World Armaments and Disarmament

SIPRI yearbook 1976

Stockholm International Peace Research Institute

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Stockholm International Peace Research Institute

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PREFACE

The seventh issue of the *SIPRI Yearbook* continues our analysis of the world's arms races, and the attempts to stop them, up to 31 December 1975. As in all SIPRI publications, information has been obtained from open sources only.

The preparation of the Yearbook was directed and supervised by Frank Barnaby.

Attributions

The SIPRI research staff mainly responsible for the preparation of the Yearbook were: Frank Barnaby, Richard Booth, Jozef Goldblat, Ron Huisken and Signe Landgren-Bäckström.

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The editorial staff were: Connie Wall, Rajesh Kumar and Felicity Roos.

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May 1976

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ABBREVIATIONS, CONVENTIONS AND CONVERSIONS

Abbreviations

bn	billion (one thousand million)
cm	centimetre
deg	degree
FY	fiscal year
h	hour
ha	hectare
kg	kilogramme
km	kilometre
kt	kiloton
l	litre
m	metre
min	minute
mm	millimetre
mn	million
mt	megaton
MWe	million watts of electricity
MWt	million watts of thermal power
nm	nanometre (10^{-9} m)
s	second
W	watt
μm	micrometre (10^{-6} m)

Conventions

Some conventions used with particular tables only are given together with those tables. The conventions used in Part II are given in Chapter 6.

..	Data not available
–	Nil or less than half the final digit shown; negligible; not applicable
()	Greater degree of uncertainty about estimate
[]	Crude estimate

Country terminology

For the convenience of the reader, we have tended to use the geographical rather than the formal official name of certain countries. In addition, several states have recently changed their official names. Examples are given here.

Bangladesh	formerly East Pakistan
Benin	formerly Dahomey
Cambodia	formerly Khmer Republic
China	People's Republic of China
Congo	People's Republic of Congo

Democratic Yemen	People's Democratic Republic of Yemen (formerly South Yemen)
Egypt	Arab Republic of Egypt (formerly United Arab Republic)
North Korea	Democratic People's Republic of Korea
North Viet-Nam	Democratic Republic of Viet-Nam (DRV)
South Korea	Republic of Korea
South Viet-Nam	Republic of Viet-Nam
Sri Lanka	formerly Ceylon
Taiwan	Republic of China
Yemen	Arab Republic of Yemen
Zaire	formerly Democratic Republic of Congo (Congo Kinshasa)

Conversions

Units of length

1 millimetre=0.039 inch
1 inch=25.4 millimetres
1 metre=1.1 yard=3.28 feet
1 foot=30.480 centimetres
1 yard=3 feet=36 inches=0.91 metre
1 kilometre=0.62 statute mile=1 094 yards
1 statute mile=1.61 kilometres=1 760 yards
1 nautical mile=6 076 feet=1 852 metres

Units of mass

1 ton=1 000 kilogrammes (tonne)=2 205 pounds, avoirdupois=0.98 long ton=1.1 short tons
1 short ton=2 000 pounds=0.91 ton=0.89 long ton
1 long ton=2 240 pounds=1.1 tons=1.12 short tons
1 kiloton=1 000 tons
1 megaton=1 000 000 tons
1 kilogramme=2.2 pounds
1 pound=0.45 kilogramme

Part I. 1975, the year in review

Chapter 1. The main events of the year

Arms control and disarmament / The NPT Review Conference / The long-range cruise missile / The threat of first use of nuclear weapons / The arms trade / Diego Garcia / Conclusions / US and Soviet strategic nuclear forces, 1967–1976 / The spread of nuclear power

Chapter 2. Conflict

The end of the Second Indo-China War (1961–1975) / Angola—a second Viet-Nam?

Chapter 3. The arms build-up in the Middle East

Introduction / Military expenditure / Military arsenals: quantitative and qualitative aspects / Defence industry and military infrastructure / Future developments / Conclusions

Chapter 4. Environmental and ecological warfare

Introduction / Weather and climate modification / Manipulation of certain electromagnetic radiation / Modification of oceans and earthquakes / Modification of certain electrical behaviour of the atmosphere / Ecological damage in modern warfare / Discussion / Conclusions / Weather processes / Human ecology / Military use of raw materials

Chapter 5. Reconnaissance satellites

Introduction / Chinese reconnaissance satellites / US reconnaissance satellites / Soviet reconnaissance satellites / Conclusions / Tables of Chinese, US and Soviet reconnaissance satellites

1. The main events of the year

Square-bracketed numbers, thus [1], refer to the list of references on page 23.

I. *Arms control and disarmament*

At the beginning of 1975 there were expectations that the Non-Proliferation Treaty (NPT) would be much strengthened by a successful Review Conference in May (see pages 6–11). After the Indian nuclear explosion in May 1974 there were few doubts about the need to strengthen the NPT and it was generally assumed that the SALT II accord, worked out by General Secretary Brezhnev and President Ford at Vladivostok on 24 November 1974, would be turned into a binding treaty. There was even hope that the mutual force reduction (MFR) negotiations in Vienna would make progress. And some expected that the Conference of the Committee on Disarmament (CCD) in Geneva might make a significant move towards a ban on chemical warfare, even if this were only a partial ban. The USA and the USSR had, after all, agreed in July 1974 to consider a joint initiative at the CCD with respect to the conclusion "of an international convention dealing with the most dangerous, lethal means of chemical warfare". Not one of these expectations was fulfilled.

The results of the NPT Review Conference were very meagre compared with most expectations (see page 9). As if to emphasize the failure of the powers to establish a viable non-proliferation régime, seven major suppliers —the USA, the USSR, the UK, Canada, France, the Federal Republic of Germany, and Japan—held a series of secret meetings in London after the Review Conference to discuss ways of minimizing the risk of diversion of nuclear technology (which they are eager to supply) to the production of nuclear explosives.

One weakness of the present non-proliferation régime is the fact that two supplier nations—France and Japan—are among the important states not party to the NPT. Even so, the most sensible—though in some cases discriminatory—course of action would be for the exporters to insist (where necessary) that their clients accede to the NPT, or at least subscribe to the same system of international safeguards as the parties to the NPT are required to take on. This would mean that supplier countries would supply nuclear material, equipment and services to states non-party to the NPT only if the latter states accepted International Atomic Energy Agency (IAEA) safeguards on all their peaceful nuclear activities. Anything less would not do. It would not be sufficient to insist, for example, that only nuclear exports be safeguarded. For one thing, this would allow client states to copy imported facilities for the production of fissionable material for military purposes. As enriched uranium plants may be part of exported packages, this is a singular danger.

Another sound measure of control would be to ensure that the key elements of the nuclear fuel cycle (uranium enrichment plants, reprocessing plants and reactor-fuel fabrication plants) were under multinational ownership and international control. So few of these plants now exist outside the nuclear-weapon powers that this would be an important non-proliferation step—provided that an early decision to do so were made. Unfortunately, politics will almost certainly prevent these safeguards measures from being adopted. Less likely still is a satisfactory solution to even more complex problems. Safeguarding nuclear material produced in facilities of foreign design is an example. The control of the dissemination of nuclear know-how is clearly much more difficult than safeguarding nuclear material itself. But in the ultimate analysis, the spread of nuclear knowledge may well turn out to be the more crucial issue.

While the NPT was being discussed, the spread of peaceful nuclear technology accelerated. The Federal Republic of Germany agreed to sell to Brazil nuclear power reactors, and fuel reprocessing and uranium enrichment plants. France made similar deals with South Korea, Pakistan and Iran. Canada arranged the sale of a power reactor to South Korea. US reactors were offered to Middle Eastern countries. And the Soviet Union continued its efforts to export nuclear facilities to countries outside the Socialist bloc—to Libya, for example. Some West European countries are buying Soviet nuclear fuel. The fast spread of nuclear technology—including a uranium enrichment capability—has obvious implications for the proliferation of nuclear weapons (see appendix 1B).

