar and his representative have followed closely the various initiatives to bring about a peaceful settlement in Kampuchea. Both have visited the region several times and maintained regular contact with the parties and countries involved. In the summer of 1988, the Secretary-General formulated a proposal which his representative took to South-East Asia to present to the four Kampuchean parties, Viet Nam, the Lao People's Democratic Republic and ASEAN representatives. The countries of ASEAN

have assumed the major role in the search for a peaceful resolution of the problem.

In May 1988 Viet Nam pledged to pull out 50 000 troops from Kampuchea by the end of 1988 and complete withdrawal by 1990,²⁵ apparently at the urging of the Soviet Union, which provides Viet Nam with aid. On 3 November 1988 the General Assembly called for (in a resolution of 3 November 1988) the internationally supervised withdrawal of all foreign forces from Kampuchea, and for the creation of an interim administering authority in that country, with the promotion of national reconciliation under Prince Norodom Sihanouk. It also called 'for the non-return to the universally condemned policies and practices of the recent past'²⁶—alluding for the first time to the Khmer Rouge.

Clearly a peace agreement in Kampuchea will need agreement between China and the USSR as well as strong assistance from the USA, the ASEAN countries and Japan. It seems likely that an international peace-keeping force and presence will also be necessary.

IX. Conclusion

1988 has been an extraordinary year in the annals of international relations. After a long period when multilateral institutions and solutions were largely ignored on the international scene, 1988 has witnessed a series of long-standing regional conflicts begin to be settled through peaceful, international channels.

There would appear to be several main elements in this reversion to negotiation and the techniques of peaceful settlement. The improvement in US–Soviet relations is certainly one of these. General Secretary Gorbachev's reshaping of Soviet international policy has also been an important catalyst for change. Both superpowers have shown a new capacity to work together in dealing with regional conflicts rather than adopting adversarial positions which have in the past tended to make some regional conflicts almost wars by proxy between the superpowers.

The change in East–West relations has allowed the United Nations to work far more effectively for peace. The usefulness of the multilateral umbrella of the Security Council, of the creative and patient diplomacy of the Secretary-General, and of the capacity of the UN to make practical peace-keeping arrangements have all been greatly enhanced by the new climate of international relations. The new climate, which makes it far more difficult for smaller powers to play great powers against each other, has also encouraged the participants in regional conflicts to look for peaceful settlements, a tendency greatly encouraged by war weariness and bankruptcy.

It is tempting to see a historical turning-point in all this, but such a conclusion would be entirely premature. More permanent changes in governmental attitudes, a far greater strength and consistency in the use of international organizations and a far more widespread respect for international authority are only three prerequisites for a more stable and secure international order. While it is generally known that as an instrument of national policy war has become a lethal, exorbitantly expensive and ineffective anachronism, years of painstaking effort will be required before a new international system emerges in

which renunciation of force and peaceful settlement of disputes are immutable rules, and in which the rule of law is dominant. Until then, the maintenance of peace will continue to be uphill and nerve-racking work.

Notes and references

¹ See SIPRI, *SIPRI Yearbook 1988: World Armaments and Disarmament* (Oxford University Press: Oxford, 1988), appendices 13A–13E, for the full text of the INF Treaty.

² Joint Statement, released 1 June 1988; see also a Soviet report on the summit in *Pravda*, 2 June 1988.

³ UN document A/43/PV.72.

⁴ UN document A/43/PV.4.

⁵ Gorbachev, M., 'Realities of and guarantees for secured peace', *Pravda* and *Izvestiya*, 17 Sep. 1987.

⁶ 'Costs-benefits test', *The Week in Review*, *New York Times*, 14 Aug. 1988.

⁷ The Geneva Accords, signed in April 1988, entered into force in May 1988.

⁸ UN Resolution 40/50 (2 Dec. 1985).

⁹ The technique of good offices has evolved pragmatically and is not specifically mentioned in the UN Charter. In exercising good offices, the Secretary-General does not function as a mediator, but expresses his availability as an intermediary in a far less formal capacity.

¹⁰ Under-Secretary-General Rafeudin Ahmed is Special Representative of the Secretary-General for Humanitarian Affairs in South East Asia.

¹¹ See note 4.

¹² See note 3.

¹³ UN Charter, chapter 7, article 47.

¹⁴ See note 3.

¹⁵ *New York Times*, 3 Nov. 1988.

¹⁶ *Report of the Secretary-General on the Work of the Organization*, UN document A-37/I (7 Sep. 1982).

¹⁷ UN document A/37/I (note 16), p. 8.

¹⁸ 'International Peace and Security', Soviet Deputy Foreign Minister V. Petrovsky, UN document A/43/629 (22 Sep. 1988).

¹⁹ The Geneva Accords comprise four agreements: two are bilateral agreements signed by Afghanistan and Pakistan; one is a declaration of international guarantee signed by the USA and the USSR; and one is an agreement on interrelationships signed by Afghanistan and Pakistan, and the USA and the USSR as guarantors. They are variously referred to as the Geneva Accords, the Geneva Peace Accords and the Geneva Agreement. See UN document DPI/935 (July 1988).

²⁰ See also *SIPRI Yearbook 1988* (note 1), chapter 15.

²¹ UN Security Council documents S/17004 (1985); S/17036 (1985); S/PV.2516 (1985); S/17932 (1986); S/18538 (1986); S/RES/582 (1986); and S/18863 (1987).

²² The Namibia, Cuban Withdrawal Accords. See US Information Service, USIS EUR-403.

²³ UN document S/13027 (15 Jan. 1979).

²⁴ UN document A/RES/34/22.

²⁵ Keesing's 35969, vol. 34, June 1988.

²⁶ UN document A/RES/43/19; see UN Press Release GA/7755.

14. The SIPRI 1988 Olof Palme Memorial Lecture—‘Arms control and arms reduction: the agenda ahead’

In October 1986, SIPRI's Governing Board decided to arrange an annual public lecture, named after the late Swedish Prime Minister Olof Palme. The lecture is to be delivered in Stockholm by a political leader of international stature or an eminent scholar in order to highlight the need for and problems of peace and security, in particular of arms control and disarmament. The lecture is also intended to draw attention to SIPRI's commitment to a future with fewer arms and more freedom. On 18 September 1987, Willy Brandt, former Chancellor of the Federal Republic of Germany, delivered the first annual Olof Palme Memorial Lecture. On 29 September 1988, Sergey F. Akhromeyev, Chief of General Staff, First Deputy Minister of Defence and Marshal of the Soviet Union, delivered the second lecture.

MARSHAL SERGEY F. AKHROMEYEV

Please accept my gratitude to SIPRI for inviting me to deliver the Olof Palme Memorial Lecture 1988 and for giving me the opportunity to address such a prestigious audience, and to all of you for attending my lecture.

The dedication of this lecture to the memory of Olof Palme gives it a special meaning. Olof Palme was a well-known politician of our time. His name has gone down in the history of international relations. His name is connected with numerous important initiatives aimed at strengthening confidence and international security.

Olof Palme was very well known and respected in the Soviet Union as the head of the government of neighbouring Sweden, as the leader of the Social Democratic Party of Sweden and also for his peace-making activities as an active champion of peace, disarmament and universal security, and of the consolidation of various political forces working for nuclear disarmament. Many of the ideas Olof Palme was struggling for in the field of stopping the arms race, radical cuts in nuclear arms, creation of nuclear-free zones in Europe, and demilitarization of space are to a great extent in accord with Soviet initiatives. Olof Palme highly praised the programme of complete nuclear arms elimination by the year 2000 set forth in Mikhail S. Gorbachev's statement of 15 January 1986.

Two and a half years have passed since Olof Palme's tragic death. Today we have every reason to state that the world situation has improved noticeably. In spite of objective difficulties and sometimes artificially created obstacles, we are moving forward along the road of disarmament and reduction of military tension. The first concrete results have been achieved as well. These are the INF Treaty, and the Stockholm Document on confidence-building measures in Europe. A lot has been done to achieve an agreement on a 50 per cent reduction in strategic offensive weapons with the ABM Treaty of 1972 being observed; it is objectively feasible that in the near future a convention on the elimination of chemical weapons will be signed. The prospect of finalizing an

agreement on the mandate for the talks on the reduction of armed forces and conventional armaments in Europe is in view.

We have started to entertain the hope for a gradual elimination of nuclear arms; the threat of nuclear war has diminished, and the military confrontation has been decreasing. All this is indisputable. But it is premature to speak about a radical change in international politics. There is no smooth road lying ahead for the reduction of nuclear and conventional armaments.

Allow me to express our opinion concerning the prospects for the disarmament process, in particular concerning the reduction of armed forces, nuclear and conventional armaments and the military threat.

The dialectical complexity of our times consists in the fact that along with the opening of new prospects in the field of disarmament new difficulties also arise. The presidency of Mr Reagan, which was not easy for us, is coming to an end, and it was quite instructive because it is coming to an end with a certain adjustment of US policy towards the socialist countries. In our opinion the most important result of the four meetings between General Secretary Gorbachev and President Reagan is the emergence of the element of constructive realism. The transition from unpredictable zigzags in relations between the Soviet Union and the United States to more normal and stable relations is now under way. It appears that a bridge has been erected into the future, to the next US Administration.

But will this bridge withstand the inevitable overloads in stock for it? In recollecting the bitter lessons of the past, hard questions continue to arise: Is it possible that a long pause in the arms reduction process will set in? Are there any guarantees against a backward motion?

There is no easy answer to all that. Still we hope for a better future.

Firstly, because the arms race has actually driven the whole world into a blind alley. It has acquired such character that its continuation—even more so its spread into outer space—will put mankind on the brink of a nuclear catastrophe. The understanding of this became a major prerequisite for the improvement in Soviet-American relations.

Secondly, the necessity to eliminate the threat of war objectively leads to a situation where countries of the world will become more dependent on each other. The idea of partnership in setting up an international security system and of tolerance of each other's social systems should obviously predominate. A safe future is not in confrontation but in building up confidence and predictability in the relations between East and West and other regions, in constructive talks and achieving results in arms reduction.

In the field of confidence building Europe plays, I would say, a constructive and innovative role. In 1975 the Final Accord envisaging certain security- and confidence-building measures was signed in Helsinki, but the measures agreed upon were mostly not obligatory and thus not very effective militarily. Nevertheless they have paved the way to the 1986 Stockholm Document in which the measures to limit ground forces' military activities on the European continent, to ensure their monitoring and supervision, are of a more far-reaching character and are made compulsory for all European countries, the USA and Canada.

The particular value of the confidence-building measures adopted by the Stockholm Conference is that they are obligatory for all the parties concerned. As a result of their implementation all the participating parties have had an opportunity to ascertain that the intentions of the states engaged in military activities are of a peaceful character, that these activities are not threatening or aggressive by nature and have nothing to do with preparation for an aggression.

Almost two years have passed since the Stockholm agreements in the sphere of military activities have taken effect, and we have a right to pose the question: Have these agreements fully achieved the aim we strive for? I do not think that there is only a positive answer. And here is the reason why.

The reality is such that the Stockholm agreements do not cover to the full extent the military activities of the armed forces of the states parties to the agreement.

On the one hand, the implementation of the Stockholm Document put under rather strict control the activities of ground forces in Europe. For the past two years not a single violation has been revealed which could have been interpreted as the creation of a grouping with aggressive intentions or fraught with surprise attack. As far as the activities of ground forces are concerned, there could be one answer only: the Stockholm agreements have undoubtedly raised the level of confidence and considerably diminished the fears of the parties as far as a likely ground surprise attack is concerned.

On the other hand, the threat of a surprise attack has not been completely eliminated because military activities of the most potentially dangerous component of the armed forces, notably air forces and navies, are not covered by the control measures. These components represent the biggest threat to security. Neither are the national territories of the USA and Canada subject to such a control system. All these facts cause great concern not only in the socialist countries but in many other states as well.

At the Stockholm Conference, striving to reach agreement, we agreed to put off the consideration of the confidence-building measures applicable to the independent activities of air forces and navies until a later period and to consider this problem at a later stage of the Conference. It was a serious concession on our part. We expect some reciprocal steps from NATO. But there are no such steps on their part. Even more, we feel there is some blocking of this process. The USA and some of its NATO allies are persistently refusing to extend the confidence-building measures to include the independent activities of air forces and navies as well as the national territories of the USA and Canada.

What have we got? Even today the NATO countries stand for lowering the thresholds of notifiable activities of the ground forces in Europe. But the experience of the two-year-long implementation of the Stockholm agreement shows that it is no longer necessary. What causes concern are the oceans and seas. The navies of the two military alliances confront each other there. That is where the risk of military conflict is constantly increasing due to the building up of power and to the active nature of operations of the navies of the Western powers: the deployment of hundreds of American long-range sea-launched cruise missiles (SLCMs) designed to engage targets in the territory of the USSR via the airspace of other countries.

Why does the USA oppose the extension of confidence-building measures to the activities of navies? It does not give a comprehensible answer to this question.

Nevertheless, we do understand the US position. The United States and some of its allies do not want to extend verification of the confidence-building measures to the navies and air forces where they have a superiority over the USSR. For example, the US Navy exceeds the USSR Navy in:

- big warships (battleships; cruisers, destroyers and missile-armed frigates), 2.5-fold;
- attack aircraft-carriers, absolute superiority (US, 15; USSR, none);
- sea-based aircraft, 2.5-fold;
- total tonnage, 2-fold;
- marines, 19-fold.

As President Reagan said in Congress, 'Superiority at sea gives us an opportunity to exploit the geographical vulnerability of the Soviet Union and to create a constant threat to the Soviet interests'.

NATO countries outnumber Warsaw Treaty countries in tactical strike aviation—approximately by 1500 aircraft. Almost 70 per cent of the total number of all NATO combat aircraft based in Europe and on aircraft-carriers off its shores are strike aircraft.

A question arises: Are air force operations less dangerous than those of ground forces? It is obvious that, by the scale of employment, speed, manoeuvrability and strike capabilities, air forces excel ground forces. Strike aviation can ensure strategic surprise attack, and engage targets within 1.5–2 hours on D-1 to a depth of 1000 km, that is, throughout the entire depth of the theatre of operations. Neither tanks nor artillery would succeed in reaching the borders within this period of time.

Multipurpose aircraft-carrier task forces possess great strike power. Each aircraft-carrier is a floating airbase for up to 100 aircraft (40 of which are nuclear-capable). Seven out of 15 US Navy multipurpose aircraft-carriers are assigned to the US Atlantic Fleet.

Warsaw Treaty navies, including the Soviet Northern, Baltic and Black Sea Fleets which operate in the seas adjacent to the European zone, also possess substantial strike capabilities. It is obvious that their activities, too, could cause some concern in the Western countries. Why do we not try to understand and take into account our mutual concerns?

This situation cannot be allowed to continue any further. The process of disarmament and the promotion of confidence in the military field become integral factors of relations between our states and peoples.

The logic of this process, if we take into account the prospects for the reduction of strategic offensive weapons, armed forces and conventional arms in Europe, widening and deepening of control measures over the activities of ground forces, puts to the forefront of attention the extension of the confidence-building measures to include the independent activities of navies and air forces, and a reduction in their armaments.

The Soviet proposals to this effect are well known. They were set forth by

General Secretary Gorbachev in Vladivostok in July 1986, in Murmansk in October 1987, in Belgrade in March 1988 and in Krasnoyarsk in September 1988. These are our concrete proposals:

- to start negotiations (in Europe—between the Warsaw Treaty Organization and NATO with the participation of the concerned neutral and non-aligned, NN, countries) on the reduction in the military activity and limitation of the scale of naval operations, first of all of nuclear-capable ships (as for Northern Europe it could be done in the waters of the Baltic, Barents, North, Norwegian and Greenland Seas). To extend confidence-building measures to seas and oceans: notification of all large-scale naval and air exercises, invitations of observers to them; as well as notification of sea and air lifts of large military forces;

- to limit the scale and number of major air and naval exercises, to reach an agreement on abstaining from anti-submarine warfare (ASW) activities in certain zones;

- to reach an agreement on banning naval activities in mutually agreed-upon zones of international straits and busy sea lanes and in fishing areas;

- to take measures to ensure security of busy sea lanes.

Unfortunately all our initiatives aimed at limiting naval activities and extending confidence-building measures to include the independent activities of navies and air forces are blocked by the West.

Last August the Soviet Union extended an invitation to a number of Baltic and North European states to send their observers to attend our Baltic Fleet exercise held in September. We did not attach any strings or demand any concessions. But all the Western countries refused the invitation. How does that correlate with the statements by Western representatives about the necessity of strengthening confidence and security in Europe, of promoting openness in military activities?

A negative response was given by the Western countries to our proposals put forward by the Warsaw meeting of the Political Consultative Committee of the Warsaw Treaty Organization last July, concerning the establishment of a European Centre for the Reduction of Military Threat and Prevention of Surprise Attack which would include representatives of all the European countries concerned, the USA and Canada.

The USSR has taken numerous steps to create new opportunities for East-West relations. And the West should evidently act likewise. It is necessary to abandon the delusion that the Soviet Union needs disarmament and trust more than the West does.

Consider this: all Soviet proposals, no matter how thoroughly examined, envisage equality, parity at all stages. This refers to confidence-building measures, nuclear weapons, conventional weapons, etc. We thoroughly elaborate our proposals and proceed from the fact that not a single state would agree to take any steps to the detriment of its own security. And we call on the West to treat us the same way. For we shall not allow superiority over us or any infringement of our security. If both sides display such an approach, a decisive breakthrough in all directions in the field of disarmament will become possible.

This very stand should be taken in considering the prospects for the reduction of conventional armaments in Europe. Now that the INF Treaty has taken effect and we are negotiating with the USA a 50 per cent reduction in strategic offensive weapons, the problem of conventional weapons acquires, I should say, a fundamental importance. The USSR is ready to tackle this problem.

For two years we have been waiting for a response to the proposal put forward by the Warsaw Treaty Organization in Budapest (June 1986) and presented in detail in Warsaw (July 1988). We are ready to start talks and analyse and settle issues objectively and impartially. The sooner such talks begin the better for everybody.

What are the prospects for such talks? There are reassuring signs. At the Vienna consultations of the representatives of the 23 Warsaw Treaty Organization and NATO countries on the working out of a mandate for future talks on the reduction of armed forces and armaments in Europe (from the Atlantic Ocean to the Urals) the mandate's preamble, the aims of the talks, verification and data exchange have been agreed upon. An agreement has also been reached to begin the talks in 1988.

What is standing in the way of the talks? No agreement has been reached so far on the subject of the talks and the geographical zone (boundaries) of the reduction.

A variety of wording was advanced concerning the subject of the talks, but two problems remain unsettled: the problem of the dual-purpose means and the problem of tactical strike aviation. As is known, the dual-purpose means are capable of both nuclear and conventional charges. We are convinced that the talks should embrace all types of weapons of the parties, also including tactical nuclear weapons. However, taking into account that the NATO countries are not yet ready for that, we proposed a compromise solution: the subject of the talks should comprise armed forces and conventional weapons, including the dual-purpose means without their nuclear components. Evidently, a solution can be found on these grounds.

As for tactical strike aviation, we insist on including it in the subject-matter of the talks strictly following the agreed goals of the talks, that is, the elimination of a surprise attack potential.

In doing so, meeting NATO halfway, we have agreed to exclude from the talks the naval aviation issue. It goes without saying that fighter aviation that is purely defensive should also be excluded.

By excluding naval aviation and concurrently including fighter aviation along with strike aviation, the NATO countries seek to artificially create a semblance of parity in air forces. In this case the elimination of imbalances would amount merely to the reduction of ground forces and their armaments (tanks and artillery pieces), whereas tactical strike aviation in which NATO enjoys a significant superiority would not be liable to reductions. It is quite obviously being done with the aim of gaining military superiority over the Warsaw Treaty Organization. Here lies the essence of the differences.

It is senseless to conduct talks without taking into account tactical strike aviation. The NATO countries, while verbally supporting such formulation of the issue, nevertheless refuse to include it in the mandate for the future talks. I

believe that common sense will prevail and a solution to this problem will be found.

The problem of the geographical zone at the future talks should also be settled, provided that political will is displayed.

Our concept of the stage-by-stage reduction of armed forces and conventional armaments in Europe is as follows.

The first stage should have as its ultimate goal the achievement of approximately equal (balanced) collective levels in armed forces strength and in the quantity of conventional weapons possessed by the Warsaw Treaty Organization and NATO, provided, however, that there exists an understanding that such balanced levels should not be higher than those existing now on either side.

In our opinion it is necessary to begin with an exchange, between the Warsaw Treaty Organization and NATO, of initial data on the armed forces and types of weapons to the extent necessary for the negotiations. We proposed an exchange of such data right now, before the talks begin. But NATO proved not to be ready for that.

Concerning our proposal to exchange initial data for the talks, one often hears apprehensions that this would lead to futile discussion of numerical data. I am sure that this shall not happen. We propose not merely a data exchange, but also thorough verification, including on-site inspections, at any time convenient for the parties after the beginning of the talks.

On the basis of these particular data, imbalances and asymmetries existing between the Warsaw Treaty Organization and NATO could be revealed with consecutive parallel elimination of such imbalances.

At the second stage we propose that NATO and Warsaw Treaty Organization troops should be cut by approximately 25 per cent (by about 500 000 men) with their organic armament.

At the third stage a further reduction in the armed forces and armaments would continue in such a manner as to make the character of the armed forces of the alliances generally defensive.

I would like to emphasize the reciprocity principle. There can be no agreement without reciprocity. Departure from this principle means an attempt to single out such components of military potential where one of the sides possesses an advantage leaving aside the components where the other side is leading. Talks on a European scale make sense only if they lead to mutual and simultaneous reduction, to mutual elimination of imbalances and asymmetries.

It is clear that the implementation of all the three stages is a long process. It is not a matter of one year. This is why we think it is necessary that the member states do not build up their armed forces and armaments in Europe until the agreements in the new all-European talks enter into force.

Measures on reduction and elimination of the threat of a surprise attack could be stipulated at the beginning of the first stage of the talks. This purpose could be served by setting up zones of a decreased level of armaments from which the most dangerous destabilizing types of conventional armaments would be withdrawn or reduced. As such armaments we classify tactical strike aviation, tactical missiles, combat helicopters, tanks and artillery. This would

create a level of war potential that would allow for only defensive operations and that would rule out a surprise attack. In these zones a stricter regime of the restriction of military activities can be envisaged. We are prepared for limitations of troop movements, and of the number, scale, duration and periodicity of exercises.

We stand for the most effective and strict verification system at all stages of reduction, including on-site inspections with no right of refusal. Such a verification system could also cover the process of reduction, liquidation, dismantling and storing of armaments, and of disbanding units; it could also include the activities of troops and compliance with agreed-upon numerical levels of armed forces and armaments left after the reduction.

This is our programme of reduction of armed forces and armaments in Europe. We think that it takes into consideration the security interests of all participants, that it is concrete and that it can provide a good basis for future agreements.

On the problem of nuclear armaments.

The INF Treaty that marked the beginning of the movement of humanity towards a nuclear-free world has been in force for four months now. As of today more than 200 medium- and shorter-range missiles have been liquidated in the Soviet Union and up to 20 missiles in the United States.

The 10th round of the Soviet-American talks is under way in Geneva. The aim of the talks is to take a new, more radical step in solving the problem of nuclear disarmament: to prepare a draft agreement on 50 per cent cuts of strategic offensive arms (START).

How feasible is such an agreement? The talks between Mikhail Gorbachev and Ronald Reagan have created a good basis for the working out of an agreement on strategic offensive arms in a short time. However, several unsolved problems hinder this process. What are they?

First—implementation of the Washington Accords on compliance with the ABM Treaty. The ABM Treaty opponents in the USA are trying to ignore the START-ABM interrelationship; they are striving to get a free hand in the deployment of large-scale ABM systems with space-based elements, and in the deployment of weapons in space. In this way they hope to achieve a military-strategic superiority.

The Soviet Union advocates strict observance of the ABM Treaty as signed in 1972, and non-withdrawal from it for an agreed period of time.

This is our position of principle. It objectively proceeds from the assumption that in case of the rejection of the ABM Treaty the green light will be given to the arms race in space, and strategic stability in the world will be undermined. Then there will be no reduction of strategic defensive weapons.

Another serious obstacle is the problem of long-range air- and sea-launched cruise missiles. The essence of the matter here is that the USA is striving for unilateral advantages.

The American side's ambition is that strategic bombers carrying non-nuclear long-range cruise missiles will not count as strategic carriers. It means that the USA, having 600 heavy bombers, could have a considerable

unaccounted-for reserve of carriers, capable of taking aboard thousands of nuclear air-launched cruise missiles (ALCMs). The USA insists that the number of nuclear-armed CMs that will be attributed to a heavy bomber of any type will be only 10, despite the fact that American heavy bombers carry 20 or more such missiles. To agree to this approach means to give the USA a chance beforehand, circumventing the Treaty, to deploy at any time another several thousand nuclear warheads beyond the agreed level of 6000 warheads.

The position of the Soviet Union is that each strategic bomber, despite its armament (nuclear and non-nuclear), should be included in the total number of strategic carriers limited by the Treaty; that the maximum number of nuclear ALCMs which a heavy bomber of the given type is equipped for is counted; and that each nuclear-armed ALCM be counted against the total number of warheads.