Under the NPT, the USA and the USSR (like each of the other parties to the treaty) are committed "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". SALT is an obvious forum for the two great powers to fulfil this obligation. But the proposed SALT II agreement would be insufficient. The nuclear arms race would certainly not be limited quantitatively. If planned deployments are carried through, the strategic nuclear arsenals of the two powers will about double, to a total of about 17 000 nuclear warheads on missiles alone (see appendix 1A). Several thousand more nuclear warheads will be carried on strategic bombers.

The quality of nuclear delivery systems will also be improved. The use of foreseeable technology could, for example, reduce the circular error probability (CEP) of US intercontinental ballistic missile (ICBM) warheads from about 350 metres to about 30 metres. No feasible amount of hardening could protect a target from the effects of such a warhead—even if the warhead had a relatively small explosive power. Land-based ICBMs would either have to be phased out as obsolete, made mobile, or provided with a launch-on-warning system to fire the missiles before the enemy force struck. The decision to initiate nuclear war would in the latter case then pass from man to machine.

No bilateral force reductions are likely to occur in Europe until a SALT II treaty is negotiated. The political leaders now emphasize that political détente cannot survive without a military détente in Europe. Whether or not their desire for the former will stimulate them to achieve the latter still remains to be seen.

Chemical weapons (CW) have recently been extensively used in warfare and a comprehensive ban on the production and stockpiling of these weapons is urgently required. On 3 July 1974, in Moscow, President Nixon and Secretary-General Brezhnev expressed

> interest in an effective international agreement which would exclude from the arsenals of states such dangerous instruments of mass destruction as chemical weapons. Desiring to contribute to early progress in this direction, the USA and the USSR agreed to consider a joint initiative in the Conference of the Committee on Disarmament (CCD) with respect to the conclusion, as a first step, of an international convention dealing with the most dangerous, lethal means of chemical warfare [1].

On 24 November 1974, in Vladivostok, President Ford and General Secretary Brezhnev repeated this intention.

The joint initiative has yet to materialize. Discussions have been going on over the past 18 months between the USA and the USSR but no way has been found to overcome differences on how to take even the first step towards a partial CW ban. Verification is the official reason given for the failure to ban CW. But, as recent SIPRI publications show, verification is in fact no longer a real problem [2–3].

Some past barriers to the negotiation of a CW treaty no longer exist. In April 1975 the USA ratified the 1925 Geneva Protocol, which prohibits the first use in war of chemical weapons. The war in Viet-Nam, in which chemical weapons were extensively used, has already become a dim enough memory for a CW ban to be politically acceptable in the USA. And the US Congress has recently refused a US Army request for $8.8 million to set up facilities to manufacture binary nerve-agent munitions [4–5]. But the House Appropriations Committee warned, when it took this decision, that if no progress is made during the CCD's coming session on a "realistic and workable treaty to ban all means of chemical warfare", the Committee may "reappraise its position". This is no mean threat because the deployment of binary chemical weapons would, to say the least, enormously complicate the negotiation of a CW treaty.

Binary weapons contain chemicals which are relatively harmless in themselves but which generate a nerve gas when they mix together. Mixing occurs when the munition is in flight. This is a typical example of how an advance in military technology can negate a proposed arms control measure.

Binary weapons are in demand as replacements for existing nerve-agent stockpiles. The average age of, for example, the US stockpile is about 12 years, which is not far from the average shelf-life for the chemicals and the munitions. It is also claimed that many of the munitions are obsolete—more sophisticated delivery systems have been developed.

II. *The NPT Review Conference*

The technical and economic barriers to the acquisition of nuclear weapons are no longer effective—at least for any country with a peaceful nuclear programme—and, therefore, a political barrier is necessary if an attempt is to be made to control the proliferation of nuclear weapons. For many countries, this political barrier is the Non-Proliferation Treaty (NPT). An NPT Review Conference was held in Geneva in May 1975, which, according to Article VIII, was to "review the operation of this Treaty with a view to assuring that the purposes of the Preamble and the provisions of the Treaty are being realized".

The essential provisions of the NPT can be briefly summarized as follows:

Article I prohibits the transfer of nuclear weapons or other nuclear explosive devices (including devices for peaceful nuclear explosions) to any state, whether a party to the treaty or not, whether a nuclear-weapon state or not, and whether directly or indirectly through an alliance. Nuclear-weapon states are also forbidden to assist non-nuclear-weapon states to acquire nuclear weapons or explosive devices.

Article II prohibits non-nuclear-weapon signatories from manufacturing or otherwise acquiring nuclear weapons or devices, including peaceful nuclear explosives. (Only the actual manufacture of nuclear weapons is prohibited. A party to the treaty can legally make all the preparations needed to manufacture a nuclear weapon so long as it does not actually assemble the warhead. This means that a party could produce a nuclear weapon very quickly if it decided to do so.)

Article III obligates the non-nuclear-weapon parties to accept international safeguards—as specified in a special arrangement with the IAEA—on all their peaceful nuclear activities to ensure that there is no diversion of nuclear material to the manufacture of nuclear explosives.

Article IV states that all parties to the treaty have the right of full exploitation of the use of nuclear energy for peaceful purposes and obligates those parties in a position to cooperate with other countries in developing peaceful nuclear technology to do so.

It can hardly be said that the promise in Article IV of "the right to participate in the fullest possible exchange of equipment, materials and scientific and technological information for the peaceful uses of nuclear energy" has been fulfilled. It has been said that under the present circumstances, Article

IV is no more than a pious vow having no practical application, which tries to present in more palatable terms a treaty not always subscribed to with enthusiasm [6]. The main reason for this harsh judgement is that since the nuclear economic stakes are now so huge, international nuclear dealings are carried out more and more between industrial firms on the basis of ordinary commercial rules and competition, and of national interest. The idealism of Article IV is not compatible with the cutthroat competition of a multi-billion-dollar industry. Take uranium mining as an example. A considerable amount of uranium is being stockpiled by some of the main uranium producers simply to maintain prices and protect national commercial interests. These stocks, together with the uranium produced in the next few years, will amount to about four times the amount of uranium required during this period.

The development and construction of nuclear reactors and nuclear fuel fabrication and reprocessing plants, although suitable activities for wide cooperation, are also conducted entirely on the basis of commercial and economic considerations, with full protection of narrow national interests.

Many underdeveloped countries are insufficiently advanced to take part in any of the industrial processes involved in the production of nuclear fuel. These countries are the furthest removed from a nuclear-weapon capability. But many of them can profit enormously from some applications of nuclear energy—for example, the use of radioactive isotopes in medicine and in agriculture. Moreover, substantial resources of uranium probably exist in many underdeveloped countries and technical assistance in exploration, and eventually uranium mining, will be one of the most important forms of assistance for them.

Some of the more developed countries need assistance to acquire nuclear reactors. As a first stage, research reactors are needed for training purposes. And during the next decade some underdeveloped countries will reach the stage of industrialization at which they can utilize the electricity produced from nuclear power reactors. By this time, the economics of low- and medium-power reactors may have improved to a point at which they will be attractive to these countries. The developed countries, however, are now moving to larger nuclear power reactors. It would assist the underdeveloped countries if the governments of the advanced countries with large nuclear industries encouraged manufacturers to develop and export nuclear power reactors with outputs suitable for use in the underdeveloped countries. Methods will have to be found to provide financial assistance, preferably on a multinational basis, for these reactors.

Because of the enormous commercial interest in the nuclear industry it is perhaps unrealistic to expect the collaboration, the aid to less developed countries and the promotion of a wide exchange of scientific and technical equipment, material and information envisaged in Article IV to be achieved, in practice, on any significant scale.

The technical cooperation projects of the IAEA are probably the best source of nuclear assistance to the underdeveloped countries. The IAEA, however, has insufficient financial and manpower resources to give such assistance on an adequate scale and, at the same time, to fulfil its duties as the body responsible for NPT safeguards. This situation will become worse in the future as both the amount of safeguards activities and the need for technical assistance increase.

As nuclear power spreads to more and more countries, it will become increasingly necessary for the parties to the NPT to be assured of access to the important elements of the nuclear fuel industry. In particular, countries with nuclear reactors will need assurance that they can obtain adequate nuclear fuel supplies for their power programmes. The trend has been towards greater use of reactors using enriched uranium fuel and, therefore, uninterrupted supplies of this fuel will become of particular concern. For this reason, uranium enrichment is one of the fields of most relevance to Article IV. The USA and the USSR should face the fact that their duopoly position as enriched uranium suppliers cannot—for political and economic reasons—continue for much longer. They should, therefore, make information on enrichment technology available—without stringent conditions—so that multinational enrichment plants can be built outside their territories, under international supervision.

Article V of the NPT requires that the "potential benefits from any peaceful applications of nuclear explosions will be made available to non-nuclear-weapon States Party to the Treaty on a non-discriminatory basis and that the charge to such Parties for the explosive devices will be as low as possible and exclude any charge for research and development".

Furthermore, the non-nuclear-weapon parties shall "be able to obtain such benefits" through an "international body with adequate representation of non-nuclear-weapon States" but if these states so desire they may "also obtain such benefits pursuant to bilateral agreements". The explosives are to be made available "under appropriate international observation and through appropriate international procedures". Negotiations on the subject were to commence as soon as possible after the treaty entered into force. So far, an international régime governing the use of peaceful nuclear explosives by the non-nuclear-weapon parties to the treaty has not been established.

The future usefulness of nuclear explosions for peaceful purposes is controversial. Many questions concerning the effects of the devices remain to be answered and the issue can be decided only on the basis of a great deal of further research and development on the technical, safety, health and environmental aspects of peaceful nuclear explosions. Perhaps the most likely countries to find uses for peaceful nuclear explosions will be those which are large and have sparsely populated areas. Some underdeveloped countries feel strongly that peaceful nuclear explosives can benefit their development. Moreover, the practicability of these devices is probably very much dependent on the actual environment at the site of the explosion. It does not follow, therefore, that the arguments against the use of peaceful nuclear explosions in developed countries necessarily apply in underdeveloped countries. Each situation must be considered on its own merits.

Article VI commits all parties to pursue negotiations in good faith on effective measures relating to the cessation of the nuclear arms race at an early date, and to nuclear disarmament, including a treaty on general and complete disarmament.

Article VI is of paramount importance because it defines the main obligation of the nuclear-weapon parties. Mainly concerned are the USA and the USSR—the UK is a relatively minor nuclear-weapon power.

Few states, if any, expected the two great powers to make very rapid progress—immediately after the treaty came into force—towards halting the nuclear arms race and reducing their nuclear arsenals. Vast reductions in numbers of nuclear weapons were certainly not required to demonstrate the stipulated "good faith". Instead, expectations were modest. The negotiation of a comprehensive nuclear test ban, prohibiting all underground nuclear tests, and some progress in slowing down the arms race at the Strategic Arms Limitation Talks (SALT) between the USA and the USSR would have sufficed as first steps.

But no "effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament" have been negotiated since the treaty came into force. This is the main basis for the charge that the nuclear-weapon parties to the NPT are not fulfilling their major obligation under it. And if these parties do not take their obligations seriously then why, it is argued, should the others?

The results of the NPT Review Conference

Before the Review Conference took place SIPRI wrote:

> The *minimum* measures required to ensure that the NPT has a reasonable chance of survival as a workable document are:
>
> *Article III.* A commitment should be made by supplier countries party to the NPT to supply nuclear material, equipment and services to states non-party to the NPT only if the latter states accept IAEA safeguards on *all* their peaceful nuclear activities.
>
> *Article IV.* An assessment should be made of the needs of the developed and, more importantly, the underdeveloped countries in the field of nuclear energy for the next decade or two. On the basis of this assessment, ways and means should be elaborated to meet these needs. The IAEA remains the best agency for the provision of technical assistance to the underdeveloped countries. But the developed countries should commit themselves to provide adequate funds to enable the IAEA to carry out this function successfully.
>
> *Article V.* The international régime, specified in the NPT, under which peaceful nuclear explosions are to be made available to the non-nuclear-weapon parties to the Treaty should be established.

Article VI. A firm commitment should be made by the USA and the USSR to reduce their nuclear arsenals by significant amounts by a specified date—which could, for example, be the date of the next Review Conference [7].

In the final analysis, a near-nuclear country will base its political decisions on the acquisition of nuclear weapons according to its perceptions of its security interests. The question of security guarantees will almost certainly be raised as an important issue at the Review Conference. The NPT would be considerably strengthened if the nuclear-weapon powers would commit themselves not to use nuclear weapons, and not to threaten to use these weapons, *under any circumstances,* against non-nuclear-weapon parties to the NPT. Some non-nuclear-weapon parties to the NPT have nuclear weapons stationed on their territory. For these countries this commitment could take the form of an undertaking by the nuclear-weapon powers not to be the first to use nuclear weapons. A pledge of this type would be one way of reducing the inequalities of the parties under the treaty.

It must be emphasized that the above measures are the minimum required. If more can possibly be achieved at the Review Conference, so much the better. But, if less is achieved, the prospects for a continuation of an effective non-proliferation régime are grim indeed [8].

But what was actually achieved? The Final Declaration issued by the Review Conference took note of the view expressed by a number of states that IAEA safeguards should apply to all peaceful nuclear activities of all non-nuclear-weapon states (for the text of the Declaration, see appendix 9A). It failed, however, to impose this requirement as a condition for nuclear supplies. As a result, non-parties to the NPT continue to be subject only to facility-oriented safeguards instead of comprehensive safeguards. Being assured of fissionable material and relevant equipment deliveries, they have little incentive to join the NPT.

With regard to peaceful uses of nuclear energy, the Conference recommended that in reaching decisions on the provision of equipment, materials, services and scientific and technological information, and on the furnishing of technical assistance in the nuclear field, states party to the NPT should give weight to adherence to the treaty by recipient states. It also recommended that measures of cooperation to meet the needs of developing states party to the NPT might include voluntary aid provided bilaterally or through multilateral channels. No firm undertakings to fulfil specific requests of the developing non-nuclear-weapon states were given.

As concerns peaceful applications of nuclear explosions, the IAEA was requested to expedite work on identifying and examining the legal issues involved in, and to commence consideration of, the structure and content of the special international agreement or agreements contemplated in Article V of the treaty. No consensus was reached on the implications of peaceful nuclear explosions for existing and future arms control agreements.

All proposals presented at the Review Conference with a view to redressing the balance of responsibilities and obligations of the parties to the NPT, by matching the cessation of "horizontal" proliferation with a halt to "vertical" proliferation, proved unacceptable to the nuclear-weapon states. Consequently, only some general, noncommittal statements were made in the declaration about the desirability of discontinuing nuclear-weapon tests and reducing nuclear-weapon systems.

On the question of security guarantees, the Declaration merely reiterated the UN Charter requirement to refrain from the use of force in the mutual relations of states. The non-nuclear-weapon parties to the NPT received no assurance that the weapons they had renounced would not be used against them. (For a detailed analysis of the Final Declaration, see chapter 9.)

As we can see, none of SIPRI's minimum requirements was achieved at the NPT Review Conference. It is hard to see how the NPT can now contribute towards the establishment of an effective non-proliferation régime.

III. *The long-range cruise missile*[1]

Hard negotiations during 1975 failed to overcome three main barriers to SALT II—the verification of multiple independently-targetable re-entry vehicles (MIRVs); the status of the new Soviet supersonic, swing-wing, 5 000-km range Backfire bomber; and the status of US long-range cruise missiles. The most difficult of these problems is that created by cruise missiles. Both sides agree that missiles with ranges over 600 kilometres should be counted as strategic delivery vehicles but, according to the USA, this should apply only to ballistic missiles. The USSR wants all missiles (both ballistic and cruise) counted.