And now about SLCMs. The USA, while not denying in words the necessity to limit SLCMs, is actually trying its best to leave SLCMs out of the framework of any limitations, obviously striving for military superiority in the sphere of these weapons as well.

The Soviet Union proceeds from the fact that it is inadmissible to reduce only strategic weapons and at the same time, circumventing the Treaty, to build up other weapons and launch the arms race in new directions. The spread of cruise missiles in the oceans and seas of the world destabilises the strategic situation and increases the risk of the outbreak of an armed conflict.

In our view, all these problems demand solutions, and we hope that such solutions will be adopted; and we believe that achieving an agreement on a 50 per cent reduction of strategic offensive arms is feasible. Our proposal to compare the Warsaw Treaty and NATO military doctrines is also in accordance with the aims of strengthening mutual trust.

We have so far not heard a constructive answer to our proposal. But we often have to listen to statements that our proposal is allegedly of a propaganda character, that the defensive doctrines of the Warsaw Treaty are only proclaimed as a political means while actually we have an offensive strategy.

The point is that both political and military-technological sides of our military doctrines are of a defensive character; they have one main political aim—to prevent war. If an aggression is committed against us it will be rebuffed with retaliatory measures. These principles are materialized today in the general direction of our military construction and planning, and in the training and equipping of our armed forces. We do not conceal the essence of the military-technological side of our doctrine. When putting forward the proposal to compare doctrines, we of course meant their military-technical aspect.

The military-technical aspect of any military doctrine includes at least four major issues: the character of the expected military threat and the potential enemy; what kind of war to prepare the armed forces for; what kind of armed forces it is necessary to have; and what types of military action to prepare them for.

First, as to the character of the military threat: Who is the potential enemy for the USSR and the Warsaw Treaty Organization? It was not we who made the choice. We have heard for many years that the main enemies of the United

States and NATO are the USSR and the Warsaw Treaty Organization. In an interview with the *Washington Times* on 19 August 1988, following a visit to the Soviet Union, US Defense Secretary Frank Carlucci said once again that 'the Soviets still remain the potential enemy of the US'. This is being inculcated upon the public of the West, and the most important thing is that this is being supported by the enormous military might, aimed at us from all directions—from the North, West, South and East.

We have nothing to do but take this into account in our practical actions and organize our defence correspondingly. It is as a result of this short-sighted policy that this mutual threat has appeared. The situation is especially aggravated in Europe. As the weapon stockpiles increase, which results in growing mutual mistrust, the threat is redoubled by the growing possibility of an accidental outbreak of war.

But why not try to understand each other? Why not depart from the image of the adversary step by step, and by mutual efforts remove the threat? We have been striving for this for years.

Now *the second* aspect: For what kind of war, for repelling what kind of aggression, are we preparing our armed forces? It is well known that US and NATO military doctrines proceed from the possibility of both conventional and nuclear war, and a nuclear first strike. That is why we have to prepare our armed forces for repelling an aggression in both nuclear and conventional war. And this is the sad paradox of our times. Both sides are aware that nuclear war will result in a catastrophe but are still preparing for it. Isn't it better to pledge not to use nuclear weapons first, and consistently work for their reduction and complete elimination? We are ready for this.

Third: What kind of armed forces are we compelled to have? In this we proceed from the defence sufficiency principle. This implies a non-offensive structure of the armed forces, limitation of the composition of strike weapon systems, change of the groupings and their location with defence missions in mind, decrease of the scale of military production, etc. But we need time to implement these principles. We are taking steps to change the configuration of our armed forces in Europe to decrease the concern of Western countries. But we can fully implement the defence sufficiency principle on a mutual basis only. Unilateral actions to provide mutual security of defence sufficiency are practically impossible.

As to strategic offensive weapons, the defence sufficiency principle means a balance in these weapons between the USSR and the USA. At any quantitative and qualitative level the potential capabilities of these weapons should be equal in effectiveness. This is our position at the negotiations with the USA on a 50 per cent reduction of strategic offensive weapons.

For conventional arms and armed forces, defence sufficiency means a composition of forces that would enable the sides to repel a possible aggression, but at the same time not to threaten each other, and prevent the sides from conducting large-scale offensive operations. If all the components of conventional armed forces (the Army (ground forces), Air Force, Navy and Air Defence) are taken into account, we may say that there is an approximate parity of forces in Europe even today. But still there are certain imbalances and

asymmetries in various weapons and services, which are the mutual concern of both the East and the West.

Let us eliminate them and then take up a radical reduction in armed forces, and make them strictly defensive in structure and grouping.

Fourth: As to the ways of preparing our armed forces for repulsing an aggression, there are significant differences between the USSR and the USA, the Warsaw Treaty and NATO, in the views on solving major strategic problems. These differences stem from the historical and geographical peculiarities of our countries and alliances, from the situation along their frontiers. Until recently we had drawn up plans to repulse possible aggressions by conducting both defensive and offensive operations.

Today, taking into account the concerns of the West we have revised our strategy. In response to aggression the principal type of operations will be defensive operations. The modes of employment of all armed services are being revised accordingly.

But we, too, are gravely concerned about the ways of training and the activities of NATO and US armed forces: such as 'Autumn Forge'-type large-scale NATO exercises which are very difficult to distinguish from real deployment, US SAC exercises and naval exercises, which are huge and about which we are worried.

In brief, there are quite a few problems which can and must be settled through a thorough comparison of military doctrines, both on a bilateral basis and within the framework of the military alliances. It requires joint efforts, maintaining well-balanced relations, taking into account the concerns of both sides. We do not believe that mutual accusations are the way that can lead to success. That is why we have persistently been calling upon the West to make a more thorough study of the positions of both sides, to try to reach mutually acceptable decisions in the field of arms reduction and to build up confidence. Now many people both in the West and in the East realize that today openness in politics and in the military sphere is the only possible way to strengthen trust and confidence and, consequently, security.

My country is fully determined to follow this path.

* * *

Today is my second day in hospitable Sweden. My talks with distinguished statesmen, the military and journalists have made a great impression on me. I want to express the hope that my lecture and the replies to the questions I received during these talks will help you to understand better my country's position concerning peace and disarmament problems and to understand what it is that worries the Soviet people and Soviet leaders.

I also want to say that, for me personally, the contacts here in Stockholm were very beneficial. The knowledge and experience I gained here will help me in my work. In this respect I see the undoubted usefulness of such meetings, which promote better mutual understanding and strengthen confidence. This is just what Olof Palme strived for.

I wish you further success in your creative work.

Annexes

Annexe A. Major multilateral arms control agreements

RAGNHILD FERM

For the full texts of the arms control agreements, see Goldblat, J., SIPRI, *Agreements for Arms Control: A Critical Survey* (Taylor & Francis: London, 1982).

I. Summaries of the agreements

Protocol for the prohibition of the use in war of asphyxiating, poisonous or other gases, and of bacteriological methods of warfare (Geneva Protocol)

Signed at Geneva on 17 June 1925; entered into force on 8 February 1928.

Declares that the parties agree to be bound by the above prohibition, which should be universally accepted as part of international law, binding alike the conscience and the practice of nations.

Antarctic Treaty

Signed at Washington on 1 December 1959; entered into force on 23 June 1961.

Declares the Antarctic an area to be used exclusively for peaceful purposes. Prohibits any measure of a military nature in the Antarctic, such as the establishment of military bases and fortifications, and the carrying out of military manoeuvres or the testing of any type of weapon. Bans any nuclear explosion as well as the disposal of radioactive waste material in Antarctica, subject to possible future international agreements on these subjects.

At regular intervals consultative meetings are convened to exchange information and hold consultations on matters pertaining to Antarctica, as well as to recommend to the governments measures in furtherance of the principles and objectives of the Treaty.

Treaty banning nuclear weapon tests in the atmosphere, in outer space and under water (Partial Test Ban Treaty—PTBT)

Signed at Moscow on 5 August 1963; entered into force on 10 October 1963.

Prohibits the carrying out of any nuclear weapon test explosion or any other nuclear explosion: (a) in the atmosphere, beyond its limits, including outer space, or under water, including territorial waters or high seas; or (b) in any other environment if such explosion causes radioactive debris to be present outside the territorial limits of the state under whose jurisdiction or control the explosion is conducted.

Treaty on principles governing the activities of states in the exploration and use of outer space, including the moon and other celestial bodies (Outer Space Treaty)

Signed at London, Moscow and Washington on 27 January 1967; entered into force on 10 October 1967.

Prohibits the placing in orbit around the earth of any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, the installation of such weapons on celestial bodies, or the stationing of them in outer space in any other manner. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies are also forbidden.

Treaty for the prohibition of nuclear weapons in Latin America (Treaty of Tlatelolco)

Signed at Mexico City on 14 February 1967; entered into force on 22 April 1968.

Prohibits the testing, use, manufacture, production or acquisition by any means, as well as the receipt, storage, installation, deployment and any form of possession of any nuclear weapons by Latin American countries.

The parties should conclude agreements with the IAEA for the application of safeguards to their nuclear activities.

Under *Additional Protocol I* the extra-continental or continental states which, *de jure* or *de facto*, are internationally responsible for territories lying within the limits of the geographical zone established by the Treaty (France, the Netherlands, the UK and the USA), undertake to apply the statute of military denuclearization, as defined in the Treaty, to such territories.

Under *Additional Protocol II* the nuclear weapon states undertake to respect the statute of military denuclearization of Latin America, as defined and delimited in the Treaty, and not to contribute to acts involving a violation of the Treaty, nor to use or threaten to use nuclear weapons against the parties to the Treaty.

Treaty on the non-proliferation of nuclear weapons (NPT)

Signed at London, Moscow and Washington on 1 July 1968; entered into force on 5 March 1970.

Prohibits the transfer by nuclear weapon states, to any recipient whatsoever, of nuclear weapons or other nuclear explosive devices or of control over them, as well as the assistance, encouragement or inducement of any non-nuclear weapon state to manufacture or otherwise acquire such weapons or devices. Prohibits the receipt by non-nuclear weapon states from any transferor whatsoever, as well as the manufacture or other acquisition by those states of nuclear weapons or other nuclear explosive devices.

Non-nuclear weapon states undertake to conclude safeguard agreements with the International Atomic Energy Agency (IAEA) with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices.

The parties undertake to facilitate the exchange of equipment, materials and scientific and technological information for the peaceful uses of nuclear energy and to ensure that

potential benefits from peaceful applications of nuclear explosions will be made available to non-nuclear weapon parties to the Treaty. They also undertake to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament.

Twenty-five years after the entry into force of the Treaty, a conference shall be convened to decide whether the Treaty shall continue in force indefinitely or shall be extended for an additional fixed period or periods.

Treaty on the prohibition of the emplacement of nuclear weapons and other weapons of mass destruction on the sea-bed and the ocean floor and in the subsoil thereof (Sea-Bed Treaty)

Signed at London, Moscow and Washington on 11 February 1971; entered into force on 18 May 1972.

Prohibits emplanting or emplacing on the sea-bed and the ocean floor and in the subsoil thereof beyond the outer limit of a 12-mile sea-bed zone any nuclear weapons or any other types of weapons of mass destruction as well as structures, launching installations or any other facilities specifically designed for storing, testing or using such weapons.

Convention on the prohibition of the development, production and stockpiling of bacteriological (biological) and toxin weapons and on their destruction (BW Convention)

Signed at London, Moscow and Washington on 10 April 1972; entered into force on 26 March 1975.

Prohibits the development, production, stockpiling or acquisition by other means or retention of microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification of prophylactic, protective or other peaceful purposes, as well as weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict. The destruction of the agents, toxins, weapons, equipment and means of delivery in the possession of the parties, or their diversion to peaceful purposes, should be effected not later than nine months after the entry into force of the Convention.

Convention on the prohibition of military or any other hostile use of environmental modification techniques (Enmod Convention)

Signed at Geneva on 18 May 1977; entered into force on 5 October 1978.

Prohibits military or any other hostile use of environmental modification techniques having widespread, long-lasting or severe effects as the means of destruction, damage or injury to states party to the Convention. The term 'environmental modification techniques' refers to any technique for changing—through the deliberate manipulation of natural processes—the dynamics, composition or structure of the Earth, including its biota, lithosphere, hydrosphere and atmosphere, or of outer space.

The understandings reached during the negotiations, but not written into the Convention, define the terms 'widespread', 'long-lasting' and 'severe'.

Convention on the prohibitions or restrictions on the use of certain conventional weapons which may be deemed to be excessively injurious or to have indiscriminate effects ('Inhumane Weapons' Convention)

Signed at New York on 10 April 1981; entered into force on 2 December 1983.

The Convention is an 'umbrella treaty', under which specific agreements can be concluded in the form of protocols.

Protocol I prohibits the use of weapons intended to injure by fragments which are not detectable in the human body by X-rays.

Protocol II prohibits or restricts the use of mines, booby-traps and similar devices.

Protocol III prohibits or restricts the use of incendiary weapons.

South Pacific Nuclear Free Zone Treaty (Treaty of Rarotonga)

Signed at Rarotonga, Cook Islands, on 6 August 1985; entered into force on 11 December 1986.

Prohibits the manufacture or acquisition by other means of any nuclear explosive device, as well as possession or control over such device by the parties anywhere inside or outside the zone area described in an annex. The parties also undertake not to supply nuclear material or equipment unless subject to IAEA safeguards; and to prevent in their territories the stationing as well as the testing of any nuclear explosive device. Each party remains free to allow visits, as well as transit, by foreign ships and aircraft.

Under Protocol 1, France, the UK and the USA would undertake to apply the treaty prohibitions relating to the manufacture, stationing and testing of nuclear explosive devices in the territories situated within the zone, for which they are internationally responsible.

Under Protocol 2, China, France, the UK, the USA and the USSR would undertake not to use or threaten to use a nuclear explosive device against the parties to the treaty or against any territory within the zone for which a party to Protocol 1 is internationally responsible.

Under Protocol 3, China, France, the UK, the USA and the USSR would undertake not to test any nuclear explosive device anywhere within the zone.

II. Status of the implementation of the major multilateral arms control agreements, as of 1 January 1989

Number of parties

1925 Geneva Protocol	115
Antarctic Treaty	38
Partial Test Ban Treaty	118
Outer Space Treaty	91
Treaty of Tlatelolco	23
Additional Protocol I	3
Additional Protocol II	5
Non-Proliferation Treaty	139
NPT safeguards agreements (non-nuclear weapon states)	80
Sea-Bed Treaty	82
BW Convention	111
Enmod Convention	55

'Inhumane Weapons' Convention	30
Treaty of Rarotonga	9
Protocol 1	0
Protocol 2	2
Protocol 3	2

Notes

1. The table records year of ratification, accession and succession.

2. The Partial Test Ban Treaty, the Outer Space Treaty, the Non-Proliferation Treaty, the Sea-Bed Treaty and the Biological Weapons Convention provide for three depositaries—the governments of the UK, the USA and the USSR. The dates given for these agreements are the earliest dates on which countries deposited their instruments of ratification, accession or succession—whether in London, Washington or Moscow. The dates given for the other agreements, for which there is only one depositary, are the dates of the deposit of the instruments of ratification, accession or succession with the depositary in question.

3. The 1925 Geneva Protocol, the Partial Test Ban Treaty, the Outer Space Treaty, the Non-Proliferation Treaty, the Sea-Bed Treaty, the BW Convention, the Enmod Convention and the 'Inhumane Weapons' Convention are open to all states for signature.

The Antarctic Treaty is subject to ratification by the signatories and is open for accession by UN members or by other states invited to accede with the consent of all the contracting parties whose representatives are entitled to participate in the consultative meetings provided for in Article IX.

The Treaty of Tlatelolco is open for signature by all the Latin American republics; all other sovereign states situated in their entirety south of latitude 35° north in the western hemisphere; and (except for a political entity the territory of which is the subject of an international dispute) all such states which become sovereign, when they have been admitted by the General Conference; Additional Protocol I—by 'all extra-continental or continental states having *de jure* or *de facto* international responsibility for territories situated in the zone of application of the Treaty'; Additional Protocol II—by 'all powers possessing nuclear weapons', that is, the USA, the USSR, the UK, France and China.

The Treaty of Rarotonga is open for signature by members of the South Pacific Forum; Protocol 1—by France, the UK and the USA; Protocol 2—by France, China, the USSR, the UK and the USA; Protocol 3—by France, China, the USSR, the UK and the USA.

4. Key to abbreviations used in the table:

S: Signature without further action

PI, PII: Additional Protocols to the Treaty of Tlatelolco

P1, P2, P3: Protocols to the Treaty of Rarotonga

CP: Party entitled to participate in the consultative meetings provided for in Article IX of the Antarctic Treaty

SA: Nuclear safeguards agreement in force with the International Atomic Energy Agency as required by the Non-Proliferation Treaty or the Treaty of Tlatelolco, or concluded by a nuclear weapon state on a voluntary basis.

5. The footnotes are listed at the end of the table and are grouped separately under the heading for each agreement. The texts of the statements contained in the footnotes have been abridged, but the wording is close to the original version.

6. A complete list of UN member states and year of membership appears in section III.

State	Geneva Protocol	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty	Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention	Enmod Convention	'Inhumane Weapons' Convention	Treaty of Rarotonga
Afghanistan	1986		1964	1988	1970	1971 SA	1975	1985	S		
Algeria			S								
Antigua and Barbuda			1981 ¹	1988 ¹	1983 ²	1985 ¹	1988 ¹³		1988 ⁸		
Argentina	1969	1961 CP	1986	1969	S ¹		1983 ¹	1979	1987 ¹	S	
Australia	1930 ¹	1961 CP	1963	1967		1973 SA	1973	1977	1984	1983	1986
Austria	1928	1987	1964	1968		1969 SA	1972	1973 ¹		1983	
Bahamas			1976 ¹	1976 ¹	1977 ²	1976 ¹		1986			
Bahrain	1988 ^{1,3}					1988 ²		1988 ²			
Bangladesh			1985	1986		1979 SA		1985	1979		
Barbados	1976 ²			1968	1969 ²	1980		1973			
Belgium	1928 ¹	1960 CP	1966	1973		1975 SA	1972	1979	1982	S	

Belize					1985 ¹		1986			
Benin	1986		1964	1986		1972	1986	1975	1986	
Bhutan	1978		1978			1985		1978		
Bolivia	1985		1965	S	1969 ²	1970	S	1975	S	
Botswana			1968 ¹	S		1969	1972	S		
Brazil	1970	1975 CP	1964	1969 ²	1968 ³		1988 ²	1973	1984	
Brunei Darussalam						1985 SA				
Bulgaria	1934 ¹	1978	1963	1967		1969 SA	1971	1972	1978	1982
Burkina Faso (formerly Upper Volta)	1971		S	1968		1970				
Burma			1963	1970			S	S		
Burundi			S	S		1971	S	S		
Byelorussia	1970 ⁴		1963 ²	1967 ³			1971	1975	1978	1982
Cameroon			S	S		1969	S			

State	Geneva Protocol	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty	Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention	Enmod Convention	'Inhumane Weapons' Convention	Treaty of Rarotonga
Canada	1930 ¹	1988	1964	1967		1969 SA	1972 ³	1972	1981	S	
Cape Verde			1979			1979	1979	1977	1979		
Central African Republic	1970		1964	S		1970	1981	S			
Chad			1965			1971					
Chile	1935 ¹	1961 CP	1965	1981	1974 ⁴			1980			
China	1929 ⁵	1983 CP		1983	PII: 1974 ⁵			1984 ³		1982 ¹	P2:1988 ¹ P3:1988 ¹
Colombia			1985	S	1972 ² SA	1986	S	1983			
Congo						1978	1978	1978			
Cook Islands											1985
Costa Rica			1967		1969 ² SA ¹⁶	1970 SA	S	1973			

Côte d'Ivoire	1970		1965			1973 SA	1972	S			
Cuba	1966	1984		1977 ⁴			1977 ⁴	1976	1978	1987	
Cyprus	1966 ²		1965	1972		1970 SA	1971	1973	1978	1988 ²	
Czechoslovakia	1938 ⁶	1962	1963	1967		1969 SA	1972	1973	1978	1982	
Denmark	1930	1965	1964	1967		1969 SA	1971	1973	1978	1982	
Dominica						1984 ¹					
Dominican Republic	1970		1964	1968	1968 ² SA ¹⁶	1971 SA	1972	1973			
Ecuador	1970	1987	1964	1969	1969 ² SA ¹⁶	1969 SA		1975		1982	
Egypt	1928		1964	1967		1981 ³ SA		S	1982	S	
El Salvador	S		1964	1969	1968 ² SA ¹⁶	1972 SA		S			
Equatorial Guinea						1984	S				

State	Geneva Protocol	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty	Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention	Enmod Convention	'Inhumane Weapons' Convention	Treaty of Rarotonga
Ethiopia	1935		S	S		1970 SA	1977	1975	S		
Fiji	1973 ^{1,2}		1972 ¹	1972 ¹		1972 ¹ SA		1973			1985
Finland	1929	1984	1964	1967		1969 SA	1971	1974	1978	1982	
France	1926 ¹	1960 CP		1970	PI: S ⁶ PII: 1974 ⁷	⁴		1984		1988 ³	
Gabon			1964			1974		S			
Gambia	1966 ²		1965 ¹	S		1975 SA	S	S			
German Dem. Republic	1929	1974 ¹ CP	1963	1967		1969 SA	1971	1972	1978	1982	
FR Germany	1929	1979 ² CP	1964 ⁴	1971 ⁵		1975 ⁵ SA	1975 ⁵	1983 ⁴	1983 ²	S	
Ghana	1967		1963	S		1970 SA	1972	1975	1978		

Greece	1931	1987	1963	1971		1970 SA	1985	1975	1983	S	
Grenada					1975 ²	1975 ¹		1986			
Guatemala	1983		1964 ³		1970 ² SA ¹⁶	1970 SA	S	1973	1988 ³	1983	
Guinea						1985	S				
Guinea-Bissau			1976	1976		1976	1976	1976			
Guyana				S				S			
Haiti			S	S	1969 ²	1970		S			
Holy See (Vatican City)	1966			S		1971 ⁶ SA			S		
Honduras			1964	S	1968 ² SA ¹⁶	1973 SA	S	1979			
Hungary	1952	1984	1963	1967		1969 SA	1971	1972	1978	1982	
Iceland	1967		1964	1968		1969 SA	1972	1973	S	S	
India	1930 ¹	1983 CP	1963	1982			1973 ⁶	1974 ⁵	1978	1984	

State	Geneva Protocol	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty	Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention	Enmod Convention	'Inhumane Weapons' Convention	Treaty of Rarotonga
Indonesia	1971 ²		1964	S		1979 ⁷ SA		S			
Iran	1929		1964	S		1970 SA	1971	1973	S		
Iraq	1931 ¹		1964	1968		1969 SA	1972 ⁴	S	S		
Ireland	1930 ⁷		1963	1968		1968 SA	1971	1972 ⁶	1982	S	
Israel	1969 ⁸		1964	1977							
Italy	1928	1981 CP	1964	1972		1975 ⁸ SA	1974 ⁷	1975	1981	S ⁴	
Jamaica	1970 ²		S	1970	1969 ² SA ¹⁶	1970 SA	1986	1975			
Japan	1970	1960 CP	1964	1967		1976 ⁹ SA	1971	1982	1982	1982	
Jordan	1977 ⁹		1964	S		1970 SA	1971	1975			
Kampuchea	1983 ¹⁰					1972	S	1983			

Kenya	1970		1965	1984		1970		1976		
Kiribati						1985 ¹				1986
Korea, Democratic People's Rep. of	1988 ^{1,11}	1987				1985		1987	1984	
Korea, Republic of	1988 ¹	1986	1964 ³	1967 ⁴		1975 ^{10,11} SA	1987	1987 ⁷	1986 ⁴	
Kuwait	1971 ¹²		1965 ⁵	1972 ⁶		S		1972 ⁸	1980 ⁵	
Lao People's Dem. Republic			1965	1972		1970	1971	1973	1978	1983
Lebanon	1969		1965	1969		1970 SA	S	1975	S	
Lesotho	1972 ²			S		1970 SA	1973	1977		
Liberia	1927		1964			1970	S	S	S	
Libya	1971 ¹³		1968	1968		1975 SA		1982		
Liechtenstein						1978 ¹² SA				S

State	Geneva Protocol	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty	Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention	Enmod Convention	'Inhumane Weapons' Convention	Treaty of Rarotonga
Luxembourg	1936		1965	S		1975 SA	1982	1976	S	S	
Madagascar	1967		1965	1968 ⁷		1970 SA	S	S			
Malawi	1970		1964 ¹			1986		S	1978		
Malaysia	1970		1964	S		1970 SA	1972	S			
Maldives	1966 ²					1970 SA					
Mali			S	1968		1970	S	S			
Malta	1970 ²		1964 ¹			1970	1971	1975			
Mauritania			1964								
Mauritius	1970 ²		1969 ¹	1969 ¹		1969 SA	1971	1972			
Mexico	1932		1963	1968	1967 ^{2,8} SA	1969 ¹³ SA	1984 ⁸	1974 ⁹		1982	

[illegible]