The cruise missile is essentially a pilotless aircraft driven by a jet engine. The missile may be initially boosted by a rocket to its cruising speed before the turbojet, turbofan or ramjet engine takes over. It will then travel in the atmosphere to its target at a nearly constant velocity, the movement of air over aerodynamic surfaces providing lift and the engine overcoming drag. The crucial characteristic of a cruise missile is that the propulsion unit is air-breathing.

Both the USA and the USSR started to develop cruise missiles soon after World War II. A variety of types have been produced—surface-to-surface, surface-to-air and air-to-surface—for both tactical (short-range) and strategic (long-range) use (see table 1.1).

In the early 1960s, US strategic surface-to-surface cruise missiles were replaced by ballistic missiles. But some cruise missiles—for example, the 1 000-km range Hound Dog air-to-surface missile first deployed on B-52s in 1960—have remained in the US arsenal.

Soviet cruise missile developments led to the deployment in 1962 of the SS-N-3 Shaddock—a 450-km range missile carrying a nuclear warhead with

[1] For a detailed discussion of cruise missile technology, see *SIPRI Yearbook 1975*, chapter 11.

Table 1.1. Typical cruise missiles

Country	Name	Type	Pro-pulsion	Launch weight *kg*	Max range *km*	Warhead	Comment
France	Caisseur	SSM	SPB/RJ	1 000	100	250 kg of HE	Operational 1956
France/Italy	Otomat	SSM	SPB/TJ	. .	~80	210 kg of HE	Operational 1975; sh launched anti-ship
FR Germany	Hydra	ASM	RJ	. .	. .	HE	Under development: anti-ship
Sweden	RB 08A	SSM	SPB/TJ	1 215	. .	. .	Operational 1967; anti-ship
UK	Bloodhound	SAM	SPB/RJ	. .	. .	. .	Operational 1958
UK	Sea Dart	SAM	SPB/RJ	550	80	HE	Operational 1973
USA	Matador	SSM	SPB/TJ	5 680	800	N/HE	Operational 1954
USA	Regulus I	SSM	SPB/TJ	6 587	925	N	Operational 1954; su marine- or ship-lau
USA	Regulus II	SSM	SPB/TJ	~13 600	~1 500	N	Cancelled 1958
USA	Navaho	SSM	LPB/RJ	. .	8 000	N	Cancelled 1958
USA	Bull Goose	ASM	SPB/TJ	. .	. .	None	Cancelled 1958; dec missile
USA	Crossbow	ASM	TJ	. .	. .	. .	Cancelled 1958; rada homing bomber def missile
USA	Snark	SSM	SPB/TJ	~22 700	~10 140	N	Initially operational withdrawn 1961
USA	Mace	SSM	SPB/TJ	7 045	1 045	N/HE	Operational 1960
USA	Hound Dog	ASM	TJ	~4 500	~925	N	Operational 1960
USA	Bomarc	SAM	LPB/RJ	6 820	~460	N/HE	Operational 1960
USA	Quail	ASM	TJ	~500	. .	None	Operational 1961; de missile
USA	Scad	ASM	TF or TJ	. .	~1 000	N	Cancelled 1973
USA	Harpoon	SSM/ ASM	SPB/TJ	635	~110	~230 kg of HE	Operational 1976 shi submarine- or air-launched anti-ship
USA	SLCM	SSM	–/TF	. .	~2 750	N	Under development; merged-launch from attack submarine; tactical anti-ship variant proposed (T
USA	ALCM	ASM	TF	1 000	1 800	N	Under development
USSR	Kennel	ASM	TJ	. .	100	HE	Operational 1956
USSR	Scrubber	SSM	SPB/RJ	~6 500	240	HE	Operational 1958
USSR	Kipper	ASM	TJ	~3 500	210	. .	Operational 1960
USSR	Kangaroo	ASM	TJ	~8 000	740	. .	Operational 1961
USSR	Shaddock	SSM	SPB/TJ	~4 500	~460	. .	Operational 1962
USSR	Genef	SAM	SPB/RJ	~1 000	~70	. .	Operational 1964
USSR	SS-N-7	SSM	. .	. .	~56	. .	Operational 1969; ca be launched from s merged submarine
USSR	AS.6	ASM	TF or TJ	. .	~550	. .	Operational 1971
USSR	SS-N-12	SSM	TF or TJ	. .	~750	. .	Under development

Code: Types: SSM surface-to-surface missile; ASM air-to-surface missile; SAM surface-to-air mi Propulsion: LPB liquid propellant booster; SPB solid propellant booster; RJ ramjet; TJ turbojet turbofan. Warhead: HE high explosive; N nuclear.

Source: Barnaby, F. B., "Will the Cruise Missile Torpedo Salt?", *New Scientist,* Vol. 68, No. 980, December 1975, p. 680.

an explosive power in the kiloton range—and to the deployment of several short-range types (mainly naval air-to-surface missiles). Other important current Soviet cruise missiles include the 60-km range SS-N-7, the 750-km range SS-N-12 surface-to-surface naval missile, and the 550-km range AS.6 air-to-surface missile to be deployed on the Backfire bomber.

In 1972, US interest in the long-range cruise missile revived. New technologies have so revolutionized the weapon's potentialities that the cruise missiles currently under development in the USA bear little relation to earlier versions which were, in comparison, ineffective and crude devices.

One of the main technological advances is the development of relatively small turbofan jet engines (ideal for long-range missiles), dramatic improvements in missile guidance systems, and considerable increases in the yield-to-weight ratios of nuclear warheads. Small propulsion units make available a relatively large proportion of the volume of the missile for the guidance system and warhead.

Currently, the USA is developing an air-launched cruise missile (ALCM) and a sea-launched cruise missile (SLCM)—both versions will probably use the same guidance system, will be subsonic and will carry nuclear warheads (probably with yields of about 200 kilotons). The 1800-km range ALCM, about 62 cm in diameter and 4.2 metres long, will weigh just under 1 000 kg and will be carried by B-52 and later by B-1 strategic bombers (about 25 ALCMs could be carried by each aircraft). The ALCM is designed to fit into the short-range attack missile (SRAM) rotary launcher with which these aircraft are now, or will be, equipped. ALCMs could also be air-launched from a variety of other aircraft—the Boeing 747, for example, could carry several dozens of them.

The US Navy's 2700-km range SLCM is designed to be launched from submarines, surface ships and land vehicles. The size of the missile, about 53 cm in diameter and 6.4 metres long, was chosen so that it can be fired from a standard torpedo tube. The missile will be boosted by rocket to its cruising speed and then powered by a turbofan jet engine of about 270 kg thrust. The US Navy plans to develop a tactical version of the SLCM, with a conventional (non-nuclear) warhead, as an anti-ship missile with a range of up to 500 km. Flight tests for the ACLM and the SCLM will begin in 1976 and, if the decision is taken to deploy the missiles, production could start before 1980, possibly as early as 1977.

During testimony to the Armed Services Committee of the US House of Representatives in February 1975, Dr Malcolm R. Currie, US Director of Defense Research and Engineering, attempted to explain why the USA was developing new cruise missiles:

As a major alternative approach to penetration of formidable Soviet air defenses, including tens of surveillance radars, hundreds of ground radars and thousands of interceptors and SAMs, we are continuing development of the strategic cruise missile. The Congress has expressed concern about our Cruise Missile programs and we share that concern. For the last several months we have been completely reappraising cruise missiles, examining in detail both the need and the available technical solutions. A substantial number of studies have been conducted on cruise missiles. By using these to illuminate the situation, we have developed a set of fundamental considerations associated with cruise missiles. Salient among these are the following:

- An air-launched Cruise Missile may be required to complement the pure penetrating bomber in advanced threat environments, but the extent of the need depends on how the threat evolves.
- A sea-launched Cruise Missile development provides a desirable augmentation of capability, a unique potential for unambiguous, controlled single-weapon response and an invulnerable reserve force.
- Both types of Cruise Missiles, because they are designed for use on existing carrier vehicles and therefore have relatively low cost, are potentially very high leverage systems. They stress the air defenses in a different way than our penetrating bomber forces (i.e., they are effective against advanced fighters and are countered by extensive advanced-capability SAMs).
- A tactical Cruise Missile which is a derivative of the strategic version could provide the Navy with over-the-horizon defense and single-hit kill strike capability [9].

Dr Currie did not explain exactly why there was a need for both an ACLM and such an advanced strategic bomber as the B-1.

The need for "an invulnerable reserve force" has never been officially expressed before and sounds very much like a rationalization for the development of a new weapon system for which there is no real military need. If experience is any guide, the real reason for the development may simply be that the relevant technology has become available.

Strategic cruise missiles will be comparatively cheap—about $750 000 each—at least an order of magnitude cheaper than ICBMs. This will encourage the deployment of relatively large numbers. But it will not be possible for one side to monitor the number deployed by the other side. The US Navy, for example, has a fleet of 65 nuclear-powered attack submarines, all capable of firing cruise missiles when submerged. If long-range cruise missiles are deployed, it will be impossible to verify the number of relevant launchers on submarines and all torpedo tubes would have to be counted. And other possible launch vehicles would present equally insurmountable problems. Under these circumstances, the negotiation of a meaningful strategic arms limitation agreement is unimaginable.

Because of their characteristics, cruise missiles are likely to be of considerable interest to smaller powers. The possibility of the proliferation of these weapons together with the proliferation of the capability to produce nuclear weapons is, to say the least, a frightening prospect.

IV. *The threat of first use of nuclear weapons*

"We will make use of nuclear weapons should we be faced with obvious aggression likely to result in defeat in an area of great importance to the

United States in terms of foreign policy." This statement, made by former US Secretary of Defense James R. Schlesinger on 1 July 1975, caused considerable concern.

The first use of nuclear weapons threatened by Schlesinger is, of course, not in response to a Soviet nuclear attack but rather to avoid defeat in a conventional war. In March 1975, ex-General Westmoreland speculated that the use of a few nuclear weapons might have ended the war in Viet-Nam in favour of the USA. Two months later a senior US Army officer in South Korea warned that the use of nuclear weapons may well occur if war breaks out in Korea. And other recent official US statements have threatened a nuclear response to non-nuclear aggression.

A first-use doctrine is not new—it has been a basic element of US strategy since World War II. As Schlesinger himself said at a news conference on 1 September 1975, "we have never indicated that we were prepared to renounce the option of first use". The USSR has also never renounced a first-use option. In fact, Soviet nuclear strategy stresses nuclear war-fighting capability.

Until the end of the 1950s, the USA had an overwhelming nuclear superiority and could therefore afford to emphasize strongly the first use of nuclear weapons. Such use was, for example, threatened in the Korean War. But for more than a decade now, US spokesmen have played down the war-fighting capabilities of nuclear forces and have emphasized instead their deterrent aspects.

The restatement of the first-use policy is one of a number of recent developments in nuclear doctrine, all of which are related to improving the capabilities for nuclear-war fighting. These are: the new US emphasis on counterforce weapons; the introduction of long-range cruise missiles; and discussions of the replacement of existing tactical nuclear weapons by precision-guided low-yield nuclear weapons [10].

The first nuclear weapons were made to win World War II. Some groups in the USA and the USSR have never given up the idea that a nuclear war could be fought and won in the traditional way. These groups have sufficient political power in both countries to ensure that nuclear warheads and their delivery systems are developed as rapidly as possible to make them ever more suitable for this end.

Accurately delivered low-yield nuclear warheads, multiple warheads on missiles, very large numbers of strategic delivery vehicles, quick-reaction strategic nuclear forces of high penetrativity, flexible strategic command and control, and strategic cruise missiles are unneccessary and even harmful for a strategy of deterrence but are all highly desirable for effectively fighting a nuclear war. The fact that these weapons are being developed and deployed without significant restraint is firm evidence that each of the two great powers is striving for a first-strike capability.

In reality, neither side could "win" an all-out nuclear war—either now or in the foreseeable future. Even if all the planned improvements in defensive and offensive strategic nuclear forces are made, a high enough number of nuclear weapons would still survive an initial attack to be able to inflict massive damage on the attacker. We can, however, be sure that the present technological situation will not continue for decades. The vast amount of money being spent on research into antisubmarine warfare, for example, is likely eventually to produce spectacular results. Nuclear ballistic-missile submarines, currently the most invulnerable component of the strategic forces, may then be vulnerable to a mass attack.

The risk of an outbreak of nuclear war is much increased by the current official campaigns to reduce the population's fear of the consequences of a full-scale nuclear war. For this reason official attempts to gain support for the counterforce strategy, the first-use policy and the deployment of new tactical nuclear weapons are deplorable [13].

V. *The arms trade*

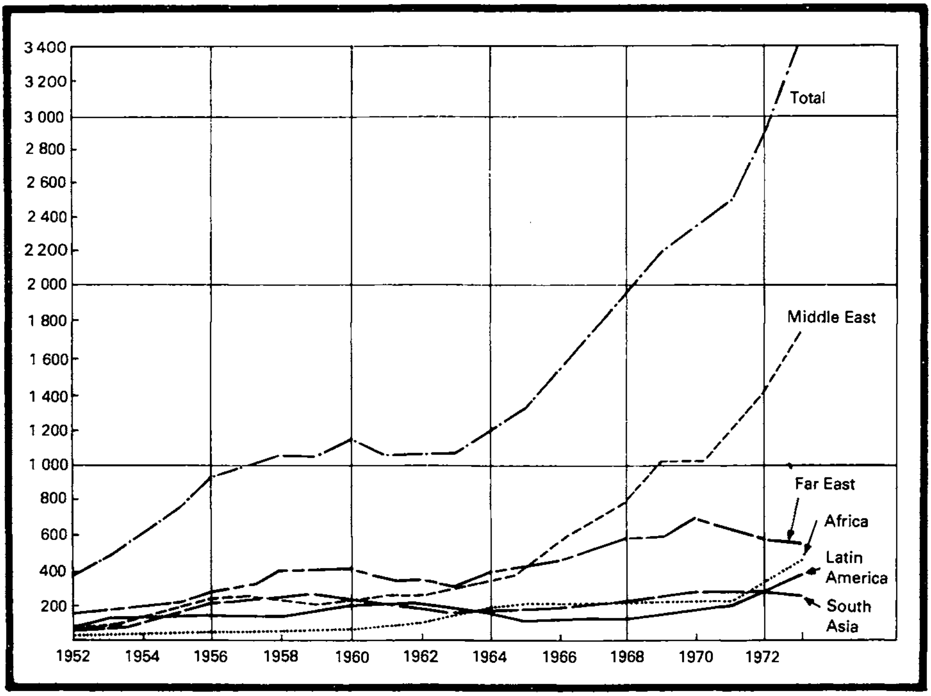
The international trade in arms has grown rapidly and consistently, both in volume and in scope, since World War II. But since the October 1973 Arab-Israeli War, the growth in the arms trade can only be described as explosive. The current annual value of the trade is probably $10–12 billion and is unlikely to decline in the near future. In 1974, for example, the total value of arms export contracts signed by the USA, the USSR and France has been estimated at nearly $25 billion [11]. The rapid increase in the volume of the trade and the lavish nature of many of the deals concluded have at least had the beneficial effect of attracting attention to this long-neglected aspect of world armaments. Particularly notable is the growing scepticism in some of the main supplying countries concerning official assurances that the full political and military implications of each transaction are carefully assessed. In the United States this has led to a move to revise existing legislation to give Congress more control over arms exports.