State	Geneva Protocol	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty	Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention	Enmod Convention	'Inhumane Weapons' Convention	Treaty of Rarotonga
Norway	1932	1960 CP	1963	1969		1969 SA	1971	1973	1979	1983	
Pakistan	1960 ²		1988	1968				1974	1986	1985	
Panama	1970		1966	S	1971 ² SA	1977	1974	1974			
Papua New Guinea	1981 ¹	1981	1980 ¹	1980 ¹		1982 SA		1980	1980		S
Paraguay	1933 ¹⁶		S		1969 ² SA ¹⁶	1970 SA	S	1976			
Peru	1985	1981	1964	1979	1969 ² SA ¹⁶	1970 SA		1985			
Philippines	1973		1965 ³	S		1972 SA		1973		S	
Poland	1929	1961 CP	1963	1968		1969 SA	1971	1973	1978	1983	
Portugal	1930 ¹		S			1977 SA	1975	1975	S	S	
Qatar	1976						1974	1975			

Romania	1929 ¹	1971 ³	1963	1968		1970 SA	1972	1979	1983	S ⁶	
Rwanda	1964 ²		1963	S		1975	1975	1975			
Saint Lucia	1988					1979 ¹		1986 ¹⁰			
Saint Vincent and the Grenadines						1984 ¹					
Samoa, Western			1965			1975 SA					1986
San Marino			1964	1968		1970 ¹⁰		1975			
Sao Tome and Principe						1983	1979	1979	1979		
Saudi Arabia	1971			1976		1988	1972	1972			
Senegal	1977		1964			1970 SA	S	1975			
Seychelles			1985	1978		1985	1985	1979			
Sierra Leone	1967		1964	1967		1975	S	1976	S	S	
Singapore			1968 ¹	1976		1976 SA	1976	1975			

State	Geneva Protocol	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty	Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention	Enmod Convention	'Inhumane Weapons' Convention	Treaty of Rarotonga
Solomon Islands	1981					1981 ¹	1981 ¹³	1981 ¹⁰	1981 ⁸		S
Somalia			S	S		1970		S			
South Africa	1930 ¹	1960 CP	1963	1968			1973	1975			
Spain	1929 ¹⁷	1982 CP	1964	1968		1987	1987	1979	1978	S	
Sri Lanka	1954		1964	1986		1979 SA		1986	1978		
Sudan	1980		1966			1973 SA	S			S	
Suriname					1977 ² SA ¹⁶	1976 ¹ SA					
Swaziland			1969			1969 SA	1971				
Sweden	1930	1984 CP	1963	1967		1970 SA	1972	1976	1984	1982	
Switzerland	1932		1964	1969		1977 ¹² SA	1976	1976 ¹¹	1988 ⁹	1982	
Syria	1968 ¹⁸		1964	1968 ⁸		1969 ¹⁰		S	S		

[illegible]

State	Geneva Protocol	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty	Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention	Enmod Convention	'Inhumane Weapons' Convention	Treaty of Rarotonga
Uruguay	1977	1980 ⁴ CP	1969	1970	1968 ² SA ¹⁶	1970 SA	S	1981			
USA	1975 ²⁰	1960 CP	1963	1967	PI: 1981 ¹² PII: 1971 ¹³	1970 SA ¹⁷	1972	1975	1980	S ⁷	
USSR	1928 ²¹	1960 CP	1963	1967	PII: 1979 ¹⁴	1970 SA ¹⁸	1972	1975	1978	1982	P2 1988 ² P3 1988 ²
Venezuela	1928		1965	1970	1970 ^{2,15} SA ¹⁶	1975 SA		1978			
Viet Nam	1980 ¹			1980		1982	1980 ¹¹	1980	1980	S	
Yemen Arab Republic	1971		S			1986	S	S	1977		
Yemen, People's Dem. Republic of	1986 ²²		1979	1979		1979	1979	1979	1979		
Yugoslavia	1929 ²³		1964	S		1970 ¹⁹ SA	1973 ¹²	1973		1983	
Zaire			1965	S		1970 SA		1977	S		
Zambia			1965 ¹	1973			1972				

The 1925 Geneva Protocol

¹ The Protocol is binding on this state only as regards states which have signed and ratified or acceded to it. The Protocol will cease to be binding on this state in regard to any enemy state whose armed forces or whose allies fail to respect the prohibitions laid down in it.

Australia withdrew its reservation in 1986, New Zealand in 1989.

² Notification of succession. (In notifying its succession to the obligations contracted in 1930 by the UK, Barbados stated that as far as it was concerned the reservation made by the UK was to be considered as withdrawn.)

³ The accession of Bahrain to the Protocol shall in no way constitute recognition of Israel or be a cause for the establishment of any relations with it.

⁴ In a note of 2 Mar. 1970, submitted at the UN, Byelorussia stated that 'it recognizes itself to be a party' to the Protocol.

⁵ On 13 July 1952 the People's Republic of China issued a statement recognizing as binding upon it the 1929 accession to the Protocol in the name of China. China considers itself bound by the Protocol on condition of reciprocity on the part of all the other contracting and acceding powers.

⁶ Czechoslovakia shall cease to be bound by this Protocol towards any state whose armed forces, or the armed forces of whose allies, fail to respect the prohibitions laid down in the Protocol.

⁷ Ireland does not intend to assume, by this accession, any obligation except towards the states having signed and ratified this Protocol or which shall have finally acceded thereto, and should the armed forces or the allies of an enemy state fail to respect the Protocol, the government of Ireland would cease to be bound by the said Protocol in regard to such state. In Feb. 1972, Ireland declared that it had decided to withdraw the above reservations made at the time of accession to the Protocol.

⁸ The Protocol is binding on Israel only as regards states which have signed and ratified or acceded to it. The Protocol shall cease to be binding on Israel as regards any enemy state whose armed forces, or the armed forces of whose allies, or the regular or irregular forces, or groups or individuals operating from its territory, fail to respect the prohibitions which are the object of the Protocol.

⁹ The accession by Jordan to the Protocol does not in any way imply recognition of Israel. Jordan undertakes to respect the obligations contained in the Protocol with regard to states which have undertaken similar commitments. It is not bound by the Protocol as regards states whose armed forces, regular or irregular, do not respect the provisions of the Protocol.

¹⁰ The accession was made on behalf of the coalition government of Democratic Kampuchea (the government in exile), with a statement that the Protocol will cease to be binding on it in regard to any enemy state whose armed forces or whose allies fail to respect the prohibitions laid down in the Protocol. France declared that as a party to the Geneva Protocol (but not as the depositary) it considers this accession to have no effect. A similar statement was made by Australia, Bulgaria, Cuba, Czechoslovakia, GDR, Hungary, Mauritius, Netherlands, Poland, Romania, USSR and Viet Nam, which do not recognize the coalition government of Kampuchea.

¹¹ The People's Dem. Rep. of Korea states that it will not exclude the right to exercise its sovereignty *vis-à-vis* the other contracting party which violates the Protocol in its implementation.

¹² The accession of Kuwait to the Protocol does not in any way imply recognition of Israel or the establishment of relations with the latter on the basis of the present Protocol. In case of breach of the prohibition laid down in this Protocol by any of the parties, Kuwait will not be bound, with regard to the party committing the breach, to apply the provisions of this Protocol.

¹³ The accession to the Protocol does not imply recognition of Israel. The Protocol is binding on Libya only as regards states which are effectively bound by it and will cease to be binding on Libya as regards states whose armed forces, or the armed forces of whose allies, fail to respect the prohibitions which are the object of this Protocol.

¹⁴ In the case of violation of this prohibition by any state in relation to Mongolia or its allies, Mongolia shall not consider itself bound by the obligations of the Protocol towards that state.

¹⁵ As regards the use in war of asphyxiating, poisonous or other gases and of all analogous liquids, materials or devices, this Protocol shall cease to be binding on the Netherlands with regard to any enemy state whose armed forces or whose allies fail to respect the prohibitions laid down in the Protocol.

¹⁶ This is the date of receipt of Paraguay's instrument of accession. The date of the notification by the depositary government 'for the purpose of regularization' is 1969.

¹⁷ Spain declared the Protocol as binding *ipso facto*, without special agreement with respect to any other member or state accepting and observing the same obligation, that is, on condition of reciprocity.

¹⁸ The accession by Syria to the Protocol does not in any case imply recognition of Israel or lead to the establishment of relations with the latter concerning the provisions laid down in the Protocol.

¹⁹ The Protocol, signed in 1929 in the name of China, is taken to be valid for Taiwan which is part of China. However, unlike the People's Republic of China, Taiwan has not reconfirmed its accession to the Protocol.

²⁰ The Protocol shall cease to be binding on the USA with respect to the use in war of asphyxiating, poisonous or other gases, and of all analogous liquids, materials, or devices, in regard to an enemy state if such state or any of its allies fail to respect the prohibitions laid down in the Protocol.

²¹ The Protocol only binds the USSR in relation to the states which have signed and ratified or which have definitely acceded to the Protocol. The Protocol shall cease to be binding on the USSR in regard to any enemy state whose armed forces or whose allies *de jure* or in fact do not respect the prohibitions which are the object of this Protocol.

²² In case any party fails to observe the prohibition under the Protocol, the People's Democratic Republic of Yemen will consider itself free of its obligation.

²³ The Protocol shall cease to be binding on Yugoslavia in regard to any enemy state whose armed forces or whose allies fail to respect the prohibitions which are the object of the Protocol.

The Antarctic Treaty

¹ The GDR stated that in its view Article XIII, paragraph 1 of the Treaty was inconsistent with the principle that all states whose policies are guided by the purposes and principles of the UN Charter have a right to become parties to treaties which affect the interests of all states.

² FR Germany stated that the Treaty applies also to Berlin (West).

³ Romania stated that the provisions of Article XIII, paragraph 1 of the Treaty were not in accordance with the principle according to which multilateral treaties whose object and purposes concern the international community, as a whole, should be open for universal participation.

⁴ In acceding to the Treaty, Uruguay proposed the establishment of a general and definitive statute on Antarctica in which the interests of all states involved and of the international community as a whole would be considered equitably. It also declared that it reserved its rights in Antarctica in accordance with international law.

The Partial Test Ban Treaty

¹ Notification of succession.

² The USA considers that Byelorussia and Ukraine are already covered by the signature and ratification by the USSR.

³ With a statement that this does not imply the recognition of any territory or regime not recognized by this state.

⁴ FR Germany stated that the Treaty applies also to Berlin (West).

⁵ Kuwait stated that its signature and ratification of the Treaty do not in any way imply its recognition of Israel nor oblige it to apply the provisions of the Treaty in respect of the said country.

⁶ The UK stated its view that if a regime is not recognized as the government of a state, neither signature nor the deposit of any instrument by it, nor notification of any of those acts, will bring about recognition of that regime by any other state.

The Outer Space Treaty

¹ Notification of succession.

² Brazil interprets Article X of the Treaty as a specific recognition that the granting of tracking facilities by the parties to the Treaty shall be subject to agreement between the states concerned.

³ The USA considers that Byelorussia and Ukraine are already covered by the signature and ratification by the USSR.

⁴ With a statement that this does not imply the recognition of any territory or regime not recognized by this state.

⁵ FR Germany stated that the Treaty applies also to Berlin (West).

⁶ Kuwait acceded to the Treaty with the understanding that this does not in any way imply its recognition of Israel and does not oblige it to apply the provisions of the Treaty in respect of the said country.

⁷ Madagascar acceded to the Treaty with the understanding that under Article X of the Treaty the state shall retain its freedom of decision with respect to the possible installation of foreign observation bases in its territory and shall continue to possess the right to fix, in each case, the conditions for such installation.

⁸ Syria acceded to the Treaty with the understanding that this should not mean in any way the recognition of Israel, nor should it lead to any relationship with Israel that could arise from the Treaty.

⁹ China declared as illegal and null and void the signature and ratification of the Outer Space Treaty by the Taiwan authorities.

The Treaty of Tlatelolco

¹ On signing the Treaty, Argentina stated that it understands Article 18 as recognizing the rights of parties to carry out, by their own means or in association with third parties, explosions of nuclear devices for peaceful purposes, including explosions which involve devices similar to those used in nuclear weapons.

² The Treaty is in force for this country due to a declaration, annexed to the instrument of ratification in accordance with Article 28, paragraph 2, which waived the requirements for the entry into force of the Treaty, specified in paragraph 1 of that Article: namely, that all states in the region deposit the instruments of ratification; that Protocol I and Protocol II be signed and ratified by those states to which they apply; and that agreements on safeguards be concluded with the IAEA. (Colombia made this declaration subsequent to the deposit of ratification, as did Nicaragua and Trinidad and Tobago.)

³ On signing the Treaty, Brazil stated that, according to its interpretation, Article 18 of the Treaty gives the signatories the right to carry out, by their own means or in association with third parties, nuclear explosions for peaceful purposes, including explosions which involve devices similar to those used in nuclear weapons. This statement was reiterated at the ratification. Brazil also stated that it did not waive the requirements for the entry into force of the Treaty laid down in Article 28. *The Treaty is therefore not yet in force for Brazil.*

⁴ Chile has not waived the requirements for the entry into force of the Treaty laid down in Article 28. *The Treaty is therefore not yet in force for Chile.*

⁵ On signing Protocol II, China stated, *inter alia*: China will never use or threaten to use nuclear weapons against non-nuclear Latin American countries and the Latin American nuclear weapon-free zone; nor will China test, manufacture, produce, stockpile, install or deploy nuclear weapons in these countries or in this zone, or send its means of transportation and delivery carrying nuclear weapons to cross the territory, territorial sea or airspace of Latin American countries. The signing of the Protocol does not imply any change whatsoever in China's stand on the disarmament and nuclear weapons issue and, in particular, does not affect its stand against the Non-Proliferation Treaty and the Partial Test Ban Treaty.

China holds that, in order that Latin America may truly become a nuclear weapon-free zone, all nuclear countries, and particularly the superpowers, must undertake not to use or threaten to use nuclear weapons against the Latin American countries and the Latin American nuclear weapon-free zone, and implement the following undertakings: (1) dismantle all foreign military bases in Latin America and refrain from establishing new bases there, and (2) prohibit the passage of any means of transportation and delivery carrying nuclear weapons through Latin American territory, territorial sea or airspace.

⁶ On signing Protocol I, France made the following reservations and interpretative statements: The Protocol, as well as the provisions of the Treaty to which it refers, will not affect the right of self-defence under Article 51 of the UN Charter; the application of the legislation referred to in Article 3 of the Treaty relates to legislation which is consistent with international law; the obligations under the Protocol shall not apply to transit across the territories of the French Republic situated in the zone of the Treaty, and destined to other territories of the French Republic; the Protocol shall not limit, in any way, the participation of the populations of the French territories in the activities mentioned in Article 1 of the Treaty, and in efforts connected with the national defence of France; the provisions of Articles 1 and 2 of the Protocol apply to the text of the Treaty as it stands at the time when the Protocol is signed by France, and consequently no amendment to the Treaty that might come into force under Article 29 thereof would be binding on the government of France without the latter's express consent.

⁷ On signing Protocol II, France stated that it interprets the undertaking contained in Article 3 of the Protocol to mean that it presents no obstacle to the full exercise of the right of self-defence enshrined in Article 51 of the UN Charter; it takes note of the interpretation of the Treaty given by the Preparatory Commission for the Denuclearization of Latin America and reproduced in the Final Act, according to which the Treaty does not apply to transit, the granting or denying of which lies within the exclusive competence of each state party in accordance with the pertinent principles and rules of international law; it considers that the application of the legislation referred to in Article 3 of the Treaty relates to legislation which is consistent with international law. The provisions of Articles 1 and 2 of the Protocol apply to the text of the Treaty as it stands at the time when the Protocol is signed by France. Consequently, no amendment to the Treaty that might come into force under the provision of Article 29 would be binding on the government of France without the latter's express consent. If this declaration of interpretation is contested in part or in whole by one or more contracting parties to the Treaty or to Protocol II, these instruments would be null and void as far as relations between France and the contesting state or states are concerned. On depositing its instrument of ratification of Protocol II, France stated that it did so subject to the statement made on signing the Protocol. On 15 Apr. 1974, France made a supplementary statement to the effect that it was prepared to consider its obligations under Protocol II as applying not only to the signatories of the Treaty, but also to the territories for which the statute of denuclearization was in force in conformity with Article 1 of Protocol I.

⁸ On signing the Treaty, Mexico said that if technological progress makes it possible to differentiate between nuclear weapons and nuclear devices for peaceful purposes, it will be necessary to amend the relevant provisions of the Treaty, according to the procedures established therein.

⁹ The Netherlands stated that Protocol I shall not be interpreted as prejudicing the position of the Netherlands as regards its recognition or non-recognition of the rights or of claims to sovereignty of the parties to the Treaty, or of the grounds on which such claims are made.

¹⁰ Nicaragua stated that it reserved the right to use nuclear energy for peaceful purposes such as the removal of earth for the construction of canals, irrigation works, power plants, and so on, as well as to allow the transit of atomic material through its territory.

¹¹ When signing and ratifying Protocol I and Protocol II, the UK made the following declarations of understanding:

In connection with Article 3 of the Treaty, defining the term 'territory' as including the territorial sea, airspace and any other space over which the state exercises sovereignty in accordance with 'its own legislation', the UK does not regard its signing or ratification of the Protocols as implying recognition of any legislation which does not, in its view, comply with the relevant rules of international law.

The Treaty does not permit the parties to carry out explosions of nuclear devices for peaceful purposes unless and until advances in technology have made possible the development of devices for such explosions which are not capable of being used for weapon purposes.

The signing and ratification by the UK could not be regarded as affecting in any way the legal status of any territory for the international relations of which the UK is responsible, lying within the limits of the geographical zone established by the Treaty.

Should a party to the Treaty carry out any act of aggression with the support of a nuclear weapon state, the UK would be free to reconsider the extent to which it could be regarded as committed by the provisions of Protocol II.

In addition, the UK declared that its undertaking under Article 3 of Protocol II not to use or threaten to use nuclear weapons against the parties to the Treaty extends also to territories in respect of which the undertaking under Article I of Protocol I becomes effective.

¹² The USA ratified Protocol I with the following understandings: The provisions of the Treaty made applicable by this Protocol do not affect the exclusive power and legal competence under international law of a state adhering to this Protocol to grant or deny transit and transport privileges to its own or any other vessels or aircraft irrespective of cargo or armaments; the provisions of the Treaty made applicable by this Protocol do not

affect rights under international law of a state adhering to this Protocol regarding the exercise of the freedom of the seas, or regarding passage through or over waters subject to the sovereignty of a state, and the declarations attached by the United States to its ratification of Protocol II apply also to its ratification of Protocol I.

¹³ The USA signed and ratified Protocol II with the following declarations and understandings:

In connection with Article 3 of the Treaty, defining the term 'territory' as including the territorial sea, airspace and any other space over which the state exercises sovereignty in accordance with 'its own legislation', the ratification of the Protocol could not be regarded as implying recognition of any legislation which does not, in the view of the USA, comply with the relevant rules of international law.

Each of the parties retains exclusive power and legal competence, unaffected by the terms of the Treaty, to grant or deny non-parties transit and transport privileges.

As regards the undertaking not to use or threaten to use nuclear weapons against the parties, the USA would consider that an armed attack by a party, in which it was assisted by a nuclear weapon state, would be incompatible with the party's obligations under Article 1 of the Treaty.

The definition contained in Article 5 of the Treaty is understood as encompassing all nuclear explosive devices; Articles 1 and 5 of the Treaty restrict accordingly the activities of the parties under paragraph 1 of Article 18.

Article 18, paragraph 4 permits, and US adherence to Protocol II will not prevent, collaboration by the USA with the parties to the Treaty for the purpose of carrying out explosions of nuclear devices for peaceful purposes in a manner consistent with a policy of not contributing to the proliferation of nuclear weapon capabilities.

The USA will act with respect to such territories of Protocol I adherents, as are within the geographical area defined in Article 4, paragraph 2 of the Treaty, in the same manner as Protocol II requires it to act with respect to the territories of the parties.

¹⁴ The USSR signed and ratified Protocol II with the following statement:

The USSR proceeds from the assumption that the effect of Article 1 of the Treaty extends, as specified in Article 5 of the Treaty, to any nuclear explosive device and that, accordingly, the carrying out by any party to the Treaty of explosions of nuclear devices for peaceful purposes would be a violation of its obligations under Article 1 and would be incompatible with its non-nuclear status. For states parties to the Treaty, a solution to the problem of peaceful nuclear explosions can be found in accordance with the provisions of Article V of the Non-Proliferation Treaty and within the framework of the international procedures of the IAEA. The signing of the Protocol by the USSR does not in any way signify recognition of the possibility of the force of the Treaty being extended beyond the territories of the states parties to the Treaty, including airspace and territorial waters as defined in accordance with international law. With regard to the reference in Article 3 of the Treaty to 'its own legislation' in connection with the territorial waters, airspace and any other space over which the states parties to the Treaty exercise sovereignty, the signing of the Protocol by the USSR does not signify recognition of their claims to the exercise of sovereignty which are contrary to generally accepted standards of international law. The USSR takes note of the interpretation of the Treaty given in the Final Act of the Preparatory Commission for the Denuclearization of Latin America to the effect that the transport of nuclear weapons by the parties to the Treaty is covered by the prohibitions in Article 1 of the Treaty. The USSR reaffirms its position that authorizing the transit of nuclear weapons in any form would be contrary to the objectives of the Treaty, according to which, as specially mentioned in the preamble, Latin America must be completely free from nuclear weapons, and that it would be incompatible with the non-nuclear status of the states parties to the Treaty and with their obligations as laid down in Article 1 thereof.

Any actions undertaken by a state or states parties to the Treaty which are not compatible with their non-nuclear status, and also the commission by one or more states parties to the Treaty of an act of aggression with the support of a state which is in possession of nuclear weapons or together with such a state, will be regarded by the USSR as incompatible with the obligations of those countries under the Treaty. In such cases the USSR reserves the right to reconsider its obligations under Protocol II. It further reserves the right to reconsider its attitude to this Protocol in the event of any actions on the part of other states possessing nuclear weapons which are incompatible with their obligations under the said Protocol. The provisions of the articles of Protocol II are applicable to the text of the Treaty of Tlatelolco in the wording of the Treaty at the time of the signing of the Protocol by the Soviet Union, due account being taken of the position of the USSR as set out in the present statement. Any amendment to the Treaty entering into force in accordance with the provisions of Articles 29 and 6 of the Treaty without the clearly expressed approval of the USSR shall have no force as far as the USSR is concerned.

In addition, the USSR proceeds from the assumption that the obligations under Protocol II also apply to the territories for which the status of the denuclearized zone is in force in conformity with Protocol I of the Treaty.

¹⁵ Venezuela stated that in view of the existing controversy between Venezuela on the one hand and the UK and Guyana on the other, Article 25, paragraph 2 of the Treaty should apply to Guyana. This paragraph provides that no political entity should be admitted, part or all of whose territory is the subject of a dispute or claim between an extra-continental country and one or more Latin American states, so long as the dispute has not been settled by peaceful means.

¹⁶ Safeguards under the Non-Proliferation Treaty cover the Treaty of Tlatelolco.

The Non-Proliferation Treaty

¹ Notification of succession.

² Bahrain declared that its accession to the Treaty shall in no way constitute recognition of Israel or be a cause of establishment of any relations of any kind therewith.

³ On the occasion of the deposit of the instrument of ratification, Egypt stated that since it was embarking on the construction of nuclear power reactors, it expected assistance and support from industrialized nations with a developed nuclear industry. It called upon nuclear weapon states to promote research and development of

peaceful applications of nuclear explosions in order to overcome all the difficulties at present involved therein. Egypt also appealed to these states to exert their efforts to conclude an agreement prohibiting the use or threat of use of nuclear weapons against any state, and expressed the view that the Middle East should remain completely free of nuclear weapons.

⁴ France, not party to the Treaty, declared that it would behave like a state adhering to the Treaty and that it would follow a policy of strengthening appropriate safeguards relating to nuclear equipment, material and technology. On 12 Sep. 1981 an agreement between France, the European Atomic Energy Community (Euratom) and the IAEA for the application of safeguards in France entered into force. The agreement covers nuclear material and facilities notified to the IAEA by France.

⁵ On depositing the instrument of ratification, FR Germany reiterated the declaration made at the time of signing: it reaffirmed its expectation that the nuclear weapon states would intensify their efforts in accordance with the undertakings under Article VI of the Treaty, as well as its understanding that the security of FR Germany continued to be ensured by NATO; it stated that no provision of the Treaty may be interpreted in such a way as to hamper further development of European unification; that research, development and use of nuclear energy for peaceful purposes, as well as international and multinational co-operation in this field, must not be prejudiced by the Treaty; that the application of the Treaty, including the implementation of safeguards, must not lead to discrimination of the nuclear industry of FR Germany in international competition; and that it attached vital importance to the undertaking given by the USA and the UK concerning the application of safeguards to their peaceful nuclear facilities, hoping that other nuclear weapon states would assume similar obligations.

In a separate note, FR Germany declared that the Treaty will also apply to Berlin (West) without affecting Allied rights and responsibilities, including those relating to demilitarization. In notes of 24 July, 19 Aug. and 25 Nov. 1975, respectively, addressed to the US Department of State, Czechoslovakia, the USSR and the GDR stated that this declaration by FR Germany had no legal effect.