A total of 95 countries imported major weapons (such as missiles, aircraft, ships, tanks and so on) in 1975. Most of these countries have no feasible alternative means of acquiring these weapons. Without the arms trade, participation in arms races would be limited to that small group of countries which has the required scientific, industrial and financial resources.

Of the total trade, it is that with the underdeveloped countries which has attracted the most attention both because, to a large extent, it represents an extension of the conflict between East and West and because the weapons supplied have been extensively used. Chart 1.1 shows the volume of trade in major weapons with the third world and its distribution over the major regions for the period 1950–1975. Because the value of the trade moves erratically

Chart 1.1. The arms trade in major weapons with the third world, 1952–1973

US $ mn, at constant (1968) prices, five-year moving averages



from year to year, five-year moving averages have been plotted. The values have been computed independently by SIPRI and attempt to measure the quantity of resources transferred in the form of major weapons.

Because the military "requirements" of different countries are so highly interdependent, it only takes the acquisition of a new weapon by one country in a particular region to create strong pressures in the surrounding countries for the acquisition of comparable weapons. This is illustrated in tables 1.2 and 1.3 with respect to supersonic aircraft and long-range surface-to-air missile systems.

In addition to horizontal proliferation, the complexity and sophistication of the weaponry being supplied is also escalating rapidly. The aircraft included in table 1.2, for example, range from the Soviet MiG-19 to the US F-14 Tomcat. In the not too distant future it will be possible to prepare similar data for such things as electronic countermeasure aircraft, integrated air-defence systems and high-precision air-to-ground munitions.

The spread of sophisticated weaponry has obvious effects for the minimum level of conflict, should conflict break out. The amount of destruction it is possible to inflict through the possession of sophisticated weapons is clearly evidenced by the war in Viet-Nam and the recent Arab-Israeli War. Such

Table 1.2. The spread of sophisticated weapons to the third world: supersonic aircraft, 1955–1975

	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Israel	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Taiwan				×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
India				×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
China					×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Cuba								×	×	×	×	×	×	×	×	×	×	×	×	×	×
Egypt								×	×	×	×	×	×	×	×	×	×	×	×	×	×
Pakistan								×	×	×	×	×	×	×	×	×	×	×	×	×	×
Iraq									×	×	×	×	×	×	×	×	×	×	×	×	×
South Africa									×	×	×	×	×	×	×	×	×	×	×	×	×
Indonesia										×	×	×	×	×	×	×	×	×	×	×	×
Algeria											×	×	×	×	×	×	×	×	×	×	×
Iran											×	×	×	×	×	×	×	×	×	×	×
Korea, North											×	×	×	×	×	×	×	×	×	×	×
Korea, South											×	×	×	×	×	×	×	×	×	×	×
Philippines											×	×	×	×	×	×	×	×	×	×	×
Afghanistan												×	×	×	×	×	×	×	×	×	×
Argentina												×	×	×	×	×	×	×	×	×	×
Ethiopia												×	×	×	×	×	×	×	×	×	×
Morocco												×	×	×	×	×	×	×	×	×	×
Saudi Arabia												×	×	×	×	×	×	×	×	×	×
Thailand												×	×	×	×	×	×	×	×	×	×
Viet-Nam, North												×	×	×	×	×	×	×	×	×	×
Lebanon													×	×	×	×	×	×	×	×	×
Syria													×	×	×	×	×	×	×	×	×
Viet-Nam, South													×	×	×	×	×	×	×	×	×
Kuwait														×	×	×	×	×	×	×	×
Libya														×	×	×	×	×	×	×	×
Paraguay														×	×	×	×	×	×	×	×
Jordan															×	×	×	×	×	×	×
Nigeria															×	×	×	×	×	×	×
Sudan																×	×	×	×	×	×
Brazil																		×	×	×	×
Colombia																		×	×	×	×
Abu Dhabi																			×	×	×
Bangladesh																			×	×	×
Singapore																			×	×	×
Venezuela																			×	×	×
Somalia																				×	×
Tanzania																				×	×
Uganda																				×	×
Yemen																				×	×
Zaire																				×	×
Malaysia																					×

Source: SIPRI d[illegible]

Table 1.3. The spread of sophisticated weapons to the third world: long-range surface-to-air missiles, 1958–1975

	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
China	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Taiwan		×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Cuba				×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Indonesia				×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Egypt						×	×	×	×	×	×	×	×	×	×	×	×	×
Iraq						×	×	×	×	×	×	×	×	×	×	×	×	×
Israel						×	×	×	×	×	×	×	×	×	×	×	×	×
India								×	×	×	×	×	×	×	×	×	×	×
Korea, South								×	×	×	×	×	×	×	×	×	×	×
Afghanistan									×	×	×	×	×	×	×	×	×	×
Algeria									×	×	×	×	×	×	×	×	×	×
Iran									×	×	×	×	×	×	×	×	×	×
Korea, North									×	×	×	×	×	×	×	×	×	×
Saudi Arabia									×	×	×	×	×	×	×	×	×	×
Viet-Nam, North									×	×	×	×	×	×	×	×	×	×
Syria										×	×	×	×	×	×	×	×	×
Thailand												×	×	×	×	×	×	×
Singapore														×	×	×	×	×
Sudan														×	×	×	×	×
Zambia														×	×	×	×	×
South Africa																×	×	×
Libya																	×	×
Pakistan																	×	×
Somalia																	×	×
Uganda																	×	×
Brazil																		×
Abu Dhabi																		×

Source: SIPRI data.

weapons have enormously raised the minimum cost of acquiring and operating effective armed forces. Moreover, some of the resources absorbed —foreign exchange for the purchase of weapons and skilled personnel for their operation and maintenance—are usually in short supply in underdeveloped countries.

VI. *Diego Garcia*

The year 1975 proved to be one of mixed fortunes for the US Administration's plans to expand the facilities on Diego Garcia so as to enable the island to serve as a logistical support facility for US naval units deployed in the Indian Ocean.[2]

Although the US expansion plans were formulated some years ago, the first request for funding was included in the fiscal year 1975 defence budget. The direct costs of the programme were relatively small—only $37.8 million spread over three years—but despite this, the request generated an enormous debate. Opposition to the programme centred on the fact that the US Navy had not previously shown any great interest in the Indian Ocean and that the new attitude had been generated primarily because of the existence of Soviet naval units in the area. Critics pointed out that a hasty US reaction could precipitate a naval crisis in the Indian Ocean which was both undesirable in itself and which would involve costs very much larger than the $37.8 million requested for Diego Garcia.

The outcome of the debate was that Congress agreed to appropriate the funds, provided two conditions were fulfilled. The first was that the President reassess the programme and certify that it was essential to US interests. The second was that neither the Senate nor the House of Representatives adopt a resolution of disapproval.

The President submitted the certification on 13 May 1975. But Senator Mansfield had submitted a resolution of disapproval and it was anticipated that this resolution would be adopted. However, on 10 June former Secretary of Defense James Schlesinger revealed aerial reconnaissance photographs of Berbera in Somalia which he claimed showed that the Soviet Union was in the process of acquiring facilities at least comparable to those planned for Diego Garcia. Subsequently, at the invitation of the Somali government, two Congressional teams visited Berbera to verify the former's claims that there were no foreign military bases in Somalia.

[2] The island of Diego Garcia in the Chagos Archipelago, was originally administered as part of Mauritius. When Mauritius was granted independence, Diego Garcia and two other atolls in the archipelago were bought by the British Indian Ocean Territory (BIOT), which includes the islands of Aldabra, Farquhar, Desroches (detached from the Seychelles group) and the Chagos Archipelago. The 1966 Anglo-American agreement made the islands comprising the BIOT available to both countries for military purposes for a period of 50 years.

In his report, Senator Bartlett, the leader of the Senate team, stated that the Soviet Union appeared to have control of a long-range communications transmitter and a barracks ship; had access to a significant missile-handling facility; and would in the near future have access to a major airfield. His assessment was that "collectively these and other facilities, not previously known to us, represent a significant capability" [12].