⁶ On acceding to the Treaty, the Holy See stated, *inter alia*, that the Treaty will attain in full the objectives of security and peace and justify the limitations to which the states party to the Treaty submit, only if it is fully executed in every clause and with all its implications. This concerns not only the obligations to be applied immediately but also those which envisage a process of ulterior commitments. Among the latter, the Holy See considers it suitable to point out the following:

(a) The adoption of appropriate measures to ensure, on a basis of equality, that all non-nuclear weapon states party to the Treaty will have available to them the benefits deriving from peaceful applications of nuclear technology.

(b) The pursuit of negotiations in good faith of effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective control.

⁷ On signing the Treaty, Indonesia stated, *inter alia*, that it attaches great importance to the declarations of the USA, the UK and the USSR affirming their intention to provide immediate assistance to any non-nuclear weapon state party to the Treaty that is a victim of an act of aggression in which nuclear weapons are used. Of utmost importance, however, is not the action *after* a nuclear attack has been committed but the guarantees to prevent such an attack. Indonesia trusts that the nuclear weapon states will study further this question of effective measures to ensure the security of the non-nuclear weapon states. On depositing the instrument of ratification, Indonesia expressed the hope that the nuclear countries would be prepared to co-operate with non-nuclear countries in the use of nuclear energy for peaceful purposes and implement the provisions of Article IV of the Treaty without discrimination. It also stated the view that the nuclear weapon states should observe the provisions of Article VI of the Treaty relating to the cessation of the nuclear arms race.

⁸ Italy stated that in its belief nothing in the Treaty was an obstacle to the unification of the countries of Western Europe; it noted full compatibility of the Treaty with the existing security agreements; it noted further that when technological progress would allow the development of peaceful explosive devices different from nuclear weapons, the prohibition relating to their manufacture and use shall no longer apply; it interpreted the provisions of Article IX, paragraph 3 of the Treaty, concerning the definition of a nuclear weapon state, in the sense that it referred exclusively to the five countries which had manufactured and exploded a nuclear weapon or other nuclear explosive device prior to 1 Jan. 1967, and stressed that under no circumstance would a claim of pertaining to such category be recognized by Italy for any other state.

⁹ On depositing the instrument of ratification, Japan expressed the hope that France and China would accede to the Treaty; it urged a reduction of nuclear armaments and a comprehensive ban on nuclear testing; appealed to all states to refrain from the threat or use of force involving either nuclear or non-nuclear weapons; expressed the view that peaceful nuclear activities in non-nuclear weapon states party to the Treaty should not be hampered and that Japan should not be discriminated against in favour of other parties in any aspect of such activities. It also urged all nuclear weapon states to accept IAEA safeguards on their peaceful nuclear activities.

¹⁰ A statement was made containing a disclaimer regarding the recognition of states party to the Treaty.

¹¹ On depositing the instrument of ratification, the Republic of Korea took note of the fact that the depositary governments of the three nuclear weapon states had made declarations in June 1968 to take immediate and effective measures to safeguard any non-nuclear weapon state which is a victim of an act or an object of a threat of aggression in which nuclear weapons are used. It recalled that the UN Security Council adopted a resolution to the same effect on 19 June 1968.

¹² On depositing the instruments of accession and ratification, Liechtenstein and Switzerland stated that activities not prohibited under Articles I and II of the Treaty include, in particular, the whole field of energy production and related operations, research and technology concerning future generations of nuclear reactors based on fission or fusion, as well as production of isotopes. Liechtenstein and Switzerland define the term 'source or special fissionable material' in Article III of the Treaty as being in accordance with Article XX of the IAEA Statute, and a modification of this interpretation requires their formal consent; they will accept only such

interpretations and definitions of the terms 'equipment or material especially designed or prepared for the processing, use or production of special fissionable material', as mentioned in Article III of the Treaty, that they will expressly approve; and they understand that the application of the Treaty, especially of the control measures, will not lead to discrimination of their industry in international competition.

¹³ On signing the Treaty, Mexico stated, *inter alia*, that none of the provisions of the Treaty shall be interpreted as affecting in any way whatsoever the rights and obligations of Mexico as a state party to the Treaty of Tlatelolco.

It is the understanding of Mexico that at the present time any nuclear explosive device is capable of being used as a nuclear weapon and that there is no indication that in the near future it will be possible to manufacture nuclear explosive devices that are not potentially nuclear weapons. However, if technological advances modify this situation, it will be necessary to amend the relevant provisions of the Treaty in accordance with the procedure established therein.

¹⁴ The ratification was accompanied by a statement in which Turkey underlined the non-proliferation obligations of the nuclear weapon states, adding that measures must be taken to meet adequately the security requirements of non-nuclear weapon states. Turkey also stated that measures developed or to be developed at national and international levels to ensure the non-proliferation of nuclear weapons should in no case restrict the non-nuclear weapon states in their option for the application of nuclear energy for peaceful purposes.

¹⁵ The UK recalled its view that if a regime is not recognized as the government of a state, neither signature nor the deposit of any instrument by it, nor notification of any of those acts, will bring about recognition of that regime by any other state.

¹⁶ This agreement, signed by the UK, Euratom and the IAEA, provides for the submission of British non-military nuclear installations to safeguards under IAEA supervision.

¹⁷ This agreement provides for safeguards on fissionable material in all facilities within the USA, excluding those associated with activities of direct national security significance.

¹⁸ The agreement provides for the application of IAEA safeguards in Soviet peaceful nuclear facilities designated by the USSR.

¹⁹ In connection with the ratification of the Treaty, Yugoslavia stated, *inter alia*, that it considered a ban on the development, manufacture and use of nuclear weapons and the destruction of all stockpiles of these weapons to be indispensable for the maintenance of a stable peace and international security; it held the view that the chief responsibility for progress in this direction rested with the nuclear weapon powers, and expected these powers to undertake not to use nuclear weapons against the countries which have renounced them as well as against non-nuclear weapon states in general, and to refrain from the threat to use them. It also emphasized the significance it attached to the universality of the efforts relating to the realization of the Non-Proliferation Treaty.

The Sea-Bed Treaty

¹ On signing and ratifying the Treaty, Argentina stated that it interprets the references to the freedom of the high seas as in no way implying a pronouncement of judgement on the different positions relating to questions connected with international maritime law. It understands that the reference to the rights of exploration and exploitation by coastal states over their continental shelves was included solely because those could be the rights most frequently affected by verification procedures. Argentina precludes any possibility of strengthening, through this Treaty, certain positions concerning continental shelves to the detriment of others based on different criteria.

² On signing the Treaty, Brazil stated that nothing in the Treaty shall be interpreted as prejudicing in any way the sovereign rights of Brazil in the area of the sea, the sea-bed and the subsoil thereof adjacent to its coasts. It is the understanding of Brazil that the word 'observation', as it appears in paragraph 1 of Article III of the Treaty, refers only to observation that is incidental to the normal course of navigation in accordance with international law. This statement was repeated at the time of ratification.

³ In depositing the instrument of ratification, Canada declared: Article I, paragraph 1, cannot be interpreted as indicating that any state has a right to implant or emplace any weapons not prohibited under Article I, paragraph 1, on the sea-bed and ocean floor, and in the subsoil thereof, beyond the limits of national jurisdiction, or as constituting any limitation on the principle that this area of the sea-bed and ocean floor and the subsoil thereof shall be reserved for exclusively peaceful purposes. Articles I, II and III cannot be interpreted as indicating that any state but the coastal state has any right to implant or emplace any weapon not prohibited under Article I, paragraph 1 on the continental shelf, or the subsoil thereof, appertaining to that coastal state, beyond the outer limit of the sea-bed zone referred to in Article I and defined in Article II. Article III cannot be interpreted as indicating any restrictions or limitation upon the rights of the coastal state, consistent with its exclusive sovereign rights with respect to the continental shelf, to verify, inspect or effect the removal of any weapon, structure, installation, facility or device implanted or emplaced on the continental shelf, or the subsoil thereof, appertaining to that coastal state, beyond the outer limit of the sea-bed zone referred to in Article I and defined in Article II. On 12 Apr. 1976, FR Germany stated that the declaration by Canada is not of a nature to confer on the government of this country more far-reaching rights than those to which it is entitled under current international law, and that all rights existing under current international law which are not covered by the prohibitions are left intact by the Treaty.

⁴ A statement was made containing a disclaimer regarding recognition of states party to the Treaty.

⁵ On ratifying the Treaty, FR Germany declared that the Treaty will apply to Berlin (West).

⁶ On the occasion of its accession to the Treaty, the government of India stated that as a coastal state, India has, and always has had, full and exclusive rights over the continental shelf adjoining its territory and beyond its territorial waters and the subsoil thereof. It is the considered view of India that other countries cannot use its

continental shelf for military purposes. There cannot, therefore, be any restriction on, or limitation of, the sovereign right of India as a coastal state to verify, inspect, remove or destroy any weapon, device, structure, installation or facility, which might be implanted or emplaced on or beneath its continental shelf by any other country, or to take such other steps as may be considered necessary to safeguard its security. The accession by the government of India to the Treaty is based on this position. In response to the Indian statement, the USA expressed the view that, under existing international law, the rights of coastal states over their continental shelves are exclusive only for the purposes of exploration and exploitation of natural resources, and are otherwise limited by the 1958 Convention on the Continental Shelf and other principles of international law. On 12 Apr. 1976, FR Germany stated that the declaration by India is not of a nature to confer on the government of this country more far-reaching rights than those to which it is entitled under current international law, and that all rights existing under current law which are not covered by the prohibitions are left intact by the Treaty.

⁷ On signing the Treaty, Italy stated, *inter alia*, that in the case of agreements on further measures in the field of disarmament to prevent an arms race on the sea-bed and ocean floor and in their subsoil, the question of the delimitation of the area within which these measures would find application shall have to be examined and solved in each instance in accordance with the nature of the measures to be adopted. The statement was repeated at the time of ratification.

⁸ Mexico declared that in its view no provision of the Treaty can be interpreted to mean that a state has the right to emplace nuclear weapons or other weapons of mass destruction, or arms or military equipment of any type, on the continental shelf of Mexico. It reserves the right to verify, inspect, remove or destroy any weapon, structure, installation, device or equipment placed on its continental shelf, including nuclear weapons or other weapons of mass destruction.

⁹ Ratification of the Treaty by Taiwan is considered by Romania as null and void.

¹⁰ The UK recalled its view that if a regime is not recognized as the government of a state neither signature nor the deposit of any instrument by it, nor notification of any of those acts, will bring about recognition of that regime by any other state.

¹¹ Viet Nam stated that no provision of the Treaty should be interpreted in a way that would contradict the rights of the coastal states with regard to their continental shelf, including the right to take measures to ensure their security.

¹² On 25 Feb. 1974, the Ambassador of Yugoslavia transmitted to the US Secretary of State a note stating that in the view of the Yugoslav Government, Article III, paragraph 1, of the Treaty should be interpreted in such a way that a state exercising its right under this Article shall be obliged to notify in advance the coastal state, in so far as its observations are to be carried out 'within the stretch of the sea extending above the continental shelf of the said state'. On 16 Jan. 1975 the US Secretary of State presented the view of the USA concerning the Yugoslav note, as follows: In so far as the note is intended to be interpretative of the Treaty, the USA cannot accept it as a valid interpretation. In addition, the USA does not consider that it can have any effect on the existing law of the sea. In so far as the note was intended to be a reservation to the Treaty, the USA placed on record its formal objection to it on the grounds that it was incompatible with the object and purpose of the Treaty. The USA also drew attention to the fact that the note was submitted too late to be legally effective as a reservation. A similar exchange of notes took place between Yugoslavia and the UK on 12 Apr. 1976. FR Germany stated that the declaration by Yugoslavia is not of a nature to confer on the government of this country more far-reaching rights than those to which it is entitled under current international law, and that all rights existing under current international law which are not covered by the prohibitions are left intact by the Treaty.

¹³ Notification of succession.

The BW Convention

¹ Considering the obligations resulting from its status as a permanently neutral state, Austria declares a reservation to the effect that its co-operation within the framework of this Convention cannot exceed the limits determined by the status of permanent neutrality and membership of the UN.

² Bahrain declared that its accession to the Convention shall in no way constitute recognition of Israel or be a cause of establishment of any relations of any kind with it.

³ China stated that the BW Convention has the following defects: it fails explicitly to prohibit the use of biological weapons; it does not provide for 'concrete and effective' measures of supervision and verification; and it lacks measures of sanctions in case of violation of the Convention. China hopes that these defects will be corrected at an appropriate time, and also that a convention for complete prohibition of chemical weapons will soon be concluded. The signature and ratification of the Convention by the Taiwan authorities in the name of China are considered illegal and null and void.

⁴ On depositing its instrument of ratification, FR Germany stated that a major shortcoming of the BW Convention is that it does not contain any provisions for verifying compliance with its essential obligations. The Federal Government considers the right to lodge a complaint with the UN Security Council to be an inadequate arrangement. It would welcome the establishment of an independent international committee of experts able to carry out impartial investigations when doubts arise as to whether the Convention is being complied with.

⁵ In a statement made on the occasion of the signature of the Convention, India reiterated its understanding that the objective of the Convention is to eliminate biological and toxin weapons, thereby excluding completely the possibility of their use, and that the exemption with regard to biological agents or toxins, which would be permitted for prophylactic, protective or other peaceful purposes, would not in any way create a loophole in regard to the production or retention of biological and toxin weapons. Also any assistance which might be furnished under the terms of the Convention would be of a medical or humanitarian nature and in conformity with the UN Charter. The statement was repeated at the time of the deposit of the instrument of ratification.

⁶ Ireland considers that the Convention could be undermined if the reservations made by the parties to the 1925 Geneva Protocol were allowed to stand, as the prohibition of possession is incompatible with the right to retaliate, and that there should be an absolute and universal prohibition of the use of the weapons in question. Ireland notified the depositary government for the Geneva Protocol of the withdrawal of its reservations to the Protocol, made at the time of accession in 1930. The withdrawal applies to chemical as well as to bacteriological (biological) and toxin agents of warfare.

⁷ The Republic of Korea stated that the signing and ratification of the Convention does not in any way mean or imply the recognition of any territory or regime which has not been recognized by the Republic of Korea as a state or government.

⁸ In the understanding of Kuwait, its ratification of the Convention does not in any way imply its recognition of Israel, nor does it oblige it to apply the provisions of the Conventions in respect of the said country.

⁹ Mexico considers that the Convention is only a first step towards an agreement prohibiting also the development, production and stockpiling of all chemical weapons, and notes the fact that the Convention contains an express commitment to continue negotiations in good faith with the aim of arriving at such an agreement.

¹⁰ Notification of succession.

¹¹ The ratification by Switzerland contains the following reservations:

1. Owing to the fact that the Convention also applies to weapons, equipment or means of delivery designed to use biological agents or toxins, the delimitation of its scope of application can cause difficulties since there are scarcely any weapons, equipment or means of delivery peculiar to such use; therefore, Switzerland reserves the right to decide for itself what auxiliary means fall within that definition.

2. By reason of the obligations resulting from its status as a perpetually neutral state, Switzerland is bound to make the general reservation that its collaboration within the framework of this Convention cannot go beyond the terms prescribed by that status. This reservation refers especially to Article VII of the Convention as well as to any similar clause that could replace or supplement that provision of the Convention.

In a note of 18 Aug. 1976, addressed to the Swiss Ambassador, the US Secretary of State stated the following view of the USA with regard to the first reservation: The prohibition would apply only to (a) weapons, equipment and means of delivery, the design of which indicated that they could have no other use than that specified, and (b) weapons, equipment and means of delivery, the design of which indicated that they were specifically intended to be capable of the use specified. The USA shares the view of Switzerland that there are few weapons, equipment or means of delivery peculiar to the uses referred to. It does not, however, believe that it would be appropriate, on this ground alone, for states to reserve unilaterally the right to decide which weapons, equipment or means of delivery fell within the definition. Therefore, while acknowledging the entry into force of the Convention between itself and Switzerland, the USA enters its objection to this reservation.

¹² The deposit of the instrument of ratification by Taiwan is considered by the Soviet Union as an illegal act because the government of the People's Republic of China is regarded by the USSR as the sole representative of China.

¹³ The UK recalled its view that if a regime is not recognized as the government of a state, neither signature nor the deposit of any instrument by it nor notification of any of those acts will bring about recognition of that regime by any other state.

The Enmod Convention

¹ Argentina interprets the terms 'widespread, long-lasting or severe effects' in Article I, paragraph 1, of the Convention in accordance with the definition agreed upon in the understanding on that article. It likewise interprets Articles II, III and VIII in accordance with the relevant understandings.

² The FRG declared that the Convention applies also to Berlin (West). The USSR and the GDR stated that the West German declaration was 'illegal', while France, the UK and the USA confirmed its validity.

³ Guatemala accepts the text of Article III on condition that the use of environmental techniques for peaceful purposes does not adversely affect its territory or the use of its natural resources.

⁴ It is the understanding of the Republic of Korea that any technique for deliberately changing the natural state of rivers falls within the meaning of the term 'environmental modification techniques' as defined in Article II of the Convention. It is further understood that military or any other hostile use of such techniques, which could cause flooding, inundation, reduction in the water-level, drying up, destruction of hydrotechnical installations or other harmful consequences, comes within the scope of the Convention, provided it meets the criteria set out in Article I thereof.

⁵ Kuwait made the following reservations and understanding: This Convention binds Kuwait only towards states parties thereto; its obligatory character shall *ipso facto* terminate with respect to any hostile state which does not abide by the prohibition contained therein. It is understood that accession to this Convention does not mean in any way recognition of Israel by Kuwait; furthermore, no treaty relation will arise between Kuwait and Israel.

On 23 June 1980, the UN Secretary-General, the depositary of the Convention, received from the government of Israel a communication stating that Israel would adopt towards Kuwait an attitude of complete reciprocity.

⁶ The Netherlands accepts the obligation laid down in Article I of the Enmod Convention as extending to states which are not party to the Convention and which act in conformity with Article I of this Convention.

⁷ New Zealand declared that, in its interpretation, nothing in the Convention detracts from or limits the obligations of states to refrain from military or any other hostile use of environmental modification techniques which are contrary to international law.

⁸ Notification of succession.

⁹ Because of its obligation incumbent upon it by virtue of its status of perpetual neutrality, Switzerland made a general reservation specifying that its co-operation in the framework of this Convention cannot go beyond the

limits imposed by this status. This reservation refers, in particular, to article V, paragraph 5, of the Convention, and to any similar clause which may replace or supplement this provision in the Convention (or in any other arrangement).

¹⁰ On signing the Convention, Turkey declared that the terms 'widespread', 'long-lasting' and 'severe effects' contained in the Convention need to be more clearly defined, and that so long as this clarification was not made, Turkey would be compelled to interpret for itself the terms in question and, consequently, reserved the right to do so as and when required. Turkey also stated its belief that the difference between 'military or any other hostile purposes' and 'peaceful purposes' should be more clearly defined so as to prevent subjective evaluations.

The 'Inhumane Weapons' Convention

¹ Upon signature, China stated that the Convention fails to provide for supervision or verification of any violation of its clauses, thus weakening its binding force. The Protocol on mines, booby traps and other devices fails to lay down strict restrictions on the use of such weapons by the aggressor on the territory of the victim and to provide adequately for the right of a state victim of an aggression to defend itself by all necessary means. The Protocol on incendiary weapons does not stipulate restrictions on the use of such weapons against combat personnel.

² Cyprus declared that the provisions of Article 7, paragraph 3b, and Article 8 of Protocol II of the Convention will be interpreted in such a way that neither the status of peace-keeping forces or missions of the UN in Cyprus will be affected nor will additional rights be, *ipso jure*, granted to them.

³ France ratified only Protocols I and II. On signing the Convention France stated that it regretted that it had not been possible to reach agreement on the provisions concerning the verification of facts which might be alleged and which might constitute violations of the undertakings subscribed to. It therefore reserved the right to submit, possibly in association with other states, proposals aimed at filling that gap at the first conference to be held pursuant to Article 8 of the Convention and to utilize, as appropriate, procedures that would make it possible to bring before the international community facts and information which, if verified, could constitute violations of the provisions of the Convention and the Protocols annexed thereto. Reservation: Not being bound by the 1977 Additional Protocol I to the Geneva Conventions of 1949, France considers that the fourth paragraph of the preamble to the Convention on prohibitions or restrictions on the use of certain conventional weapons, which reproduces the provisions of Article 35, paragraph 3, of Additional Protocol I, applies only to states parties to that Protocol. France will apply the provisions of the Convention and its three Protocols to all the armed conflicts referred to in Articles 2 and 3 common to the Geneva Conventions of 1949.

⁴ Italy stated its regret that no agreement had been reached on provisions that would ensure respect for the obligations under the Convention. Italy intends to undertake efforts to ensure that the problem of the establishment of a mechanism that would make it possible to fill this gap in the Convention is taken up again at the earliest opportunity in every competent forum.

⁵ The Netherlands made the following statements of understanding: A specific area of land may also be a military objective if, because of its location or other reasons specified in Article 2, paragraph 4, of Protocol II and in Article 1, paragraph 3, of Protocol III, its total or partial destruction, capture, or neutralization in the prevailing circumstances offers a definitive military advantage; military advantage mentioned in Article 3, paragraph 3 under c, of Protocol II, refers to the advantage anticipated from the attack considered as a whole and not only from isolated or particular parts of the attack; in Article 8, paragraph 1, of Protocol II, the words 'as far as it is able' mean 'as far as it is technically able'.

⁶ Romania stated that the provisions of the Convention and its Protocols have a restricted character and do not ensure adequate protection either to the civilian population or to the combatants as the fundamental principles of international humanitarian law require.

⁷ The USA stated that it had strongly supported proposals by other countries to include special procedures for dealing with compliance matters, and reserved the right to propose at a later date additional procedures and remedies, should this prove necessary, to deal with such problems.

The Treaty of Rarotonga

¹ In signing Protocols 2 and 3 China declared that it respected the status of the South Pacific nuclear-free zone and would neither use nor threaten to use nuclear weapons against the zone nor test nuclear weapons in the region. However, China reserved its right to reconsider its obligations under the Protocols if other nuclear weapon states or the contracting parties to the Treaty took any action in 'gross' violation of the Treaty and the Protocols, thus changing the status of the zone and endangering the security interests of China.

² In signing Protocols 2 and 3 the USSR stated the view that admission of transit of nuclear weapons or other nuclear explosive devices by any means, as well as of visits by foreign military ships and aircraft with nuclear explosive devices on board, to the ports and airfields within the nuclear-free zone would contradict the aims of the Treaty of Rarotonga and would be inconsistent with the status of the zone. It also warned that in case of action taken by a party or parties violating their major commitments connected with the nuclear-free status of the zone, as well as in case of aggression committed by one or several parties to the Treaty, supported by a nuclear-weapon state, or together with it, with the use by such a state of the territory, airspace, territorial sea or archipelagic waters of the parties for visits by nuclear weapon-carrying ships and aircraft or for transit of nuclear weapons, the USSR will have the right to consider itself free of its non-use commitments assumed under Protocol 2.

The Soviet Union ratified Protocols 2 and 3 to the Treaty without reference to the conditions included in its statement made at the time of signature. It expressed the hope that all states members of the South Pacific Forum would join the Treaty, and called upon the nuclear powers, which had not done so, to sign and ratify the relevant Protocols.

III. UN member states and year of membership

In the following list of names of the 159 UN member states, the countries marked with an asterisk are also members of the Geneva-based Conference on Disarmament (CD).