In July, the Senate voted against the Mansfield resolution and thereby released for use the $19 million for Diego Garcia that had been included in the FY 1975 budget. The bulk of this money will be used to construct storage for 480 000 barrels of POL (petroleum, oil, lubricants), for the initial extension of the runway and aircraft parking areas and for the construction of a pier.

The FY 1976 defence budget included $13.8 million for the second phase of the Diego Garcia expansion programme. This money was authorized on 22 September 1975 when the Senate-House conference passed the FY 1976 military construction bill. However, at the appropriations stage the Senate reserved itself and on 6 November voted to delay the expenditure of the additional funds until July 1976. This date was subsequently changed to 14 April 1976 to prevent a complete stop of work on the island, should the decision be made to release the second instalment of funding. The probable cause of this reversal was the revelation that between 1971 and 1973 some 1 200–1 400 inhabitants of Diego Garcia and two nearby islets were removed and resettled in Mauritius. This was confirmed by the US Department of State on 19 October. During the debate on Diego Garcia rather a lot had been made of the fact that the island was uninhabited and therefore politically uncomplicated.

This disclosure will almost certainly mean that the Diego Garcians will receive more substantial compensation than they have received to date (some $1.4 million from the British government). It is more doubtful if it will have a permanent effect on the plans for Diego Garcia. The funding for the first stage has been released and work is presumably under way. As already mentioned, this money will provide for POL storage and extension of the runway and aircraft parking space. It is unlikely that these facilities will be left in a semi-finished state. It is worth noting, however, that most of the facilities that would convert Diego Garcia into a fully-fledged logistical support base—primarily the workshops and facilities for personnel to be stationed on the island—are included in the FY 1976 budgets and the first of these has already been delayed.

One of the basic issues, and one that cannot be resolved with the information openly available, is the extent to which Soviet activities in Somalia are part of an economic and military aid package or whether they are directed at facilities intended primarily or exclusively for Soviet use. Senator Bartlett, for example, referred only to Soviet "access" to the missile-handling facility and the future airfield, although he was more certain that the communications facility and the barracks ship were Soviet-controlled. This general ambiguity was such that both opponents and supporters of the Diego Garcia expansion programme could draw favourable conclusions from the same aerial photographs and subsequent Congressional reports on Soviet activities in Berbera.

However, the fact that the US Congress continues to regard the case for the expansion of Diego Garcia as at best a marginal one will not stem the drift of events towards the competitive deployment of naval units in the Indian Ocean by the USA and USSR. Much more decisive steps need to be taken.

VII. *Conclusions*

During 1975 significant advances were made in military technology, and the worldwide proliferation of sophisticated conventional weapons and of the capability to produce nuclear weapons continued. The nuclear arms race between the USA and the USSR continued unabated. But there was no progress in arms control and disarmament. The thirtieth Session of the UN General Assembly discussed an imposing list of topics:

Economic and social consequences of the armaments race and its effects on world peace and security.
Mid-term review of the Disarmament Decade.
Limitation of strategic nuclear-weapon systems.
Prohibition of nuclear-weapon tests.
Peaceful applications of nuclear explosions.
Prohibition of the development and manufacture of new types of weapons of mass destruction.
Study of the question of nuclear-weapon-free zones.
Implementation of additional protocols to the Treaty for the prohibition of nuclear weapons in Latin America.
Denuclearization of Africa.
Nuclear-weapon-free zone in the Middle East.
Nuclear-weapon-free zone in South Asia.
Nuclear-weapon-free zone in the South Pacific.
Implementation of the Declaration of the Indian Ocean as a zone of peace.
Prohibition of environmental warfare.
Prohibition of the development, production and stockpiling of chemical weapons.
Prohibition of restriction of use of incendiary and other specific conventional weapons.
Reduction of military expenditures.
Convening of a conference to review the operation of the Sea-Bed Treaty.
Convening of a World Disarmament Conference.
Review of the role of the United Nations in the disarmament field.

There was, therefore, much discussion on arms control and disarmament issues but no significant disarmament measure is in sight. This has now become an only too familiar pattern of events.

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Appendix 1A

US and Soviet strategic nuclear forces, 1967–1976

Mid-year (1 July) figures

		Intro-duced	Range, *nm*	Payload	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Delivery vehicles														
Strategic bombers														
USA	B-52C/D/E/F	1956	10 000	27 210 kg	(334)	(283)	(218)	(206)	(206)	(167)	(150)	(150)	(150)	80
	B-52 G/H	1959	10 860	34 015 kg	283	283	283	283	283	282	274	274	274	274
	B-58	1960	(2 000)	5 442 kg	80	80	80	–	–	–	–	–	–	–
	FB-111	1970	3 300	16 780 kg	–	–	–	(28)	(76)	76	76	76	76	76
USSR	Mya-4 "Bison"	1955	5 255	9 070 kg	55	50	40	40	40	40	40	40	40	40
	Tu- 20 "Bear"	1956	6 775	18 140 kg	100	100	100	100	100	100	100	100	100	100
	Tu- . . "Backfire"	1975	(3 000)	(20 000 kg)	–	–	–	–	–	–	–	–	(20)	(60)
				Bomber total: USA	**697**	**646**	**581**	**517**	**565**	**525**	**500**	**500**	**500**	**430**
				USSR	**155**	**150**	**140**	**140**	**140**	**140**	**140**	**140**	**160**	**180**
Strategic submarines														
USA	With Polaris A-2	1962	n.a.	16×A-2	13	13	13	8	8	8	8	6	3	–
	With Polaris A-3	1964	n.a.	16×A-3	28	28	28	32	26	21	13	13	13	13
	With Poseidon C-3	1970	n.a.	16×C-3	–	–	–	1	7	12	20	22	25	28
USSR	"Hotel" class	1960	n.a.	3×"SS-N-5"	9	9	9	8	8	8	8	8	8	8
	"Yankee" class	1968	n.a.	16×"SS-N-6"	–	(2)	(8)	(14)	(21)	(27)	(33)	34	34	34
	"Delta I" class	1973	n.a.	12×"SS-N-8"	–	–	–	–	–	–	(1)	(8)	(11)	(11)
	"Delta II" class	1976	n.a.	16×"SS-N-8"	–	–	–	–	–	–	–	–	–	(1)
				Submarine total: USA	**41**	**41**	**41**	**41**	**41**	**41**	**41**	**41**	**41**	**41**
				USSR	**9**	**11**	**17**	**22**	**29**	**35**	**42**	**50**	**53**	**54**
SLBMs (Submarine-launched ballistic missiles)														
USA	Polaris A-2	1962	1 520	1×1 mt	208	208	208	128	128	128	128	96	48	–
	Polaris A-3	1964	2 500	3×200 kt (MRV)	448	448	448	512	416	336	208	208	208	208
	Poseidon C-3	1970	2 500	14×40 kt (MIRV)	–	–	–	16	112	192	320	352	400	448
USSR	"SS-N-5"	1963	700	1×1 mt	27	27	27	24	24	24	24	24	24	24
	"SS-N-6 mod. 1"	1968	1 300	1×1 mt	–	32	128	224	336	432	528	544	544	544
	"SS-N-6 mod. 2"	1974	1 600	1×1 mt										
	"SS-N-8"	1973	4 200	1×1 mt	–	–	–	–	–	–	12	96	132	148
				SLBM total: USA	**656**	**656**	**656**	**656**	**656**	**656**	**656**	**656**	**656**	**656**
				USSR	**27**	**59**	**155**	**248**	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

ICBMs (Intercontinental ballistic missiles)