- | | | |
|--------------------------------|---------------------------------|-----------------------------------|
| Afghanistan, 1946 | *FR Germany, 1973 | Papua New Guinea, 1975 |
| Albania, 1955 | Ghana, 1957 | Paraguay, 1945 |
| *Algeria, 1962 | Greece, 1945 | *Peru, 1945 |
| Angola, 1976 | Grenada, 1974 | Philippines, 1945 |
| Antigua and Barbuda, 1981 | Guatemala, 1945 | *Poland, 1945 |
| *Argentina, 1945 | Guinea, 1958 | Portugal, 1955 |
| *Australia, 1945 | Guinea-Bissau, 1974 | Qatar, 1971 |
| Austria, 1955 | Guyana, 1966 | *Romania, 1955 |
| Bahamas, 1973 | Haiti, 1945 | Rwanda, 1962 |
| Bahrain, 1971 | Honduras, 1945 | Saint Christopher and Nevis, |
| Bangladesh, 1974 | *Hungary, 1955 | 1983 |
| Barbados, 1966 | Iceland, 1946 | Saint Lucia, 1979 |
| *Belgium, 1945 | *India, 1945 | Saint Vincent and the Grenadines, |
| Belize, 1981 | *Indonesia, 1950 | 1980 |
| Benin, 1960 | *Iran, 1945 | Samoa, Western, 1976 |
| Bhutan, 1971 | Iraq, 1945 | Sao Tome and Principe, 1975 |
| Bolivia, 1945 | Ireland, 1955 | Saudi Arabia, 1945 |
| Botswana, 1966 | Israel, 1949 | Senegal, 1960 |
| *Brazil, 1945 | *Italy, 1955 | Seychelles, 1976 |
| Brunei Darussalam, 1984 | Ivory Coast (see Côte d'Ivoire) | Sierra Leone, 1961 |
| *Bulgaria, 1955 | Jamaica, 1962 | Singapore, 1965 |
| Burkina Faso, 1960 | *Japan, 1956 | Solomon Islands, 1978 |
| *Burma, 1948 | Jordan, 1955 | Somalia, 1960 |
| Burundi, 1962 | Kampuchea, 1955 | South Africa, 1945 |
| Byelorussia, 1945 | *Kenya, 1963 | Spain, 1955 |
| Cameroon, 1960 | Kuwait, 1963 | *Sri Lanka, 1955 |
| *Canada, 1945 | Lao People's Democratic | Sudan, 1956 |
| Cape Verde, 1975 | Republic, 1955 | Suriname, 1975 |
| Central African Republic, 1960 | Lebanon, 1945 | Swaziland, 1968 |
| Chad, 1960 | Lesotho, 1966 | *Sweden, 1946 |
| Chile, 1945 | Liberia, 1945 | Syria, 1945 |
| *China, 1945 | Libya, 1955 | Tanzania, 1961 |
| Colombia, 1945 | Luxembourg, 1945 | Thailand, 1946 |
| Comoros, 1975 | Madagascar, 1960 | Togo, 1960 |
| Congo, 1960 | Malawi, 1964 | Trinidad and Tobago, 1962 |
| Costa Rica, 1945 | Malaysia, 1957 | Tunisia, 1956 |
| Côte d'Ivoire, 1960 | Maldives, 1965 | Turkey, 1945 |
| *Cuba, 1945 | Mali, 1960 | Uganda, 1962 |
| Cyprus, 1960 | Malta, 1964 | *UK, 1945 |
| *Czechoslovakia, 1945 | Mauritania, 1961 | Ukraine, 1945 |
| Denmark, 1945 | Mauritius, 1968 | United Arab Emirates, 1971 |
| Djibouti, 1977 | *Mexico, 1945 | Uruguay, 1945 |
| Dominica, 1978 | *Mongolia, 1961 | *USA, 1945 |
| Dominican Republic, 1945 | *Morocco, 1956 | *USSR, 1945 |
| Ecuador, 1945 | Mozambique, 1975 | Vanuatu, 1981 |
| *Egypt, 1945 | Nepal, 1955 | *Venezuela, 1945 |
| El Salvador, 1945 | *Netherlands, 1945 | Viet Nam, 1977 |
| Equatorial Guinea, 1968 | New Zealand, 1945 | Yemen Arab Republic, 1947 |
| *Ethiopia, 1945 | Nicaragua, 1945 | Yemen, People's Democratic |
| Fiji, 1970 | Niger, 1960 | Republic of, 1967 |
| Finland, 1955 | *Nigeria, 1960 | *Yugoslavia, 1945 |
| *France, 1945 | Norway, 1945 | *Zaire, 1960 |
| Gabon, 1960 | Oman, 1971 | Zambia, 1964 |
| Gambia, 1965 | *Pakistan, 1947 | Zimbabwe, 1980 |
| *German Democratic Republic, | Panama, 1945 | |
| 1973 | | |

Annexe B. Chronology

RAGNHILD FERM

For the convenience of the reader, key words are indicated in the right-hand column, opposite each entry. They refer to the subject-areas covered in the entry. The wording in the entries is as close as possible to the original statements.

4 Jan.	A letter of 16 Dec. 1987 to the Chancellor of FR Germany from the Chairman of the State Council of the GDR is published in East Berlin, suggesting that the WTO would refrain from modernizing its short-range nuclear systems if NATO agrees not to update its arsenal of such weapons.	Short-range nuclear weapons NATO/WTO
5 Jan.	The USSR hands over to India a Charlie Class nuclear-powered submarine under a lease agreement.	NPT
8-15 Jan.	In accordance with an agreement reached at the US-Soviet summit meeting of December 1987 a team of US experts visits the Soviet Semipalatinsk Test Site in order to familiarize themselves with the Soviet test site and prepare for a Joint Verification Experiment (JVE).	USA/USSR Nuclear tests
15 Jan.	Spain formally calls for the withdrawal of the 72 US F-16 fighter aircraft based in Spain within 3 years. It is announced that both parties agree in principle on the framework for a new 8-year friendship, defence and co-operation pact.	US bases
15 Jan.	At the US-Soviet Nuclear and Space Talks (NST) the USSR proposes adding a protocol on defence and space issues to the draft treaty on strategic arms reductions (START).	NST Space: ABM Treaty START
15-16 Jan.	The presidents of Costa Rica, El Salvador, Guatemala, Costa Rica, Honduras and Nicaragua, meeting in San José, Costa Rica, sign an agreement calling for complete compliance with the Central American peace accord and for the establishment of a verification commission composed of the countries' foreign ministers.	Regional conflicts: Central America
22 Jan.	The President of France and the Chancellor of FR Germany sign an agreement on defence and security co-operation. The agreement includes provisions for the creation of a joint council and the formation of a joint brigade.	France/FRG
22 Jan.	The leaders of Argentina, Greece, India, Mexico, Sweden and Tanzania (the Six-Nation Initiative), meeting in Stockholm, stress the need for the establishment of an integrated multilateral verification system within the UN for verification of compliance with disarmament agreements.	UN Nuclear tests

- | | | |
|------------|--|--------------------------------------|
| 22 Jan. | At the US-Soviet Nuclear and Space Talks (NST), the USA presents a draft Space Defense Treaty including elements of an agreement reached at the US-Soviet summit meeting of Dec. 1987. | NST
Space: ABM Treaty
USA/USSR |
| 25-30 Jan. | In accordance with an agreement reached at the US-Soviet summit meeting of Dec. 1987, a team of Soviet experts visits the US Nevada Test Site to familiarize themselves with the site and prepare for a Joint Verification Experiment (JVE). | USA/USSR
Nuclear tests |
| 29 Jan. | The UK and France decide to increase military co-operation. The two governments agree to allow port visits by each other's nuclear submarines and to hold joint manoeuvres to test the possible use of French facilities to reinforce British troops on the continent in time of crisis. | UK/France |
| 8 Feb. | General Secretary Gorbachev announces that Soviet troops would start a 10-month period of withdrawal from Afghanistan on 15 May 1988 if the documents covering all aspects of a settlement are signed in Geneva by 15 Mar. | Regional conflicts:
Afghanistan |
| 8 Feb. | In an article in <i>Pravda</i> the Soviet Defence Minister assesses the US-Soviet military balance and notes asymmetries in nearly all weapon categories. He confirms that the WTO has 20 000 more tanks than NATO while NATO has 50 per cent more helicopters and roughly twice as many anti-tank missiles. The number of troops and artillery of the two sides is about the same. | Conventional forces |
| 25 Feb. | The Soviet Government states that prior to the entering into force of the INF Treaty the USSR will start withdrawing its SS-12 missiles, their launchers and auxiliary equipment from the GDR and Czechoslovakia. The missiles will be transported to sites within the USSR designated in the Memorandum of Understanding of the INF Treaty. | INF Treaty |
| 2-3 Mar. | The heads of state and government of the NATO member states, meeting in Brussels, issue two communiqués:

1. A statement on future conventional arms control. The NATO objectives will be the establishment of a secure and stable balance of conventional forces at lower levels; the elimination of disparities prejudicial to stability and security; the elimination of the capability for launching a surprise attack and for initiating large-scale offensive action.

2. A declaration on the principles and purposes of NATO and its attitude to East-West relations. It is stated that, for the foreseeable future, the strategy of | NATO
CFE |

deterrence for the prevention of war in Europe must be based upon an appropriate mix of adequate and effective nuclear and conventional forces which will continue to be kept up-to-date where necessary.

- | | | |
|----------|---|---|
| 2-3 Mar. | The Greek and Turkish leaders, meeting at the NATO summit conference in Brussels, state that a committee consisting of diplomats and military experts would be convened to examine the contentious issues of military exercises and control of airspace over the Aegean Sea. | Regional conflicts:
Greece/
Turkey |
| 9 Mar. | At the US-Soviet negotiations on nuclear testing in Geneva the US delegation presents a draft verification protocol for the Threshold Test Ban Treaty (TTBT), covering on-site monitoring of all tests above 50 kt. | USA/USSR
Nuclear tests |
| 16 Mar. | In a speech to the Yugoslav parliament General Secretary Gorbachev proposes a freeze of the number of US and Soviet warships in the Mediterranean from 1 July 1988 and suggests that both the superpowers and Mediterranean countries could give advance notice of any naval movement in the Mediterranean as well as invite observers to any exercises. In addition, he says that the USSR would issue all necessary guarantees for a Balkan nuclear weapon-free zone. | USA/USSR
Naval arms control
CSBMs
NWFZ:
Balkans |
| 16 Mar. | The USA reaffirms previous claims that 'Soviet nuclear testing activities for a number of tests constitute a likely violation of legal obligations under the TTBT'. | USA/USSR
Nuclear tests |
| 17 Mar. | The Soviet Defence Minister, meeting the US Defense Secretary in Berne, reaffirms the Soviet readiness to present the necessary data concerning its armed forces in Europe and to start talks on conventional weapons and the question of eliminating imbalances and asymmetry on a mutual basis. | USA/USSR
CFE
Data exchange |
| 17 Mar. | The US State Department reports that Saudi Arabia has purchased Chinese intermediate-range ballistic missiles. | Missile proliferation
NPT |
| 17 Mar. | At the Conference on Disarmament France puts forward the possibility of having a minimum security stock supplemented by a production unit placed under international control, from the moment a chemical weapon convention has entered into force. | CD
CW |
| 22 Mar. | The Nuclear Risk Reduction Centre agreed on by the USA and the USSR on 15 Sep. 1987 is opened in Washington, DC. | USA/USSR
INF Treaty |
| 23 Mar. | In Nicaragua the Sandinistas and the Contras sign a 60-day cease-fire agreement to take effect from 1 Apr. US humanitarian Contras aid for 60 days is to be distributed by neutral organizations (further negotiations to begin on 6 Apr.). | Regional conflicts:
Central America |

25 Mar.	The Commander-in-Chief of the French Navy in the Pacific announces that, in order to prevent serious fractures in the rock of Mururoa that might be caused by repeated underground nuclear explosions, the most powerful blasts will in the future be conducted at Fangataufa, an atoll 40 km from Mururoa.	Nuclear tests
30 Mar.	<p>The WTO Foreign Ministers, meeting in Sofia, issue an appeal to the NATO states and the CSCE to intensify efforts to conclude new disarmament agreements. Points include:</p> <ol style="list-style-type: none"> 1. A 50 per cent reduction of strategic offensive arms and strict observance of the ABM Treaty as it was signed in 1972. 2. A complete prohibition of nuclear tests. 3. A prohibition of chemical weapons. 4. A reduction of armed forces and conventional armaments in Europe (through talks in the Group of 23 within the framework of the CSCE). Data on the armed forces and conventional armaments of the WTO and NATO states will be exchanged. Tactical nuclear weapons and dual-capable weapons should be dealt with in separate talks. 5. An expansion of the confidence- and security-building measures (CSBMs) adopted at the Stockholm Conference. 6. The creation of nuclear and chemical weapon-free zones in certain areas in Europe. 7. A 1- or 2-year moratorium on the growth of the military spending of the WTO and the NATO states. 	<p>WTO/NATO START ABM Treaty CFE NWFZ: Europe CWFZ: Europe Military spending CSCE Nuclear tests CW Short-range nuclear weapons</p>
30 Mar.	The WTO Foreign Ministers, meeting in Sofia, make an appeal for a treaty to reduce strategic weapons and call for new talks on restricting tactical nuclear weapons in Europe.	START Short-range nuclear weapons
1 Apr.	The US-Soviet Nuclear Risk Reduction Centre (see 22 Mar.) is opened in Moscow.	USA/USSR INF Treaty
3 Apr.	Ethiopia and Somalia sign an agreement on disengagement of forces, a halt to subversive activities and the re-establishment of diplomatic relations.	Regional conflicts: Ethiopia/ Somalia
14 Apr.	The Danish Parliament approves a resolution by the opposition Social Democrats, requesting the Government to notify all visiting warships that they must not carry nuclear arms into Danish ports. The Prime Minister calls a new election to be held on 10 May.	NATO NPT
14 Apr.	The Geneva Accords, providing for the withdrawal of Soviet forces from Afghanistan and the restoration of a non-aligned Afghan state, are signed at the UN, in Geneva. The Accords consist of:	Regional conflicts: Afghanistan

1. A bilateral agreement between Afghanistan and Pakistan on the principles of mutual relations, in particular on non-interference and non-intervention.

2. A declaration by the USA and the USSR on international guarantees.

3. A bilateral agreement between Afghanistan and Pakistan on the voluntary return of refugees.

4. An agreement on the interrelationships for the settlement of the situation relating to Afghanistan, signed by Afghanistan and Pakistan, and by the USA and the USSR as co-guarantors.

- | | | |
|---------|--|--|
| 19 Apr. | The White House announces that President Reagan has directed US forces to strike Iranian military targets in the southern Persian Gulf. Oil platforms, used as command-and-control radar stations for the Iranian military, are attacked in response to Iran's resumption of minelaying in international waters and its mine attack on the <i>USS Samuel B. Roberts</i> . | USA/Iran |
| 21 Apr. | During a meeting in Moscow between the US Secretary of State and the Soviet Foreign Minister, the USSR presents a draft Space Defence Treaty based on the agreement reached at the summit meeting of Dec. 1987. | USA/USSR
Space: ABM
Treaty |
| 21 Apr. | The USSR deposits, without reservations, the instruments of ratification of Protocols 2 and 3 of the South Pacific Nuclear-Free Zone Treaty (Treaty of Rarotonga), undertaking not to use or threaten to use nuclear weapons against the countries or territories within the zone and not to test any nuclear explosive devices within the zone. | NFZ: South
Pacific
Nuclear tests |
| 25 Apr. | A UN report based on investigations of allegations of the use of chemical weapons in the Iraq-Iran War is issued. It documents that chemical weapons have been used on a large scale against military and civilian targets in the Gulf area. (Three more such UN reports were issued during the year: on 20 July, 25 July and 19 Aug.) | UN
CW
Regional
conflicts:
Iraq/Iran |
| 29 Apr. | At a meeting in Moscow with heads of diplomatic missions the Soviet Defence Minister declares that the WTO member states are ready to hold consultations about the numerical strength and armaments of the WTO and NATO in Europe and talks on how to eliminate the existing imbalances and asymmetries. The declaration states that the military organizations of the WTO and NATO should be abandoned. | WTO/NATO
Conventional
forces
Data
exchange |
| 4 May | The US House of Representatives votes (244-174) for an amendment that would prevent the SDI Organization from spending more than 40 per cent of its budget on a partial 'Phase I' defence to be developed and deployed in 1990. | SDI |

4 May	Norway confirms that 15 tons of exported Norwegian heavy water did not reach their intended destination.	NPT
6 May	The Indian Prime Minister denies allegations that India has received 15 tons of heavy water diverted secretly and illegally from Norway.	NPT
9 May	The UN Security Council, acting unanimously, vigorously condemns the continued use of chemical weapons in the Iraq–Iran War. It calls on nations to continue to apply or to establish strict control over the export to the parties to the conflict of chemical products serving for the production of chemical weapons.	UN CW Regional conflicts: Iraq/Iran
13 May	Nine neutral and non-aligned states of the CSCE present a draft for the military–political section of a concluding document from the CSCE Vienna meeting. It suggests that (a) negotiations (involving all CSCE member states) on confidence- and security-building measures should take place in order to build upon and expand the results achieved at the Stockholm Conference; and (b) negotiations on conventional arms reduction in Europe should take place between the WTO and the NATO member states. At these meetings comprehensive and substantial information should be provided on the developments, progress and results of the negotiations, allowing an appraisal of their course.	CSCE CFE
15 May	The Geneva Accords (see 14 Apr.) enter into force; Soviet forces officially begin their withdrawal from Afghanistan.	Regional conflicts: Afghanistan
24–26 May	A team of Soviet experts visits the Chemical Defence Establishment at Porton Down, UK.	CW
25 May	The Philippine Senate approves a bill to enforce a ban against nuclear weapons on Philippine soil.	NPT
26 May	The Vietnamese Ministry of National Defence announces that Viet Nam will withdraw 50 000 troops from Kampuchea before the end of the year and will place the remaining forces under Kampuchean control until they are entirely withdrawn by 1990.	Regional conflicts: Kampuchea/ Viet Nam
27 May	In a communiqué issued by the NATO Defence Planning Committee meeting in Brussels it is reaffirmed that flexible response and forward defence, based on an appropriate mix of adequate and effective nuclear and conventional forces, remain vital to the security of NATO.	NATO
27 May	The US Senate ratifies the INF Treaty.	INF Treaty

28 May	The Presidium of the Supreme Soviet ratifies the INF Treaty.	INF Treaty
29 May– 2 June	A US–Soviet summit meeting is held in Moscow.	USA/USSR
30 May	At the US–Soviet summit meeting General Secretary Gorbachev proposes a mutual phased reduction of 500 000 troops in Europe by both the WTO and NATO. He also proposes an exchange of military data.	NATO/WTO Conventional forces Data exchange
31 May	The US Secretary of State and the Soviet Foreign Minister sign two arms control agreements in Moscow: (a) to design a Joint Verification Experiment at each other's nuclear test sites; and (b) to notify each other at least 24 hours in advance of future strategic ballistic missile launches.	USA/USSR Nuclear tests CBMs
31 May– 26 June	The Third UN Special Session Devoted to Disarmament is held in New York. The conference fails to achieve consensus on a final document.	UN SSOD III
1 June	At the US–Soviet summit meeting President Reagan and General Secretary Gorbachev sign a protocol on the exchange of the instruments of ratification of the INF Treaty, signed on 8 Dec. 1987 in Washington, DC. The Treaty enters into force.	INF Treaty
1 June	At the end of the US–Soviet summit meeting President Reagan and General Secretary Gorbachev issue a joint statement. The two sides have continued negotiations to achieve a separate agreement concerning the ABM Treaty and a joint draft START treaty reflecting agreed limits and also recognized areas of disagreement. The delegations have also prepared joint draft texts of an Inspection Protocol, a Conversion or Elimination Protocol and a Memorandum of Understanding on data, which are integral parts of a START treaty. The leaders pledge to proceed with protocols to the Threshold Test Ban Treaty (TTBT) and to the Peaceful Nuclear Explosions Treaty (PNET) as soon as possible after the Joint Verification Experiment (JVE) has been conducted and analysed. The leaders agree to bilateral expert-level discussions on the problem of proliferation of ballistic missile technology.	ABM Treaty START Nuclear tests NPT Missile proliferation
4 June	The Italian Government decides to accept on its territory, within 3 years, the 72 US F-16 fighters which are being withdrawn from Spain (see 15 Jan.).	NATO US bases
7 June	The new Danish Government declares that it proceeds on the assumption that its nuclear-free status is respected by visiting foreign ships or aircraft and does not seek specific assurances.	NATO NPT

8 June	The Soviet Foreign Minister, speaking before the Third UN Special Session Devoted to Disarmament, states that the USSR is prepared to announce the presence or absence of nuclear weapons aboard its naval ships calling at foreign ports if the USA and other nuclear powers do the same. He also suggests an agreement limiting the number of ships equipped with tactical nuclear weapons.	UN SSOD III NPT Naval arms control
9 June	The Sandinistas and the Contras agree to extend their cease-fire (see 23 May).	Regional conflicts: Central America
20–22 June	An international meeting on nuclear weapon-free zones is held in East Berlin.	NWFZs
28 June	The USA and the USSR exchange information on the size of some of their past nuclear tests in the 100–150-kt range.	USA/USSR Nuclear tests Data exchange
29 June– 4 July	A team of British chemical weapon experts visits the Soviet Shikhany military installation.	CW
1 July– 30 Aug.	In accordance with Article XI, 3 of the INF Treaty the USA and the USSR conduct baseline inspections of each other's missile support facilities.	INF Treaty
3 July	A US Navy ship mistakenly shoots down an Iranian civilian airliner, killing all 290 people on board.	USA/Iran
6–11 July	The Soviet Chief of Staff, Marshal S. Akhromeyev, conducts a military base inspection tour of the USA. During the tour plans are announced for the creation of a US–Soviet working group to study ways of avoiding dangerous incidents by improving communications between the two states.	USA/USSR CBMs
7 July	The Socialist Unity Party (SED) of the GDR and the Social Democratic Party (SPD) of the FRG present a plan for a 'zone of trust and security in Central Europe'.	Europe
11 July	In a speech to the Polish Parliament General Secretary Gorbachev offers the pullback of Soviet aircraft from Eastern Europe if the USA cancels plans to redeploy 72 F-16 fighter bombers from Spain to Italy (see 15 Jan. and 4 June). He also suggests the calling of an all-European summit conference to initiate the negotiations on reductions in conventional forces.	NATO/WTO CFE
13 July	Angola, Cuba and South Africa agree on principles for further negotiations which would lead to a detailed agreement for a political settlement in south-western Africa.	Regional conflicts: South-western Africa

14 July	The President of France welcomes the proposal of General Secretary Gorbachev for an all-European summit meeting (see 11 July).	Europe
16 July	At the end of its 2-day meeting in Warsaw, the WTO Political Consultative Committee adopts a document on the procedure for the talks on the reduction of armed forces and conventional armaments in Europe. According to this document the first phase of the talks should deal with (a) the elimination of asymmetries in NATO and WTO forces; (b) the reduction of forces by 25 per cent; and (c) the change of the forces to a strictly defensive force posture. During the negotiations both sides' force levels should be frozen from the Atlantic to the Urals. Measures to reduce and eliminate the risk of a surprise attack should be an integral part of the process. Relevant data on military forces, essential for conducting the negotiations, should be mutually exchanged early in the talks, or even before their start, and a system for verification including on-site inspections without the right to refuse should be created. Monitoring points should be set up both along the perimeter and inside the lowered-arms-level strips and in the reduction area.	NATO/WTO CFE Data exchange
18 July	The UN Secretary-General announces that Iran has informed him that it accepts UN Security Council Resolution 598 of 20 July 1987, calling on Iraq and Iran to observe an immediate cease-fire, stop military actions and withdraw all forces to internationally recognized boundaries.	UN Regional conflicts: Iraq/Iran
28 July	At the Conference on Disarmament the USA announces the locations of its 5 plants producing chemical weapons, naming the agents produced at each site and detailing the manner in which they will be destroyed.	CD CW
29 July	In a declaration, issued at the end of the first meeting of the South Atlantic Peace and Co-operation Zone Countries, the participating countries reaffirm interest in preventing militarization in the zone and in keeping superpower conflict out of the region.	Peace zone: South Atlantic
1 Aug.	The first Soviet SS-12 missiles are destroyed in accordance with the INF Treaty at a military base in Kazakhstan, USSR.	INF Treaty
5 Aug.	Five states (Indonesia, Mexico, Peru, Sri Lanka and Yugoslavia) submit to the depositary governments of the 1963 Partial Test Ban Treaty (PTBT) a proposal to convert the Treaty into a comprehensive test ban treaty.	Nuclear tests
12 Aug.	At the request of South Africa representatives of the USA, the USSR and the UK—the depositary states for	NPT

- the NPT—meet with representatives of the South African Government to discuss issues arising from its consideration of acceding to the Treaty.
- 17 Aug. A US nuclear explosion at the Nevada Test Site is monitored jointly by Soviet and US experts in accordance with the Joint Verification Experiment (JVE) Agreement (see 31 May). USA/USSR Nuclear tests
- 20 Aug. A UN-sponsored cease-fire between Iraq and Iran takes effect. Regional conflicts: Iraq/Iran
- 24–31 Aug. A US–Soviet ABM Treaty review is held in Geneva. The two sides fail to resolve the outstanding questions. ABM Treaty
- 25 Aug. Direct negotiations between Iraq and Iran open in Geneva under the auspices of the UN Secretary-General. UN Regional conflicts: Iraq/Iran
- 26 Aug. The UN Security Council unanimously reaffirms its opposition to Israeli actions in the occupied territories and once again asks Israel to stop deporting Palestinian civilians from the area. UN Regional conflicts: Israel/Palestinians
- 26 Aug. The UN Security Council unanimously adopts a resolution condemning the use of chemical weapons in the Gulf War and urges all states to apply or strengthen export controls on chemical products used in producing such weapons. The Council is deeply dismayed by the reports that use of chemical weapons against Iranians has become more intense and frequent. UN CW Regional conflicts: Iraq/Iran
- 28 Aug. The USSR begins to destroy its stock of SS-20 missiles in accordance with the INF Treaty. INF Treaty
- 30 Aug. In the Western Sahara conflict Morocco and Polisario accept a UN peace plan which will place UN peace-keeping forces on the territory. A referendum on the future of Western Sahara will be held in the spring of 1989. Regional conflicts: Western Sahara UN
- 1 Sep. The first 9 US Pershing II missiles are withdrawn from FR Germany, to be destroyed in Texas, USA, in accordance with the INF Treaty. INF Treaty
- 5 Sep. The Soviet Chief of Staff, Marshal S. Akhromeyev, proposes extension of the confidence-building measures defined by the Final Document of the Stockholm Conference. He suggests prior notification of major naval exercises, invitation of observers to them and the limitation of the number of major exercises as well as the establishment of security areas for missile-carrying submarines in which all anti-submarine warfare (ASW) would be banned (see also chapter 14). CBMs Naval arms control

- | | | |
|---------|--|---|
| 8 Sep. | President Reagan announces the destruction of the first US missiles under the INF Treaty. The destruction is observed by Soviet representatives. | INF Treaty |
| 8 Sep. | The first US ground-launched cruise missiles, based in the UK, are withdrawn to be destroyed in Texas, USA, in accordance with the INF Treaty. | INF Treaty |
| 12 Sep. | The Chairman of the <i>Ad Hoc</i> Committee on Chemical Weapons at the Conference on Disarmament suggests that trial inspections could be undertaken in order to assess whether the proposed text for a convention can provide the necessary assurance that civil facilities are used only for purposes not prohibited by the convention. | CD
CW |
| 14 Sep. | A Soviet nuclear explosion at the Semipalatinsk Test Site area is monitored jointly by US and Soviet experts in accordance with the JVE Agreement (see 31 May). | USA/USSR
Nuclear tests |
| 16 Sep. | In a speech held in Krasnoyarsk, Siberia, General Secretary Gorbachev offers to freeze the Soviet nuclear forces in the Asian and Pacific countries and calls upon the USA and other nuclear states to follow suit. He invites the region's naval powers to talks on the non-buildup of naval forces and the lowering of military confrontation. If the USA agrees to dismantle its military bases in the Philippines, the USSR will give up its naval base in Cam Ranh Bay, Viet Nam. The creation of a negotiating mechanism for talks on security in the Asian-Pacific region is also suggested, as well as a conference to be held not later than 1990 on creating an Indian Ocean peace zone. In addition, he offers to convert the Krasnoyarsk radar station into an international space centre and expects the USA to take corresponding measures regarding the US radars in Greenland and Britain. | Asia/Pacific
Indian Ocean
Naval arms
control
ABM Treaty
US/Soviet
bases |
| 20 Sep. | The International Atomic Energy Agency (IAEA) and China sign an agreement that for the first time sets the legal basis for the application of safeguards at some civilian nuclear power facilities in China. | NPT |
| 26 Sep. | In his address before the UN General Assembly President Reagan says that he sees the potential for an increasingly vital role for multilateral efforts and institutions such as the UN. He calls for an international conference to reinforce the existing global ban on chemical and biological weapons and improve adherence to it. | UN
CBW |
| 26 Sep. | Representatives from the USA and the USSR meet in Washington to discuss how to curb the proliferation of ballistic missile technology (see 1 June). | NPT
Missile
proliferation |

27 Sep.	At the UN General Assembly the Soviet Foreign Minister calls for a reinvigorated UN: the UN Security Council should hold foreign ministers' meetings; the superpowers should abolish some of their military programmes and use the money saved to establish an international regime of environmental security under UN auspices.	UN
27-29 Sep.	The USSR carries out its first short-notice inspection under the INF Treaty, at a Pershing II base in FR Germany.	INF Treaty
28 Sep.	The USA and Spain sign an agreement on the future use of 3 military bases in Spain for an 8-year period. An unspecified arrangement on nuclear weapons is also worked out.	NATO US bases
29 Sep.	The President of France, speaking before the UN General Assembly, states that France, which has no chemical weapons, proposes the convening of a meeting with the parties to the 1925 Geneva Protocol to find ways of strengthening the Protocol. He stresses that not only the use but also the manufacture of chemical weapons should be prohibited. Chemical-weapon factories should be closed as soon as a convention enters into force and should be subject to international control prior to dismantling. France will renounce the production of chemical weapons from the date the future convention enters into force.	UN CBW
1 Oct.	General Secretary Gorbachev is elected President of the Presidium of the Supreme Soviet.	USSR
3 Oct.	Saudi Arabia accedes to the Non-Proliferation Treaty.	NPT
3 Oct.	Chad and Libya declare a formal cessation of hostilities and resume diplomatic relations.	Regional conflicts: Chad/Libya
10 Oct.	France and the USSR agree to hold annual summit meetings.	France/USSR
18 Oct.	In his speech before the First Committee of the UN General Assembly the Soviet delegate officially presents data on Soviet naval armaments as of 1 July 1988.	UN Naval arms control Data exchange
20 Oct.	At the First Committee of the UN General Assembly France announces that an international conference will be held in Paris on 7-11 January 1989 to reinforce the 1925 Geneva Protocol and to give a new political impulse to the negotiations on a ban on the production and possession of chemical weapons.	UN CBW

- | | | |
|------------|---|--|
| 21 Oct. | China ratifies Protocols 2 and 3 of the South Pacific Nuclear Free Zone Treaty (Treaty of Rarotonga), with reservations. (The instruments of ratification are deposited on 4 Jan. 1989.) | NWFFZ:
South
Pacific
Nuclear
tests |
| 25 Oct. | The USSR and FR Germany sign an agreement designed to prevent incidents on and over the high seas. | USSR/FRG
CBMs |
| 27 Oct. | The USSR announces that the Krasnoyarsk radar station will be handed over to the Soviet Academy of Sciences for use as a civil space research centre. In addition two other radar installations which the USA has argued could violate the ABM Treaty will be destroyed. | ABM Treaty |
| 27-28 Oct. | NATO Defence Ministers meet in NATO's Nuclear Planning Group in Scheveningen, the Netherlands. A study is presented on the need for short-range nuclear forces. | NATO
Short-range
nuclear
weapons |
| 28 Oct. | The NATO Nuclear Planning Group, meeting in Scheveningen, the Netherlands, issues a communiqué, stating that it is determined to preserve the credibility of NATO's deterrent forces and keep them up-to-date where necessary. A step-by-step approach will ensure that the nuclear forces continue to provide an effective contribution to the Alliance's strategy of deterrence. | NATO |
| 29 Oct. | The WTO member states propose specific confidence- and security-building measures of a new generation, such as (a) the restriction of the number, duration and periodicity of military manoeuvres as well as a ban on major manoeuvres; (b) notification of activity of air forces and navies and invitation of observers; creation of zones of confidence and security in Europe and in the adjacent territorial waters; and (c) measures for increasing openness and predictability in military activity, verification, control, exchange of information and consultations. | WTO
CSBMs
Data
exchange |
| 3 Nov. | The UN General Assembly calls for an internationally supervised withdrawal of all foreign forces from Kampuchea, and for the creation of an interim administering authority in that country, with the promotion of national reconciliation under Prince Norodom Sihanouk. | UN
Regional
conflicts:
Kampuchea/
Viet Nam |
| 14 Nov. | Spain and Portugal formally join the Western European Union (WEU). | WEU |
| 15 Nov. | The National Council of the Palestine Liberation Organization (PLO), meeting in Algiers, declares Palestine an independent state. It also accepts UN Security Council Resolution 242 of 1967 (which confirms Israel's right as an independent state to live in peace within | Regional
conflicts:
Israel/
Palestinians |

- secure and recognized boundaries) as the basis for a Middle East peace settlement. This declaration is immediately rejected by Israel.
- 17 Nov. The UN General Assembly adopts a resolution urging South Africa to withdraw from Namibia. UN Regional conflicts: South-western Africa
- 20 Nov. At an Indian-Soviet summit meeting in New Delhi a joint statement is issued by the two leaders supporting an increased role for multilateral forums in the process of disarmament. The Soviet programme for the complete elimination of nuclear weapons by the year 2000 and India's Action Plan ushering in a nuclear weapon-free world are emphasized. They reaffirm their commitment to the 1971 UN Declaration on the Indian Ocean as a Zone of Peace and call for the dismantling of all foreign military bases. They urge the early convening of an international conference on the Indian Ocean. USSR/India Indian Ocean
- 25 Nov. The NATO countries issue a document on *Conventional Forces in Europe: the Facts*. The report presents figures on NATO and WTO troops and conventional weapons in Europe. It stresses the numerical superiority of the WTO in conventional forces. NATO/WTO Conventional forces
- 26 Nov. The US State Department announces its rejection of a request for a visa by the chairman of the PLO who was to address the UN General Assembly in New York. USA/Palestinians UN
- 1-2 Dec. The NATO Defence Planning Committee, meeting in Brussels, agrees on a report on enhancing NATO's collective security. The report stresses the need for all Alliance members to share equitably the roles, risks and responsibilities of NATO's collective defence. The report shows that there are significant variations among member states in the scale and nature of their contributions. NATO
- 2 Dec. At the end of talks held in Moscow between President Gorbachev and the Chinese Foreign Minister, it is announced that a Sino-Soviet summit meeting will be held in the first half of 1989. USSR/China
- 2 Dec. In the US annual report to the Congress on Soviet non-compliance with arms control agreements, the 1987 findings of Soviet violations or probable violations of the ABM Treaty and other agreements are reaffirmed. ABM Treaty
- 4 Dec. At a press conference in Islamabad the new Prime Minister of Pakistan, Benazir Bhutto, states that the country is committed to peaceful use of nuclear energy and that it stands for a nuclear weapon-free policy. NPT

- 5 Dec. The Defense Policy Panel of the Committee on Armed Services of the House of Representatives of the US Congress concludes that improvements in NATO capability and readiness have reduced the probability of an unprepared, unreinforced WTO attack against NATO. NATO/WTO
- 7 Dec. In a speech to the UN General Assembly President Gorbachev announces unilateral Soviet cuts over the next two years of 500 000 men, 10 000 tanks, 8500 artillery systems and 800 combat aircraft overall. Of these forces, 50 000 men and 5000 tanks would be withdrawn from Czechoslovakia, the GDR and Hungary, and the remaining forces would be restructured into a defensive posture. UN
Conventional forces
WTO
- 7 Dec. The UN General Assembly adopts resolutions on: measures to uphold the authority of the 1925 Geneva Protocol and to support the conclusion of a chemical weapons convention (43/74 A); a second Review Conference of the parties to the BW Convention (43/74 B); objective information on military matters (43/75 G); international arms transfers (43/75 I); naval armaments and disarmament (43/75 L); a Review Conference of the parties to the Sea-Bed Treaty (43/75 M); a comprehensive UN study on nuclear weapons (43/75 N); the prohibition of dumping of radioactive wastes (43/75 Q and T); conventional disarmament on a regional scale (43/75 S); a study on the role of the UN in the field of verification (43/81 B). UN
- 7 Dec. 14 delegations of the Conference on Disarmament report that their countries have carried out or have been engaged in national trial inspections (see 12 Sep.). CD
CW
- 8 Dec. The North Atlantic Council, meeting in ministerial session in Brussels, issues a declaration on conventional arms control. The NATO states will propose an overall limit of about 40 000 tanks in Europe, 20 000 for each alliance, of which no state should be allowed to possess more than a fixed proportion such as 30 per cent of the total holdings in Europe. This would result in no more than about 12 000 tanks for any one country. In addition, within the framework of the CSCE process, the NATO states will propose an annual exchange of information concerning military matters. NATO/WTO
Conventional forces
Data exchange
- 13 Dec. The Brazzaville Protocol is signed by Angola, Cuba and South Africa. Under the Protocol Cuban troops in Angola and South African troops in Namibia will be withdrawn and the Namibian independence process will take effect from 1 Apr. 1989 in accordance with UN Security Council Resolution 435 of 1978. Regional conflicts:
South-western Africa

- | | | |
|---------------------------------|---|---|
| <i>13 Dec.</i> | In his address to the UN General Assembly, meeting in Geneva, the Chairman of the Executive Committee of the PLO reaffirms the Palestine National Council's rejection of terrorism in all forms and emphasizes its commitment to UN General Assembly Resolutions 61 of 1985 and 159 of 1987 as well as the resolution of the 1988 Arab summit meeting in Algiers (see <i>15 Nov.</i>). | UN
Regional
conflicts:
Israel/
Palestinians |
| <i>19–23 Dec.</i> | The Prime Minister of India pays the first official visit of an Indian leader to Beijing since 1954. | China/
India |
| <i>14 Dec.</i> | President Reagan issues a statement that he has authorized the US State Department to enter into a substantive dialogue with the PLO. | Regional
conflicts:
Israel/
Palestinians |
| <i>22 Dec.</i> | <p>The Brazzaville Protocol (see <i>13 Dec.</i>) is formalized by the signing at the UN headquarters of two agreements:</p> <ol style="list-style-type: none"> 1. A bilateral agreement between Angola and Cuba on the withdrawal of Cuban troops from Angola over a 2-year period. 2. A tripartite agreement between Angola, Cuba and South Africa on the Namibian independence process. | UN
Regional
conflicts:
South-western
Africa |
| <i>30 Dec.–
1 Jan. 1989</i> | Indian and Pakistani Prime Ministers hold talks in Islamabad. and sign an agreement not to attack each other's nuclear installations. | Regional
conflicts: India/
Pakistan |

About the contributors

Marshal Sergey F. Akhromeyev (USSR) is the former Chief of General Staff, First Deputy Minister of Defence of the USSR (until 1988). He was also a Deputy Member of the Supreme Soviet of the USSR. In 1988 he delivered the second SIPRI Olof Palme Memorial Lecture in Stockholm.

Dr Ian Anthony (UK) is a Researcher on the SIPRI arms trade project. He is the author of *Warsaw Pact Military Expenditure: Facts and Figures* (1988), and of chapters in the *RUSI & Brassey's Defence Yearbook 1988* and the *SIPRI Yearbook 1988*.

William M. Arkin (USA) is Director of the National Security Program of the Institute for Policy Studies, Washington, DC. He was formerly an analyst at the Center for Defense Information, Washington, DC. He is co-editor of the *Nuclear Weapons Databook* series, and a contributing editor and columnist for the *Bulletin of the Atomic Scientists*. He is editor of the IPS/Greenpeace Neptune Papers series, and has published articles on military organization and infrastructure, nuclear weapons and military policy.

Dr Christoph Bertram (Federal Republic of Germany) is Diplomatic Correspondent and Editor for *Die Zeit* (Hamburg), and Guest Research Fellow at the Yomiuri Research Institute and columnist for the *Yomiuri Shimbun*, Tokyo. He is a former Director of the International Institute for Strategic Studies, London (1974–82) and Member of the Planning Staff of the FRG Ministry of Defence (1969–70). He has published widely on issues of arms control, international security and East–West relations.

Andrew S. Burrows is a Research Associate with the *Nuclear Weapons Databook* Project of the Natural Resources Defense Council, Washington, DC. He is co-author of *Nuclear Weapons Databook, Volume V, British, French, Chinese Nuclear Weapons and Nuclear Weapon Proliferation* (1989) and of chapters in the *SIPRI Yearbooks* since 1985.

Dr Thomas B. Cochran (USA) is Senior Staff Scientist, Director of the *Nuclear Weapons Databook* project and Co-director of the Nuclear Program at the Natural Resources Defense Council, Washington, DC. He co-directs the NRDC/Soviet Academy of Sciences Nuclear Test Ban Verification Project. He is co-author of several NRDC volumes of the *Nuclear Weapons Databook*, and of chapters in the *SIPRI Yearbooks* since 1985. His publications include articles on nuclear weapon research and production, arms control, nuclear weapon proliferation, safeguards, seismic verification, national energy R&D policy and radiation exposure standards.

Agnès Courades Allebeck (France) is a Research Assistant on the SIPRI arms trade project. She was formerly a Research Assistant at the European

Parliament, Luxembourg (1985), and has done research on the external relations of the European Community.

Dr Saadet Deger (Turkey) is Researcher and Leader of the SIPRI world military expenditure project. She is a former Fellow of Birkbeck College, University of London (1977–87) and Chairman of the Political Economy of Defence and Development Study Group of the Developing Studies Association, UK. She is a member of the UN Working Group of Experts for the UN Centre for Disarmament Research, Africa. She is the author of *Military Expenditure in Third World Countries: The Economic Effects* (1986) and co-editor of *Defence, Security and Development* (1987).

Ragnhild Ferm (Sweden) is Research Assistant on the SIPRI arms control and disarmament project. She has published chapters on nuclear explosions, a comprehensive test ban, arms control agreements and UN General Assembly resolutions and the chronologies of arms control events in the *SIPRI Yearbooks* since 1982. She is the author of the annual SIPRI publication *Rüstning eller Nedrustning?* (in Swedish) [*Armaments or Disarmament?*].

Richard W. Fieldhouse (USA) is Researcher and Leader of the SIPRI naval forces and arms control project. He was formerly Research Associate with the Arms Race and Nuclear Weapons Research Project of the Institute for Policy Studies, Washington, DC, where he co-authored *Nuclear Battlefields: Global Links in the Arms Race* (1985). He is a co-author of chapters in the *SIPRI Yearbooks* since 1985 and of the SIPRI volume *Superpowers at Sea: An Assessment of the Naval Arms Race* (1989). He has published articles on the nuclear and naval arms race, arms control issues and confidence-building measures.

Espen Gullikstad (Norway) is a Research Assistant on the SIPRI arms trade project. His previous research is in the field of the administrative aspects of the European Community.

Dr Heinz Gärtner (Austria) is Resident Fellow at the Institute for East–West Security Studies, New York, and Member of the Expert Group on Arms Control of the Austrian Ministries for Foreign Affairs, for Defence and for Science. His recent publications include *Handbuch zur Rüstungskontrolle, Positionen ausgewählter Länder* (1987), and a contribution in R. Rudney and L. Reyhler (eds), *European Security Beyond the Year 2000* (1988). He is the author of *Verification and Smaller States* (1989).

Gerd Hagmeyer-Gaverus (Federal Republic of Germany) is a Researcher on the SIPRI world military expenditure project. He was formerly a Researcher at the Centre for Social Science Research at the Free University, Berlin, where he co-authored several research reports, and is the co-author of chapters in the *SIPRI Yearbooks* 1985, 1987 and 1988.

Aaron Karp (USA) is a Researcher and Leader of the SIPRI arms trade project. In 1985 he taught at Columbia University, New York, and in 1984 at Rutgers University, New Jersey. In 1979–81 he worked for the US Arms Control and Disarmament Agency, Washington, DC. He has published articles in *International Studies Quarterly* (1987), *Armed Forces Journal* (1987), *International Herald Tribune* (1988), *Bulletin of the Atomic Scientists* (1988) and the *SIPRI Yearbook 1988*.

Dr Axel Krohn (Federal Republic of Germany) is a Researcher on the SIPRI project on conventional arms control in Europe. He formerly held a Volkswagen Stipendiat at the Institut für Friedensforschung und Sicherheitspolitik, University of Hamburg. He has published a PRIO Working Paper 'Between Zero Option and Deterrence: Regional Disengagement in Europe' (1987), and articles in *Antimilitarismus Information* (1988) and in G. Krell, E. Bahr and K. von Schubert (eds), *Friedensgutachten 1988*. He is the author of *Nuklearwaffenfreie Zone: Regionales Disengagement unter der Rahmenbedingung globaler Großmachtinteressen, Das Fallbeispiel Nordeuropa* (1989).

Karin Lindgren (Sweden) is a Research Assistant at the Department of Peace and Conflict Research, Uppsala University, Sweden. She is the author of a contribution in P. Wallensteen (ed.), *Food, Development and Conflict: Thailand and the Philippines* (1988) and of *Women in World Politics: Study on the Participation of Women in the Decision-Making Process Related to Peace and Disarmament at National, Regional and World Levels, The Pilot Study on Sweden* (UN, 1989).

Dr S. J. Lundin (Sweden) is Senior Researcher and Leader of the SIPRI chemical and biological warfare project. He is on leave of absence as a Director of Research at the Swedish Defence Research Institute, and was formerly Scientific Adviser to the Swedish Disarmament Delegation (1969–85) and to the Swedish Supreme Commander (1985–87). He is a co-author of a chapter in the *SIPRI Yearbook 1988* and has written extensively in the field of chemical, biological and nuclear weapons.

Dr Rabinder Nath (India) is Research Associate at SIPRI on the chemical and biological warfare project, currently on leave from the Defence Research and Development Establishment, India. He has published several research papers and reports, and was recently an instructor in awareness-building courses on chemical weapons for the Indian armed services.

Dr Robert S. Norris (USA) is Senior Research Associate at the Natural Resources Defense Council, Washington, DC. He was formerly Senior Research Analyst for the Center for Defense Information, Washington, DC. He is a co-editor of the 1987 and 1989 volumes of the *Nuclear Weapons Databook*, and a co-author of chapters in the *SIPRI Yearbooks* since 1985. He is a co-author of a column for the *Bulletin of the Atomic Scientists* in his field of

nuclear weapon research and production, arms control and nuclear weapon testing.

John Pike (USA) is Associate Director for Space Policy of the Federation of American Scientists, Washington, DC.

Dr Somnath Sen (India) is a Consultant for SIPRI on the world military expenditure project. He is a Senior Lecturer at the University of Birmingham, UK, and the author of *Protectionism, Exchange Rates and the Macroeconomy* (1985).

Jane Sharp (UK) is a Researcher and Leader of the SIPRI project on conventional arms control in Europe. She was formerly the National Director of the Council for a Livable World in Washington, DC. She has held research and teaching fellowships at the Center for Science and International Affairs and the Center for European Studies at Harvard, and in the Peace Studies Program at Cornell University. Her recent publications include contributions in D. Carlton and C. Schaerf (eds), *The Arms Race in the Era of Star Wars* (1988), and in the *SIPRI Yearbook 1988*. She has written extensively for journals in her field.

Dr Thomas Stock (German Democratic Republic) is a Researcher on the SIPRI chemical and biological warfare project. He was formerly a Researcher at the Research Unit for Chemical Toxicology of the Academy of Sciences of the GDR. He is co-author of an article in the SIPRI volume *Non-Production by Industry of Chemical-Warfare Agents: Technical Verification under a Chemical Weapons Convention* (1988).

Dr Walther Stützel (Federal Republic of Germany) is the Director of SIPRI. In 1983–86 he was International Security and Defence Correspondent for the *Stuttgarter Zeitung*, and in 1976–82 Head of the Planning Staff and Under-Secretary for Defence Planning and Policy of the FRG Ministry of Defence. He is the author of *Adenauer und Kennedy in der Berlin Krise 1961/62* (1973) and *Politik und Kräfteverhältnis* (1983), and a co-editor of the SIPRI volume *The ABM Treaty: To Defend or Not to Defend?* (1987).

Rita Tullberg (UK) is a former SIPRI Researcher and Leader of the SIPRI world military expenditure project (until 1988), and the author or co-author of chapters in the *SIPRI Yearbooks* since 1981. Her recent publications include a contribution in C. Schmidt and F. Blackaby (eds), *Peace, Defence and Economic Analysis* (1987). She is currently serving as Consultant on military expenditure matters to the UN Department for Disarmament Affairs, New York.

Sir Brian Urquhart (UK) is Scholar-in-Residence at the Ford Foundation, New York, and a Member of the SIPRI Governing Board. He has served the United Nations since 1945, most recently as the Under-Secretary-General for Special

Political Affairs (1974–86). He has served in various capacities relating to peace-keeping operations and was the UN Representative in the Congo in 1961–62. He is the author of *Hammar skjöld* (1984), *A Life in Peace and War* (1987) and a chapter in the *SIPRI Yearbook 1988*.

Professor Peter Wallensteen (Sweden) holds the Dag Hammar skjöld Chair in Peace and Conflict Research and is the Head of the Department of Peace and Conflict Research, Uppsala University, Sweden. He is the author of *Structure and War* (1973), *Dilemmas of Economic Coercion* (1983), *Global Militarization* (1985) and *Peace Research: Achievements and Challenges* (1988), and co-author of a chapter in the *SIPRI Yearbook 1988*.

G. Kenneth Wilson (UK) is a Research Associate at the Department of Peace and Conflict Research, Uppsala University, Sweden. He was previously Research Director at the Hesbjerg Peace Research Centre, Fyn, Denmark (1963–65) and at the Peace Knowledge Foundation, Lancaster, UK (1959–62). He is the author of *Nationalism and Education* (1979) and *A Global Peace Study Guide* (1982), and co-author of a chapter in the *SIPRI Yearbook 1988*.

ABSTRACTS

ARKIN, W. A., BURROWS, A. S., COCHRAN, T. B., FIELDHOUSE, R. W. and NORRIS, R. S., 'Nuclear weapons', in *SIPRI Yearbook 1989*, pp. 3-47.

1989 was the first year in history that both the USA and the USSR destroyed modern nuclear weapon systems under a disarmament treaty. The INF Treaty entered into force in June; some 25 per cent of the missiles covered by the Treaty were destroyed by the end of the year. Although all 5 acknowledged nuclear weapon states (the USA, the USSR, the UK, France and China) continued to develop and modernize their nuclear weapon systems, all are experiencing fiscal problems, improved political relations and technological developments that may slow or otherwise alter the pace of the arms race. However, nuclear weapons are still accorded high priority by these nations, and they are proceeding rapidly with their programmes, seemingly oblivious to changing political realities and opportunities. The nuclear weapon developments of these 5 nations in 1988 are documented and major trends are discussed.

FERM, R., 'Nuclear explosions', in *SIPRI Yearbook 1989*, pp. 49-63.

40 nuclear explosions were conducted in 1988, most of them by the USA and the USSR. For the first time the USA and the USSR co-operated in conducting nuclear tests. Under the 1988 Joint Verification Experiment (JVE) Agreement, 2 explosions were conducted (on 17 August in Nevada and on 14 September at Semipalatinsk) to test verification methods acceptable to both parties that might enable ratification of the Threshold Test Ban Treaty and the Peaceful Nuclear Explosions Treaty. Verification of nuclear testing limits has been based primarily on remote monitoring by seismic stations. The US Administration has proposed that the on-site CORRTEx hydrodynamic method also be used. At the JVE tests, the seismic methods performed at least as well as the CORRTEx system. The JVE Agreement and draft verification protocols for the TTBT and the PNET were worked out during US-Soviet negotiations on nuclear testing which were initiated in 1987; the protocols were not finalized by the end of 1988.

PIKE, J., 'Military use of outer space', in *SIPRI Yearbook 1989*, pp. 65-98.

Although Congress in 1988 stopped moves towards a broad reinterpretation of the ABM Treaty as it applies to SDI, strategic defence remained central to US and Soviet military space planning. In the USA developments mainly involved a revision of the SDI programme to avoid further confrontation with Congress, and linking the application of SDI technologies more closely to politically less sensitive ASAT tasks. In the USSR the upgrading and expansion of anti-missile systems continued, including deployment of phased-array early-warning radars and development of interceptor missile technology. The lack of information on Soviet BMD and ASAT efforts continues to hamper progress towards a US-Soviet agreement on strategic defence research or deployment. Both countries accounted for a spate of satellite launches and demonstrated an emphasis on the integration of earth and space capabilities down to the tactical level. The US Lacrosse satellite is the first US low-altitude intelligence satellite using SAR technology. In 1988 the US space shuttle programme recommenced and the first successful launch of a Soviet space shuttle took place.

LUNDIN, S. J., 'Chemical and biological warfare: developments in 1988', in *SIPRI Yearbook 1989*, pp. 99-130.

The threat of chemical warfare became an issue of international concern in 1988 owing to the continued use of chemical weapons both during the Iraq-Iran War and after the cease-fire. The spread of chemical-weapon production capability and sales of technology and raw materials, particularly in the Middle East, increased awareness of the threat. In this context the spread of missile technology is particularly serious. There was also concern about the spread of biological weapons. These developments had the positive effect of increasing international support for the conclusion of a chemical weapons convention. One manifestation of this was the international Paris Conference on the 1925 Geneva Protocol, which prohibits the use of chemical and biological weapons, held on 7-11 January 1989.

DEGER, S., 'World military expenditure', in *SIPRI Yearbook 1989*, pp. 133-94.

World military expenditure is on the decline, particularly as measured after adjustments are made for inflation. The USA and NATO have reduced defence spending in 1988; there is some evidence that the USSR has done the same. The burden-sharing debate in the trans-Atlantic Alliance is a major issue. An alternative analytical evaluation of comparative military burdens demonstrates that European members of NATO tend to have higher shares of military expenditure in national product than conventional measurements show. The military expenditure process in the Asian-Pacific region is explained in terms of political, economic and strategic factors. For the Third World, conflict resolution gives rise to hopes for long-term peace, but the debt crisis and its effects on militarization are a cause for concern.

ANTHONY, I., 'The trade in conventional weapons', in *SIPRI Yearbook 1989*, pp. 195-285.

In the 1980s the Persian Gulf littoral states have been the largest market for arms exports, and in the context of the arms trade the most important event of the year was the cease-fire in the Iraq-Iran War in August 1988. While the future scale of imports by Iraq and Iran is not yet clear, other countries in the region have either taken delivery of or have committed themselves to purchase large quantities of new equipment, including systems not previously present in the region. Notable was the delivery of medium-range ballistic missiles to Saudi Arabia. In spite of the changed international atmosphere, there is no evidence that any of the major exporters or importers changed their arms transfer policies in 1988. In spite of bilateral and multilateral arms control initiatives, the major actors continue to see arms transfers as legitimate instruments with which to pursue political, military and economic objectives.

KARP, A., 'Ballistic missile proliferation in the Third World', in *SIPRI Yearbook 1989*, pp. 287-318.

Events in 1988 focused world attention on Third World ballistic missile proliferation. Of 24 Third World countries which have acquired or are trying to acquire ballistic missiles, at least 22 have active programmes and 17 have deployed ballistic missiles. At least 4 have manufactured them and at least 6 others are trying to do the same. Less is known about the armaments and strategies for Third World ballistic missiles. Only Israel and possibly India and Pakistan have nuclear warheads available for missile delivery. Several others appear to be acquiring chemical warheads. Conventional explosives remain the most common missile munition, although tactical aircraft are still the preferred delivery system. International responses range from military threats, to control efforts, to overt encouragement, showing that there is no consensus on how to deal with the problem.

COURADES ALLEBECK, A., 'Arms trade regulations', in *SIPRI Yearbook 1989*, pp. 319-38.

The major export regulations that arms producers in the leading exporting countries are required to follow are described in detail, with the main focus on the decision-making procedure, the main legal restraints and the criteria for their implementation. The countries under scrutiny are 5 of the major arms exporters—the USSR, the USA, France, the United Kingdom and the Federal Republic of Germany—as well as 2 minor exporters—Sweden and Italy, which in 1988 reviewed and in the case of Sweden to a large extent revised their respective legislation. Among the East European and Third World countries, there is a lack of official documentation of the legislation of the major exporters in these regions. However, the pattern of arms trade control of the USSR is presented, relying exclusively on publicly available information, because it is the world's largest exporter of arms.

LINDGREN, K., WILSON, G. K. and WALLENSTEEN, P., 'Major armed conflicts in 1988', in *SIPRI Yearbook 1989*, pp. 339-55.

During 1988, 33 major armed conflicts were waged in the world. By the end of the year, the number of armed conflicts which were still militarily active had dropped to 28. There was a clear break in the pattern of a constant increase in the number of major conflicts to which the world had grown accustomed during the 1980s. Promising developments towards conflict resolution occurred in several conflicts, including agreements for foreign troop withdrawals and for an end to hostilities; opening of talks between opposing parties; lowering of tension in the conflict region; and the direct involvement of the United Nations, other international organizations, neighbouring countries and the superpowers in efforts towards conflict resolution. Counter-developments during the year included continued or increased escalation of conflict in spite of important political developments in several of the conflicts. The issues at stake in the 33 conflicts varied considerably: they included, e.g., border issues, regional autonomy or independence, control over central government, and the role of religion in society.

BERTRAM, C., 'US-Soviet nuclear arms control', in *SIPRI Yearbook 1989*, pp. 359-67.

Although the contours of a START treaty emerged during 1988, final agreement still faces a number of obstacles. Compromise solutions were approached on the inclusion of air-launched cruise missiles (ALCMs) and land-based mobile missiles, but agreement was blocked by two main stumbling-blocks: how to limit strategic defences in space and how to limit sea-launched cruise missiles (SLCMs). The immediate threats to the Anti-Ballistic Missile (ABM) Treaty were largely removed. The dispute on whether defensive systems can be developed and tested within the constraints of the ABM Treaty continued, but the ideology behind SDI gradually fizzled out. Attempts throughout the year to decide how to include SLCMs in a START agreement were inconclusive. Prospects for a treaty were uncertain as President Reagan left office at the end of an extraordinary period in the history of arms control.

SHARP, J., 'Conventional arms control in Europe', in *SIPRI Yearbook 1989*, pp. 369-426.

The Third CSCE follow-up meeting in Vienna mandated 2 new sets of negotiations: for the 16 NATO and the 7 WTO states a negotiation on Conventional Forces in Europe (CFE), and for all 35 CSCE states a second Conference on Confidence- and Security-Building Measures and Disarmament in Europe (CDE-II). Both sides agreed that the primary objective of the CFE talks was to reduce the capability for surprise attack and sustained offensive military action, that cuts would be asymmetrical, and that detailed data must be exchanged and verified by on-site inspection. The WTO states initially wanted to include nuclear, naval and air assets but agreed to set aside nuclear and naval issues for the initial phase of the talks. Gorbachev continued to demonstrate impatience with the pace of traditional arms control diplomacy by urging summit-level talks on negotiating objectives and by launching a unilateral disarmament initiative on precisely those forces that NATO states identified as the most offensive: tanks, artillery pieces, assault equipment and combat aircraft. Western publics enthusiastically supported the Gorbachev initiatives while NATO leaders were cautious and uncertain about how to respond.

GÄRTNER, H., 'Multilateral arms control efforts', in *SIPRI Yearbook 1989*, pp. 427-49.

Considering that a number of formidable obstacles to a convention on chemical weapons remain, the date of its conclusion is not just around the corner. Definition and verification remain the most delicate problems. The delegates of the Conference on Disarmament in Geneva have so far failed to distinguish between toxic lethal chemicals produced for strictly commercial use and those suitable for military purposes. If an agreement is to be concluded, the verification of non-production will be very loose. Several experiments prove that verification of a low-threshold test ban treaty appears to be well within the capabilities of present seismic monitoring technology. The main obstacles to the conclusion of an agreement are of a political nature, i.e., security issues. The experiment for the Level II waveform data exchange of the ad hoc Group of Seismic Experts, set up by the CD and intended for 1988, is now not expected until 1990.

URQUHART, B., 'Conflict resolution in 1988: the role of the United Nations', in *SIPRI Yearbook 1989*, pp. 445-60.

In 1988 *détente* emerged as a key theme in international politics with important moves towards the resolution of several long conflicts. Improved US-Soviet relations and the reformulation of both US and Soviet foreign policy were two important catalysts for change. These in turn contributed to the new prominence and success of the United Nations in dealing with regional conflicts. In 1988 the UN played an important diplomatic role in the conflicts in Afghanistan, Iraq-Iran, Namibia, Western Sahara, Cyprus and Kampuchea, where negotiation and other techniques of peaceful settlement prevailed after a long period in which multilateral institutions and solutions were largely ignored. It is still premature to conclude that the year was a historical turning-point. Permanent changes in governmental attitudes, consistency in the use of international organizations and more widespread respect for international authority must first be exhibited.

AKHROMEYEV, S. 'The SIPRI 1988 Olof Palme Memorial Lecture—"Arms control and arms reduction: the agenda ahead"', in *SIPRI Yearbook 1989*, pp. 461-71.

The world has moved forward towards disarmament and reduction of military tension, with the INF Treaty and the Stockholm Document on confidence-building measures in Europe, but the non-applicability of CBMs to the activities of air forces and particularly of navies is a serious remaining problem. While US-Soviet relations are more stable, the threat of a surprise attack has still not been eliminated. In the Soviet view, the great concerns are the buildup and nature of the operations of the navies of the Western powers and the asymmetries in tactical strike aviation. The USSR has taken steps to create new opportunities in East-West relations and calls upon the West to reciprocate. The USSR envisages a stage-by-stage reduction of armed forces and conventional armaments in Europe, and calls for a radical step towards nuclear disarmament in a START agreement on 50 per cent reductions of strategic offensive arms. The spread of sea-launched cruise missiles increases the risk of the outbreak of an armed conflict.

Errata

SIPRI Yearbook 1988: World Armaments and Disarmament

- | | |
|--------------------------------------|--|
| <i>Page 112, section II, line 6:</i> | Should read: 'The agreed CBMs are to comprise information and'. |
| <i>Page 112, line 2 from bottom:</i> | Should read: 'New and continued information is to be delivered by 15 April 1988. It is still'. |
| <i>Table 9.1, page 292:</i> | By 'Indonesia (East Timor)', in the column for No. of troops in 1986, the figure should read 281. |
| <i>Table 9.1, page 294:</i> | By 'Chad', in the column for No. of troops in 1986, the figure should read 14.2. |
| <i>Table 10.1, page 302:</i> | In the Source below the table, line 2 should read ' . . . — more of the order of 30% than 50%—. . . '. |

INDEX

- ABMs (anti-ballistic missiles) 15, 20, 26, 65
ABM (Anti-Ballistic Missile) Treaty (1972) 65, 66, 69, 361, 362–33, 461, 468, 511, 514, 519
Accidental Launch Protection System 67, 69
Aegis system 160, 215
Aeritalia 206
Aérospatiale 31
Afghanistan: ballistic missiles 290–91; conflict in 340, 345, 450–52; military expenditure 167; refugees 166–67; ruin of 166; USSR's invasion 210–11, 450; USSR's withdrawal from 26, 166, 340, 445, 451, 506, 510
Africa: military expenditure 180–82, 185–87, 190–91; *see also under names of countries in*
Aga Khan, Prince Sadruddin 452
Agni missile 296
aircraft: UK 18; USA bombers 7–8, 12; USSR bombers 15, 16; *see also under names of*
Air-Sol-Longue-Portée (ASLP) missile 27, 28
Air-Sol-Moyenne-Portée (ASMP) missile 27, 31, 32
Akhromeyev, Marshal Sergey 25, 26, 374, 382, 391, 515
Alabama, USS 6
Alacran missile 291
Albania 179, 184
Alfonsín, President Raúl 169
Algeria 180, 185, 190, 291
Allen, H. 202
America *see* United States of America
Amnesty International 372
AN-22 bomb 32
AN-52 bomb 32
Andrew Jackson, USS 6
Angola: arms imports 196, 201; chemical weapons and 104; conflict in 339, 349, 445; Cuban troops in 455, 520; military expenditure 181, 186, 190; Namibia and 454–56, 513, 520; South Africa and 200, 455, 513, 518, 519
Antarctic Treaty (1959) 475, 478, 480–94
Arab–Israeli War (1973) 290, 294
Arab League 111
Arafat, Yasser 341
Argentina: arms control and 434; arms imports 203, 204; arms production 202; ballistic missiles 291–92; China and 291; Egypt and 291, 292; military expenditure 182, 187, 192; nuclear weapons and 292; USA and 291
Arms Control Reporter 100
arms trade: control of 195, 217–18, 319–34; economics of 208–10; recipients 210–16; register of 217, 218; suppliers 198–208; value of 195
Army Tactical Missile System 8
Arrow missile 202, 301
artillery 13, 14, 16, 23, 379, 380
Artillery-Fired Atomic Projectiles 9
AS-3 missile 14
AS-4 missile 14
AS-11 missile 21
AS-14 missile 21
AS-15 missile 17, 20, 21
ASAT (anti-satellite activities) 65, 67, 69–72
ASEAN (Association of South-East Asian Nations) 156, 458
Aspin, Les 7–8
ASROC 13
Assad, President Hafez al- 200, 209
Astros-2 rocket 293, 298, 304
AS-X-16 missile 17, 21
AS-X-19 missile 17, 20, 21
Atkenson, Maj. Gen. Edward B. 25–26
Atlas booster 79, 80
atomic demolition munitions 13, 14, 16
Australia: arms control 217, 437; arms imports 287; chemical weapons and 113, 429; military expenditure 180, 185, 190
Australian Group 109, 120
Austria 179, 184, 189
'Autumn 88' exercise 398
Avibras 293

B-1 bomber 7, 8, 12
B-2 bomber 7, 8, 76, 135, 139–40
B-52 bomber 7, 8, 12
B61 bombs 9
Backfire bomber 22–23
Badger aircraft 22
Badr-2000 291, 295
Bahrain 179, 184, 189
Baker plan 168
Baku 24
Balkans, nuclear weapon-free zone in 507
Bangladesh 180, 185, 189
Barents Sea 395
Bear aircraft 14, 17, 21
Belgium: arms exports 320; military expenditure 178, 183 188
Belskiy, Colonel Dimitry 389
Benin 181, 186, 190
Berlin 147, 148
Bernard, Michel 206
Bhutto, President Benazir 170, 519
biological warfare 100
Biological Weapons Convention (1972) 99–100, 114–15, 477, 478, 480–94
biotechnology 100, 115
Blackjack aircraft 14, 17–18, 21
BM-21 rockets 294
Bolivia 182, 187, 192
Booster Surveillance and Tracking System 67, 69
Botswana 181, 186, 190
Brazil: arms control and 434; arms exports 197; ballistic missiles 292–94; debt 167; military expenditure 182, 187, 192; nuclear weapons and 293
Brazzaville Protocol 519, 520

- British Aerospace 205, 206
 British Seismic Verification Research Project 55
 Brunei 180, 185, 190
 Brundtland, Gro Harlem 388
 Buccaneer aircraft 18, 28
 Bulgaria: chemical weapons and 430; human rights 370; military cuts 374; military expenditure 179, 184, 188
 Burkina Faso 181, 186, 190
 Burlatsky, Fyodor M. 371
 Burma 180, 185, 190, 340, 345
 Burundi 181, 186, 190, 341
 Bush, President George 66, 119, 134, 136, 139, 140, 359, 365–67, 446
- Cambodia *see* Kampuchea
 Cameroon 181, 186, 190
 Camp David Accords 294
 Canada: arms control 435; arms imports 203; military expenditure 178, 183, 188
 Carlucci, Frank 5, 8, 17, 26, 68, 71, 202, 216, 287, 303, 306, 391, 470
 Carter, President Jimmy 366
 CD (Conference on Disarmament): chemical weapons and 108, 118, 427, 430, 431, 433, 435, 507; nuclear test ban and 438
 CDI-I (Conference on Confidence- and Security-Building Measures and Disarmament in Europe) 369; *see also* Stockholm Document
 CDE-II (Conference on Confidence- and Security-Building Measures and Disarmament in Europe) 369, 375, 393–95
 Ceaucescu, General Secretary Nicolae 377
 Central African Republic 181, 186, 190
 Central America: military expenditure 182, 187, 191–92
 Ceylon *see* Sri Lanka
 CFE (Conventional Armed Forces in Europe) negotiation 369, 372–73, 373–75, 381–93, 395–98
 Chad 181, 186, 190
 Chad–Libya War 339, 349, 516
 Charles de Gaulle 33
 chemicals: trade in 109
 chemical weapon-free zones 113
 chemical weapons: allegations about 100–4; definition 107, 431; developments 104–9; disarmament 427–36; spread of 99, 110–12, 202
 chemical weapons convention 99, 117
 Chervov, General Nikolai 389
 Chetv missile 202
 Chevenement, Jean-Pierre 30, 31, 206, 381
 Chile: arms imports 203; military expenditure 182, 187, 192
 China: arms exports 36, 111, 158, 196, 197, 202, 207–8, 209, 213, 289, 304, 305, 306, 320; arms production 208; economic problems 157–58; military expenditure 133, 156, 157–59; nuclear exercises 35–36; nuclear weapon tests 34–35, 49, 51, 58, 59, 60; strategic forces 20, 33–37; USSR and 33–34, 518; Viet Nam and 347
 Ching Feng 307
- Chirac, Jacques 33, 372, 380
 Ciriaco de Mita 389
 Clemenceau 33
 Colombia: arms control and 217; conflict in 353; military expenditure 182, 187, 192
 Common Market *see* EC
 Condor missile 202, 291–92
 conflicts: characteristics of 341–42
 Congo 181, 186, 190
 Conventional Stability Talks 370; *see also* CFE
 Cook Islands 51
 Cordovez, Diego 451
 CORTEX 54
 Costa Rica 182, 189, 191
 Côte d'Ivoire 181, 186, 190
 Council of Europe 217
 CSCE (Conference on Security and Co-operation in Europe) 372–73; Belgrade meeting 369; Helsinki meeting and Final Act 369, 370, 393, 462; Madrid meeting 369; Vienna meeting 369, 370–73, 394, 416–26; *see also* CFE
 CSS-N-3 missile 34–35
 Cuba: Angola and 196; Angola, troops in 200, 513, 518, 519, 520; ballistic missiles 294; chemical weapons and 104; military expenditure 182, 187, 191
 Cyprus 179, 184, 189, 447, 457
 CZ-4 rocket 37
 Czechoslovakia: chemical weapons and 113, 430; human rights 370; military cuts 374; military expenditure 179, 184, 188; USSR's troops in 22, 24, 376, 377
- Dassault 205, 207, 212, 299
 Dean, Jonathan 384, 386, 391
 debts 167–71
 Defense Meteorological Support Program 82, 83
 Defense Satellite Communications System 79
 Delta Launch Vehicle 82
 Deng Xiaoping 33, 34, 156
 Denmark 178, 183, 188, 391, 508, 512
détente 141, 373
 deterrence 106
 DF-3 missile 304
 Dhawan, Satish 296
 Dominican Republic 182, 187, 191
 Dreger, Alfred 379
 Dumas, Roland 371, 380
 Dunayev, Aleksander 83
- East Timor 448
 EC (European Community) 134, 203, 217, 321
 Ecuador: military expenditure 182, 187, 192
 Egypt: Argentina and 291, 292; arms control and 195; arms exports 197; arms imports 204; arms production 201; ballistic missiles 294–95; military expenditure 179, 184, 189
 Ekeus, Rolf 431
 Eliasson, Jan K. 454
 El Salvador, 182, 187, 191, 353
 Embraer 293
 Engesa 293

Enmod Convention (1977) 477, 478, 480–94
 Ericsson 212
 ERW *see* neutron bomb
 Espiell, Hector Gros 456–57
 Ethiopia 104, 181, 186, 191, 340, 350
 Ethiopia–Somalia War 339–40, 350, 508
 Eurojet Consortium 206
 Europe: military expenditure 179, 184, 189
 European Fighter Aircraft (EFA) 204, 206
 European Parliament 101
 Everett Panel/Report 66, 67, 69
 Excimer laser 72
 Exoatmospheric Reentry-vehicle Interception System (ERIS) 67, 68, 70, 72
 Experimental Aircraft Programme 206

 F-15 aircraft 9, 70, 72, 140
 F-16 aircraft 23
 F-117 aircraft 9
 F/A-18 aircraft 23
 Falklands/Malvinas War 203, 291
 famine 133, 171
 Far East 180, 185, 190
 Faw-1 missile 299
 FB-111 aircraft 12
 Fiat 206
 Fiji 180, 185, 190
 Finland 179, 184, 189
 Fletcher, Dr James 67
 Foch 33
 Follow-on to Lance missile 8, 9
 Ford, President Gerald 366
 Foudroyant 30
 France: arms control and 33, 372, 373, 378, 379, 380, 394, 516; arms exports 197, 204–7, 213, 299, 320, 325–26; chemical weapons 105–8, 109, 118, 430; Germany, co-operation with 29, 505; military expenditure 30, 145, 178, 183, 188; nuclear weapon tests 30, 49, 50–51, 58, 59, 60, 508; UK, co-operation with 4, 27–28, 506; USSR and 516
 FRAS-1 rocket 24
 FROG missile 22, 290, 291, 294, 297, 301, 302, 304, 306, 308
 Frost, Rear Admiral David 71

 Gabon 181, 186, 191
 Gabriel missile 305
 Gadaffi *see* Qaddafi
 Galosh missile 20, 66
 Gammon missile 307
 Gazelle missile 20
 GB-FEL 70, 71
 General Electric 212
 genetic engineering 100, 115
 Geneva Accords 290, 451, 452, 509, 510
 Geneva Protocol (1925) 116, 428, 475, 478, 480–94; Paris meeting on 99, 110, 116, 120, 129–30, 428, 517
 Genscher, Hans-Dietrich 217, 371, 372, 275, 380
 German Democratic Republic: arms control and 384; chemical weapons and 113, 430, 432;

human rights 370; military cuts 374; military expenditure 179, 184, 188; USSR's troops in 22, 24, 376, 377
 Germany, Federal Republic: arms control and 384, 429; arms exports 204, 205, 213, 319, 320, 328–30; chemical weapons and 105, 106, 108, 111, 112, 113, 117, 429, 430, 434; conscripts 147; France, co-operation with 29, 505; military expenditure 145, 147–48, 178, 183, 188; USSR and 517
 Ghana 181, 186, 191
 Ghazala, Lt Gen. Abdel Halim abu 295
 Giraud, André 33, 380
 Giscard d'Estaing, President Valéry 369
 Gorbachev, President Mikhail: Afghanistan and 166, 506; arms control and 155, 199, 376, 378, 382, 389, 390, 394, 397, 398, 433, 507, 511, 512, 515; arms exports and 199; China and 33; human rights and 370; President, elected as 516; UN speech 3, 24, 150, 155, 373–74, 376, 377, 390, 446; *see also* summit meetings
 Gorshkov, Admiral Sergey 26
 Great Britain *see* United Kingdom
 Greece: ballistic missiles 295; chemical weapons and 113; military expenditure 164–66; 178, 183, 188; Turkey and 507
 Green Bee 307
 Grenada 324
 Gromyko, President Andrei 26
 Ground-based Surveillance and Tracking System 67
 Guatemala 182, 187, 191, 353
 Gulf Cooperation Council 214
 Gulf War *see* Iran–Iraq War
 Guyana 182, 187, 192

 Hadès missile 31, 32, 380
 Haiti 182, 187, 192
 Hammond, Lt Gen. Robert 71
 Hawk missile 299
 Hen House radar 66
 Henry Clay, USS 6
 Henu, Charles 31
 Herrington, John S. 10
 Holst, Johan Jørgen 388
 Honduras 182, 187, 192
 Honecker, Erich 377
 Honest John missile 14, 289, 295, 302, 307
 Hong Kong 180, 185, 190
 Howe, Geoffrey 29, 375
 Hughes 79–80
 Hungary: arms control and 429; human rights 370; military cuts 374; military expenditure 179, 184, 188; USSR's troops in 24, 376–7

 India: arms control 434; arms imports 195, 210–13, 505; arms production 211; ballistic missiles 296, 309; conflict in 346; debt 168; heavy water and 510; military expenditure 180, 185, 189; nuclear weapon tests 59, 60, 297; Pakistan and 520; Space Research Organiza-

- India—*cont*
 tion 296; Sri Lanka and 448; USA and 212; USSR and 212–13, 518
- Indian Ocean 518
- India–Pakistan conflict 339, 346
- Indomptable* 30, 31
- Indonesia: ballistic missiles 297; conflict in 347; military expenditure 180, 185, 190
- Inflexible* 30
- INF Treaty 21: ballistic missile, definition of 288; chemical weapons and 118; ratification 511; theatre forces and 8; weapons destroyed 3, 8, 21, 513
- Inhumane Weapons Convention (1981) 478, 479, 480–94
- International Atomic Energy Agency 393
- International Court of Justice 448–49, 454
- International Monetary Fund 167, 168, 169
- Iran: arms imports 111, 158, 301, 306; arms production 197; ballistic missiles 297–98; biological weapons and 115; chemical weapons and 101, 109, 111; conflict in 340, 343; Kurds and 100, 343; military expenditure 164–66, 179, 184, 189; USA and 512; *see also following entry*
- Iran–Iraq War: arms imports and 196–98; cease-fire 100, 101, 115, 195, 196, 197, 447, 514; chemical weapons used in 99, 100–1, 119, 509; cities, war of 453; damage 165–66; description 343; military expenditure 133, 164–6; missiles and 196, 290; tanker war 453; UN and 452–4
- Iraq: arms exports 200; arms imports 195, 293, 294, 297, 301; arms production 197; ballistic missiles 298; biological weapons 115; chemical weapons and 99, 100–1, 109, 111, 115; conflict in 340, 341; debt 165; Kurds and 100, 101, 115, 340, 343; military expenditure 164–66, 179, 184, 189; nuclear weapons and 299; USA and 197; *see also previous entry*
- Ireland: military expenditure 179, 184, 189
- Ireland, Northern 342
- Islamic Conference Organization 453
- Israel: arms imports 195; arms production 202; ballistic missiles 299–301, 309; chemical weapons 111, 113; military expenditure 179, 184, 189; Palestinians, conflict with 340–1, 344, 448, 514; USA and 202, 300, 301; USSR and 445; *see also Arab–Israeli War* (1973)
- Italy: arms control 217, 430; arms exports 320, 322–24; arms imports 111; military expenditure 178, 183, 188; US bases in 511
- Jaguar aircraft 32
- Jakes, Milos 377
- Jamaica 182, 187, 192
- James Monroe, USS* 6
- Japan 48, 49, 98, 100, 116, 135, 138, 144, 192, 216–17; arms control 437; arms imports 215–16, 287; chemicals and 109–10; military expenditure 156, 159–62, 180, 185, 190; USA and 215, 216
- Jaruzelski, General Wojciech 376, 377, 384, 385, 386, 389
- Jericho missile 299–300, 301, 307
- John Adams, USS* 6
- Johnston Island 105
- Joint Verification Experiment 49, 50, 52–55, 56, 61–63, 427, 505, 506, 511, 514, 515
- Jordan: arms imports 197, 205, 214; military expenditure 179, 184, 189
- Juanerena, José Horacio 292
- Kampelman, Max 202
- Kampuchea: chemical weapons and 104; conflict in 339, 348, 458–9; Viet Nam and 207, 446, 458–59, 510
- Karpov, Viktor 202
- Kashlev, Yuri 372
- Katechis, James 71
- Kawara, Tsutomu 216
- Keel, Alton 381
- Kendall, Frank 70
- Kennedy, Paul 137
- Kenya 181, 186, 191
- Kohl, Chancellor Helmut 205, 371, 373, 379, 380, 381
- Korea, North: arms exports 197; arms imports 195, 196, 201; ballistic missiles 301, 309; chemical weapons and 111; debt 209; economy 163–64; military expenditure 156, 162–64, 180, 185, 190
- Korea, South: ballistic missiles 302; chemical weapons and 111; debt 168; military expenditure 156, 162–64, 180, 185, 190; US forces in 215
- Kremlin* 24
- Kuwait 179, 184, 189, 302
- Lance missile 13, 14, 300, 304, 307, 380
- Laos 104
- Laos–Thailand conflict 339, 348
- lasers 68, 70–1
- Lawson, Nigel 148
- Leased Satellite system 79
- Lebanon 179, 184, 344
- Lebedev, Maj. Gen. Yuri V. 24
- Ledogar, Stephen 372
- Leonid Brezhnev* 24
- Liberia 181, 186, 191
- Libya: arms exports 303; arms imports 195, 197, 293, 303; ballistic missiles 290, 302–3; chemical weapons and 110–11, 119; military expenditure 181, 186, 191; US raid on 303
- Lobov, General Vladimir 25
- Lockheed 69
- Luxembourg 178, 183, 188
- Lynx helicopter 18
- M-4 missile 30, 31
- M-5 missile 30, 31
- M-45 missile 31
- McDonnell Douglas 69
- Madagascar 181, 186, 191
- Makarios, Archbishop 457

- Malawi 181, 186, 191
 Malaysia 180, 185, 190, 348
 Mali 181, 186, 191
 Malvinas *see* Falklands/Malvinas War
 Mao Zedong 157
 MAR-350 rocket 300
 Mauritania 181, 186, 191, 456
 Mauritius 181, 186, 191
 MBB 205, 206
 MBFR (Mutual and Balanced Force Reduction)
 talks 369, 384, 389, 393, 395–98
 Medium Launch Vehicle programme 79
 Merveilleux de Vignaux, Vice Admiral Michel 30
 Meselson, Dr Matthew 114
 Mexico: debts 167; military expenditure 182, 187,
 192
 Middle East 179–80, 184–85, 189, 195; *see also*
 under names of countries
 Midgetman missile 136
 military doctrines 375
 Minuteman missile 12
 MIRACL 70–71
 Mirage aircraft 32–33
 MIRVs 6, 11
 missiles, ballistic: *general references* accuracy
 289; acquisition methods 289; alternatives to
 289–90; chemical weapons and 111; definitions
 288–89; foreign technology and 289; launches
 notification agreement 3, 46–47, 511; proliferation
 202, 287–310; *individual countries* China
 4, 20, 34, 36, 37; France 30, 31; UK 18, 27;
 USA 4–6, 12, 16; USSR 3–4, 11–12, 15, 16; *see*
 also under names of
 missiles, cruise: arms control and 359–60, 363–
 65; USA 7, 8, 9, 13, 14; USSR 4, 16, 21; *see also*
 under names of
 Missile Technology Control Regime 111–12, 202,
 287, 288, 289, 292, 297
 Mitterrand, President François 32, 33, 105, 107,
 110, 116, 118, 371, 373, 380, 381, 430
 MLRS rocket system 308
 Mock, Alois 433
 Moiseyev, Col. Gen. Mikhail 26
 Mongolia 24, 180, 185, 432
 Morocco 181, 186, 191, 445, 448, 456
 Moscow News 151, 398
 Mozambique 181, 186, 191, 350–51
 MPLA 455
 Mujahideen 290
 mustard gas 104, 295
 MX missiles 4–5, 6, 12, 136
 Namibia: conflict in 339, 351, 445; independence
 of 447; South Africa and 454–55
 Nasser, President Abdel Gamel 294
 NATO (North Atlantic Treaty Organization): air
 superiority 388–89, 390; arms control 378–93,
 394, 396–97, 519; burden sharing 141–46;
 communiqués issued by 506; Defence Planning
 Committee 143, 510, 518; flexible response
 doctrine 379, 381, 396, 397; forward defence
 396, 397; military expenditure 133, 141–49,
 178, 183, 188; mobilizable defence personnel
 143; naval advantage 391; Nuclear Planning
 Group 517; purposes of 507
 Natural Resources Defense Council 55
 Nepal 180, 185, 189
 nerve gas 104, 111
 Netherlands: arms control and 437; arms exports
 320; chemical weapons and 429, 430; military
 expenditure 178, 183, 188
 neutron bomb: China 4, 34, 51; France 32
 New York Times 374
 New Zealand 51, 181, 185, 190
 Nicaragua: cease-fire and 507, 512; conflict in
 339, 354; Contras 507, 512; military expendi-
 ture 182, 187, 192
 Niger 181, 186, 191
 Nigeria 168, 181, 186, 191
 Nike Hercules missile 9, 13, 14, 295, 302, 308
 Nitze, Paul 364
 Non-Proliferation Treaty (1968) 287, 476–77,
 478, 480–94
 Norway 178, 183, 188, 381, 391, 510
 Norwegian Sea 395
 Nuclear Risk Reduction Centers 507, 508
 nuclear weapons: USA's production problems 3,
 10–11
 nuclear weapon tests 49–63; *see also* Joint
 Verification Experiment
 nuclear weapon test ban 53–55, 436–39
 Nunn, Sam 5, 67, 69
 OAU (Organization for African Unity) 342, 447,
 448, 456
 Oceania 180, 185, 190
 Odom, General William E. 25
 Ogarkov, Marshal Nikolai 26
 Oghab rocket 298
 Ohio, USS 6
 oil prices 170, 209
 Oman 179, 184, 189
 Orbita 293, 303
 Otrag 303, 304, 306
 Outer Space Treaty (1967) 476, 478, 480–94
 Pakistan: ballistic missiles 303–4, 309; conflict in
 339; India and 520; military expenditure 180,
 185, 189
 Palme, Olof 452, 453, 461
 Panama 182, 187, 192
 Paraguay 182, 187, 192
 Partial Test Ban Treaty (1963) 49, 437, 475, 478,
 480–94, 514
 Peaceful Nuclear Explosions Treaty (1976) 49,
 52, 53, 54, 56, 427, 511
 Perez de Cuellar, Javier 450, 451, 453, 456, 458
 Pershing missile 8, 9, 13, 14, 300, 515, 516
 Peru: arms control and 217; conflict in 354; debt
 168; military expenditure 182, 187, 192
 Petrovsky, Vladimir 382
 Philippines: conflict in 340, 341, 349; military
 expenditure 170, 180, 185, 190; nuclear
 weapons and 510

- Pikalov, Col. Gen. Vladimir 306
 Pill Box radar 66
 PLO (Palestine Liberation Organization) 341, 518, 519, 520
 plutonium 6, 10, 28
 Pluton missile 32
 Poland: human rights 370; military cuts 374, 376; military expenditure 179, 184, 188; USSR's troops in 376
 Polaris missile 18, 27
 Polaris submarine 29
 Polisario Front 448
 Portugal: military expenditure 178, 183, 188
 Poseidon missile 12
Pravda 382-83, 391, 506
 Premadasa, Ranasinghe 340
 Prithvi missile 296

 Qaddafi, Muammar al- 302
 Qian Qichen 33

 Rafsanjani, Hashemi 165
 Raimond, Jean-Bernard 29, 372
 Raratonga Treaty (1985) 478, 479, 480-94, 509
 Reagan, President Ronald: arms control and 363, 365, 366, 428, 516; ASAT and 70; chemical weapons and 104, 108, 111, 116, 428; MX and 5; nuclear weapon test ban 56; UN and 448; *see also* summit meetings
 Redman, Charles 382
Redoutable 30
 refugees 341
Revue Aérospatiale 29
 Robinson, Julian P. Perry 105, 117
 Rocard, Michel 380
 Roh, President Tae Woo 164
 Rolls Royce 206
 Romania: human rights 370; military expenditure 179, 184, 188
 Rühle, Volker 379
 Russia *see* Union of Soviet Socialist Republics
 RX-250 rocket 297
 Rwanda 181, 186, 191
 Ryzhkov, Nikolai 395

 S3 missile 31
 S4 missile 31
 SA-1 missile 21
 SA-2 missile 21
 SA-3 missile 21
 SA-5 missile 302
 SA-10 missile 20, 21
 Sakharov, Andrei 371
 St Germain Convention 320
 Sakr-80 294
 Salam, Operation 452
Samuel B. Roberts 509
 SALT I 288, 394
 SALT II 288, 394
 sarin 110
 Satellite Data Systems 80
 satellites: *general references* developments 72-84; launch vehicles 82-84; *individual countries* China 37, 84, 89, 96; France 84, 91, 98; Israel 84; UK 84, 91, 98; USA: communications 79-80, 83, 91, 96-97; early warning 80-81, 83, 97; electronic intelligence 77, 90, 96; geodetic 97; imaging-radar 65, 69, 72, 74-76, 89, 96; navigation 72, 73, 81-82, 83, 92; nuclear detection 93, 97; oceanographic 78, 83, 90; photographic 74-75, 76; weather 82, 92, 97; USSR: communications 78-79, 91, 94-95; early warning 80, 91-92, 95; electronic intelligence 76, 90, 94; geodetic 95; navigation 81, 92, 95; nuclear detection 93; oceanographic 69, 77-78, 90; photographic 73-74, 80, 88-89, 94, 96; weather 82; *see also* ASAT
 Saudi Arabia: arms imports 36, 196, 207-8, 208-9, 213-14, 293, 507; ballistic missiles 304-5; military expenditure 179, 184, 189
 Savinkin, Lt Colonel Alexander 398
 SA-X-12 missile 21
 SCC-2B missile 294
 Scout rocket 296
 Scowcroft, Brent 365-6
 Scud missile 22, 290, 294, 295, 296, 297, 298, 299, 301, 302, 303, 304, 306, 308
 SDI (Strategic Defense Initiative) 65, 66-69, 72, 135, 361-63
 Sea-Bed Treaty (1971) 477, 478, 480-94
 Sea Harrier aircraft 18, 28
 Sea King helicopter 18
 Sea Lance missile 9
 Senegal 181, 186, 191
 Sergeant missile 14
 SH-11 missile 66
 Shabanov, General Vitaly 151
 Shavit missile 300
 Shevardnadze, Eduard 33, 150, 151, 217, 218, 361, 371, 390, 398, 427
 Shomron, General Dan 305
 Shultz, George 151, 202, 203, 215, 217, 218, 306, 361, 371, 372, 375, 388, 427
 Sierra Leone 181, 186, 191
 Sihanouk, Prince Norodom 459, 517
 Singapore 180, 185, 190
 Single Integrated Operational Plan 4
 SIPRI 218
 Siwicki, General Florian 376
 Six-Nation Initiative 505
 Skerpioen missile 308
 Sky Lite system 71
 SL-8 booster 78
 SL-14 booster 79
 SL-16 booster 76
 SLV-3 rocket 296, 297
 SM-70 missile 293
 Small ICBMs 5, 6
 Sokolov, Sergey L. 26
 Somalia: chemical weapons 111; conflict in 339, 340, 351; military expenditure 181, 186, 191
 Sonda rockets 293
 sounding rockets 293, 297, 304

- South Africa: ballistic missiles 305–6, 309; chemical weapons and 104; conflict in 351; military expenditure 181, 186, 191; nuclear weapons 305
- South America: democratization 170, 171; military expenditure 182, 187, 192; *see also under names of countries*
- South Asia: military expenditure 180, 185, 189; *see also under names of countries*
- Soviet Military Power* 11, 17, 22, 25
- space launch vehicles 292, 296, 208
- space shuttles: USA 65, 75, 80, 82, 83–84; USSR 65
- Space Surveillance and Tracking System 67
- Spain: military expenditure 178, 183, 188; US bases in 505, 516
- Sprint missile 66
- SRAM missile 8, 9
- Sri Lanka: conflict in 340, 346–7; India and 448; military expenditure 180, 185, 189
- SS-4 missile 22
- SS-5 missile 22
- SS-11 missile 12
- SS-12 missile 21–22, 298, 302, 506
- SS-17 missile 12, 22
- SS-18 missile 92
- SS-19 missile 12, 22
- SS-20 missile 14, 21, 22, 514
- SS-21 missile 4, 22, 302, 306, 307, 308
- SS-23 missile 22, 306
- SS-24 missile 3, 11
- SS-25 missile 3, 11
- SS-300 missile 293, 299
- SS-1000 missile 293
- SSC-X-4 missile 21, 22
- SSC-X-5 missile 21
- SS-N-12 missile 21
- SS-N-19 missile 21
- SS-N-20 missile 11, 13
- SS-N-21 missile 4, 21, 23, 363
- SS-N-22 missile 21, 24
- SS-N-23 missile 11, 13
- SS-NX-24 missile 21
- SS-X-26 missile 12
- Standard-2 missile 9
- START talks 119, 359–67, 468, 505, 506, 508
- stealth technology 18, 19
- Stockholm Document 369, 386, 394, 395, 403–10, 461, 462, 515
- Stoessel Report 105
- Studerman, Admiral William 35
- Su-22 aircraft 291
- Su-24 aircraft 21, 23
- Su-27 aircraft 23, 24
- submarines: Brazil 293–94; China 35; France 30–1; India 212, 505; UK 4; USA 6; USSR 12–14, 22, 23–24
- SUBROC 9, 13
- Sudan: conflict in 340, 341, 352; military expenditure 181, 186, 191
- summit meetings: Moscow (1988) 3, 8, 202, 287, 427, 428, 437, 446; Reykjavik (1986) 373; Washington (1987) 361, 362, 506
- Super Etendard aircraft 33
- SWAPO 455
- Swaziland 181, 186, 191
- Sweden: arms control and 392, 432; arms exports 319, 330–2; military expenditure 179, 184, 189
- Switzerland: 179, 184, 189
- Syria: arms imports 36, 200–1, 202; ballistic missiles 306–7, 309; chemical weapons and 110; military expenditure 179, 184, 189
- Tactical Air-to-Surface Missile 8–9
- Tahiliani, Vice Admiral R. H. 213
- Taiwan: arms production 201; ballistic missiles 307; military expenditure 156, 180, 185, 190
- Takeshita, Noboru 161
- Tanzania 181, 186, 191
- Tartarnikov, Major General Victor 390
- Tbilisi* 24
- 'Team Spirit' exercise 73
- Tennessee* 6
- Terrier missile 9
- Thailand: arms imports 207, 209; chemical weapons 104; conflict in 339; military expenditure 180, 185, 190
- Thatcher, Prime Minister Margaret 27, 28, 148, 371, 380
- Third World: arms exports 320; arms imports 195; ballistic missile programmes 290–308; conflict resolution 164–67; debt and 133, 167; military expenditure 133, 164–71
- Threshold Test Ban Treaty (1974) 49, 52, 53, 54, 55, 56, 427, 507, 511
- Titan rocket 75, 77, 79, 80, 83
- Tlass, Mustafa 200
- Tlatelolco Treaty (1968) 476, 478, 480–94
- TN-35 missile 31
- Togo 181, 186, 191
- Tomahawk missile 10, 13, 363
- Tonnant* 30
- Tornado aircraft 18, 28, 204, 213, 214, 305
- torpedoes 16
- Toshiba 215
- Trident missile 4, 6, 12, 27
- Trident submarine 27, 28–29, 149
- Trinidad and Tobago 182, 187, 192
- tritium 3, 6, 10, 11
- Try Add radar 66
- TT-09 missile 12
- Tunisia 182, 187, 191
- Turhalle Conference 454
- Turkey: arms control and 381, 391; ballistic missile 307–8; chemical weapons and 113; Greece and 507; military expenditure 145, 178, 183, 188
- Uganda 182, 187, 191, 339, 352
- Union of Soviet Socialist Republics: Academy of Sciences 55, 438; Anthrax outbreak 114, 119; arms control and 217, 359–67, 394, 429, 430, 437; arms exports 26, 196, 197, 198, 199–201, 289, 320, 324–25, 505; chemical weapons and

Union of Soviet Socialist Republics—*cont.*

- 99, 108–9, 110, 112, 113, 118, 119, 429, 431, 433, 435; Chernobyl accident 10; China and 156, 157, 445, 518; economic problems 150, 154, 398; foreign policy 446, 459; France and 516; Germany and 517; *glasnost* 17, 150, 371, 377; human rights 370, 371; India and 518; Israel and 445; Krasnoyarsk radar 515, 517; military doctrine 25, 26; military expenditure 26, 133, 150–55, 179, 184, 188; military forces, cuts in 3, 24, 26, 150, 153, 374, 519; military forces, restructuring 3, 4, 24, 25, 26, 398; naval forces 23–24; nuclear weapon tests 49, 50, 58, 59, 60, 437; moratorium on 49, 50, 54, 374; *perestroika* 24–26, 150, 371, 377; strategic defence 20–1, 65–66; strategic weapons 3–4, 11–26; theatre forces 16, 21–23; USA, relations with 3, 133, 134, 445–46; *see also under* Afghanistan
- UNITA 455
- United Arab Emirates 179, 184, 189
- United Kingdom: arms control and 29, 217, 379, 429; arms exports 203, 204, 208, 214, 320, 326–27; chemical weapons 99, 101, 108, 112, 429, 433, 434; France, co-operation with 4, 27–28, 506; military expenditure 145, 148–49, 178, 183, 188; nuclear weapon tests 49, 59, 60; strategic forces 4, 18, 27–29; uranium production, problems with 28–29; USA, co-operation with 4, 28
- United Nations: chemical weapons and 99, 101, 102–3, 107, 108, 110, 116, 117, 119, 509, 514; conflict resolution and 342, 448–60; Good Offices Mission for Afghanistan and Pakistan 453; peacekeeping forces 166, 447; Special Sessions on Disarmament 51, 113, 118, 202, 217, 369, 371, 511, 512; superpowers and 449–50
- United States of America: AirLand Battle doctrine 76; Anderson AFB 7; arms control and 217, 359–67, 379; arms exports 198, 201–4, 213, 214, 215, 321–24; control of 320–24; Barksdale AFB 7; biological weapons and 114; chemical weapons and 101, 104–5, 106, 107, 109, 112, 113, 118, 119, 429, 430, 431, 432, 433, 435; CIA 151, 374; Congress: ABM Treaty and 69; chemical weapons and 104; funds and 6, 8, 136, 363; military expenditure and 134; SDI and 67, 363, 510; conscripts 144–45; corruption in 137; Davis-Monthan AFB 8; deficits 138, 139; Dugway Proving Ground 114; Dyess AFB 7; economic problems 3, 134, 135, 138; Ellsworth AFB 7; Europe, commitment to 141; FBI 137; foreign policy 446–47; Gramm-Rudman-Hollings Act 135; Iran and 509; Lawrence Livermore Laboratory 8, 9, 436; Loring AFB 7; Mather AFB 7; military expenditure 133, 134–40, 144, 178, 183, 188; military forces, cuts in 135; Minot AFB 8; NASA 83; naval weapons 9–10; nuclear weapon tests 49, 50, 58, 59, 60, 437; Sawyer AFB 8; strategic forces 3, 4–11, 12; theatre forces 8–9, 13; troop withdrawals and 142, 146; UK's arms exports and 203; UN and 448; USSR, relations with 3, 133, 134, 445–46; Vandenberg AFB 75; Viet Nam and 215; Warren AFB 4, 5; Whiteman AFB 7
- uranium 6, 28
- Uruguay 182, 187, 192
- Venezuela 182, 187, 192
- Venkataraman, Ramaswamy 212
- Viet Nam: Cam Rahn Bay 155, 515; China and 347; Kampuchea and 207, 446, 458–59, 510
- Vougyr, Lt Gen. Philippe 27, 31
- W82 warhead 9
- W84 warhead 9
- W89 warhead 8
- Waldheim, Kurt 452
- Warsaw Pact *see* WTO
- Washington Accords 468
- Washington Times* 470
- WE-177 bomb 27, 28
- weapon systems, costs of 139
- Webster, William 374
- Weinberger, Caspar 66
- Western European Union 101, 518
- Western Sahara 352, 447, 448, 456–57, 514
- Whitehead, John 303
- World Bank 168, 169
- World Meteorological Organization 438
- World War II 138, 160
- Wörner, Manfred 389
- WTO (Warsaw Treaty Organization): arms control and 376–78, 381–93, 394, 508, 513; military expenditure 133, 179, 184, 188, 377
- Wu Zueqian 207, 208
- Yazov, General Dimitri T. 382, 391, 398
- Yemen, People's Democratic Republic of (South) 180, 185, 189, 308
- Yemen Arab Republic (North) 180, 185, 189, 308, 309
- Younger, George 28
- Yugoslavia: military expenditure 179, 184, 189
- Zaire 182, 187, 191
- Zambia 182, 187, 191
- Zenith Star space test 68, 69
- Zia-ul-Haq, President Mohammad 304
- Zimbabwe 182, 187, 191, 339

SIPRI YEARBOOK 1989

WORLD ARMAMENTS AND DISARMAMENT

What were the important developments in the military sector in 1988, and what effect did they have on peace and security? What progress was made in the attempts to control military activity and to reduce tension and the chances of war? In short, what are the prospects for a more stable international order? This twentieth edition of the SIPRI Yearbook presents detailed information on arms and arms control issues in a format that is both concise and standardized for ease of use. The Yearbooks attract world-wide attention and are used by governments, arms control negotiators, United Nations delegations, parliaments, scholars, students, the media and citizens as unique and indispensable reference works.

The *SIPRI Yearbook 1989* continues SIPRI's review of the latest developments in nuclear weapons, nuclear explosions, world military expenditure, the international arms trade, chemical and biological weapons, the military use of outer space, ongoing armed conflicts and European arms control, and presents the unique annual calendar of military activities required by the Stockholm Document. Efforts to control the arms race—in nuclear, chemical, biological, conventional and space weapons—are described, and the status of negotiations and agreements is analysed.

In addition to these regular features and statistics, this latest SIPRI Yearbook contains special studies on the arms trade regulations of seven weapon-exporting countries, on ballistic missile proliferation in the Third World, and on the enhanced role of the United Nations in regional conflict resolution. Its comprehensive coverage makes it an invaluable sourcebook for anyone seeking authoritative, factual information on issues of armaments and disarmament and thus to anyone interested in strategic studies, war studies, peace studies and international relations.

How to buy SIPRI publications

SIPRI books may be obtained through all main bookshops. In case of difficulty please contact the publisher or SIPRI.

ISBN 0-19-827751-2



9 780198 277514