USA	Titan II	1962	6 300	1×10 mt	54	54	54	54	54	54	54	54	54	54
	Minuteman I	1962	6 515	1×1 mt	700	600	500	490	390	290	(190)	(100)	–	–
	Minuteman II	1966	6 950	1×2 mt	300	400	500	500	500	500	(500)	(500)	450	450
	Minuteman III	1970	7 020	3×200 kt (MIRV)	–	–	–	10	110	210	(310)	(400)	550	550
USSR	"SS-7 Saddler"	1962	6 000	1×5 mt	200	200	200	200	190	190	190	190	190	90
	"SS-8 Sasin"	1963	6 000	1×5 mt	20	20	20	20	19	19	19	19	19	19
	"SS-9 Scarp"	1965	6 515	1×20 mt	(160)	(190)	(230)	288	288	288	288	288	288	213
	"SS-11 mod. 1"	1966	5 650	1×1 mt	(340)	(470)	(720)	(950)	970	970	970	970	970	870
	"SS-13 Savage"	1968	4 350	1×1 mt	–	(20)	(30)	(40)	60	60	60	60	60	60
	"SS-11 mod. 3"	1973	5 650	3×200 kt (MRV)	–	–	–	–	–	–	20	40	60	60
	"SS-18 mod. 1"	1976	5 500	1×20 mt	–	–	–	–	–	–	–	–	–	(75)
	"SS-19"	1976	5 500	6×1 mt (MIRV)	–	–	–	–	–	–	–	–	–	(100)
				ICBM total: USA	**1 054**	**1 054**	**1 054**	**1 054**	**1 054**	**1 054**	**1 054**	**1 054**	**1 054**	**1 054**
				USSR	**720**	**900**	**1 200**	**1 498**	**1 527**	**1 527**	**1 547**	**1 567**	**1 587**	**1 507**
				Total, bombers and missiles: USA	**2 407**	**2 356**	**2 291**	**2 227**	**2 275**	**2 235**	**2 210**	**2 210**	**2 210**	**2 210**
				USSR	**902**	**1 109**	**1 495**	**1 886**	**2 027**	**2 123**	**2 251**	**2 371**	**2 447**	**2 403**

Nuclear warheads

Independently targetable warheads on missiles, SIPRI estimates

USA	1 710	1 710	1 710	1 938	3 386	4 626	6 490	7 086	8 010	8 634
USSR	747	959	1 355	1 746	1 887	1 983	2 111	2 231	2 287	3 353

Total warheads on bombers and missiles, official US estimates

USA	4 500	4 200	4 200	4 000	4 600	5 700	6 784	7 650	8 500	8 900
USSR	1 000	1 100	1 350	1 800	2 100	2 500	2 200	2 500	2 500	3 500

For sources and notes, see page 26.

Sources and notes for appendix 1A (pages 24–25)

Sources: The main sources and methodology of this appendix are described in the *SIPRI Yearbook 1974,* pp. 106–109, where a comparable table for the decade 1965–1974 appears.

The earlier table has been corrected and updated on the basis of material published in the *Annual Report* of the US Secretary of Defense for fiscal years 1976 and 1977 Washington, US Government Printing Office, 1975, 1976) and the statements on *U.S. Military Posture* by the Chairman of the Joint Chiefs of Staff for the same two years. The numbers of US strategic submarines and SLBMs of various types have also been revised and updated on the basis of data on the dates of overhaul and conversion of each individual submarine given in the following sources: *Jane's Fighting Ships,* annual editions through 1975–76 (London, Macdonald & Co.); Rowe, J. S. and Morison, S. L., eds., *Ships and Aircraft of the U.S. Fleet,* 9th ed. (Annapolis, Naval Institute Press, 1972); and US Senate, Committee on Appropriations, annual *Hearings* on the Department of Defense budget and program for fiscal years 1972–1976, part 3, Navy (Washington, US Government Printing Office, 1971 ff.).

Notes:

General

The estimates for 1976 are planned or expected deployments.

US delivery vehicles

US bomber figures represent the Authorized Active Inventory (AAI). This is composed of Unit Equipped (UE) aircraft—i.e., aircraft assigned to an authorized number of squadrons, with an authorized number of planes per squadron—plus a 10 per cent maintenance and attrition pipeline. For individual types of aircraft, the AAI is generally smaller than the Total Active Inventory (TAI) for at least the first few years after the plane is introduced, since the TAI contains an additional reserve pool from which aircraft can be drawn either for loss replacement (to maintain the number of pipeline aircraft) or for expansion purposes. US estimates of the number of strategic bomber-carried nuclear warheads are believed to be based on the numbers of UE bombers. In recent years these have been B-52D/F: 120–135, B-52G/H: 255, and FB-111: 66 (total: 440–455).

The numbers of US strategic submarines—and the corresponding SLBMs—are derived by treating all submarines under conversion as carrying their former load until the conversion is completed (shipyard work finished), and their new load from the time of completion. This method—the only exact procedure feasible with currently available data—differs from the official US practice of excluding entirely from force load totals the loads that would be carried by submarines under conversion, and treating the converted submarines as still under conversion until the time of their first sea-deployment following conversion. The first sea-deployment may lag behind the completion of conversion by six months to one year; and the exact dates for tours of duty are, of course, not generally available. The result of this difference in procedure is that the SIPRI estimates of US-deployed SLBM warheads are considerably higher than those included in the official US estimates of total force loadings for the 1970–77 period of Poseidon conversions. Each newly equipped Poseidon boat adds a 244-warhead capacity, and this is reflected in the SIPRI estimates from the time conversion is completed, while it enters the official estimates when the submarine goes to sea. If four submarines, say, have completed conversion but are not yet at sea, the lag will amount to nearly 1 000 warheads.

Poseidon payloads are now shown as consisting of 14 warheads per missile—rather than the 10–14 warheads in the *SIPRI Yearbook 1974,* where actual deployments were indicated to average 10. This is because the present very low requirement for penetration aids to get through Soviet ABM defences is no longer believed to justify a reduction of more than one-third of the potential payload of the Poseidon missile. The difference comes to 64 additional warheads per Poseidon-equipped submarine (224 instead of 160) or nearly 1 000 warheads for the entire Poseidon force.

Soviet delivery vehicles

The estimates of new Soviet deployments closely follow official US assessments, since US satellite observations constitute the primary source of data on Soviet activity in this field. This may, however, result in some overestimates of numbers of operationally deployed Soviet ICBMs and SLBMs, since the US figures concerning very recent activity do not always allow, for example, for pre-deployment submarine outfitting and sea trials and final ICBM launch-site preparations. In a rather different but comparable vein, the Soviet bomber code-named "Backfire" is included in the table due more to the attention being given to this aircraft in the United States as a potential strategic delivery system. It should be noted that the Soviet Union has reportedly refused to count the "Backfires" among its strategic nuclear delivery vehicles to be included under the 2 400 limit agreed at Vladivostok; and US statements about the

"Backfire" have been ambivalent, indicating that it may be intended primarily for a peripheral rather than strategic role.

The numbers of Soviet ICBMs and SLBMs expected to be deployed in 1975 and 1976 do not allow for potential retirements of older systems and may include some units which are not yet fully operational. Either or both of these two factors may account for the fact that Soviet bomber and missile deployments would otherwise appear to exceed the Vladivostok-agreed limit of 2 400 strategic delivery vehicles, even excluding the "Backfire".

Nuclear warheads

The SIPRI estimates of independently targetable missile warheads can generally be reconciled with the official US estimates of total bomber and missile warheads if the following steps are taken: (1) Bomber warhead loads are based on one bomb per 8 000–9 000 kg payload, using UE aircraft for the USA and adding bomber-carried air-to-surface SRAM missiles (1 140 deployed over the period 1972–75) to the US bomber internal payload. (2) In the case of the US SLBMs, Poseidon missiles are allowed 10 warheads per missile and warhead loads on submarines under conversion and not yet redeployed following conversion are excluded altogether. (3) Each part of a multiple MRVed warhead (on the US Polaris A-3 and the Soviet "SS-11 mod. 3") is counted separately.

Appendix 1B

The spread of nuclear power

Few people have a clear idea of how extensive the spread of nuclear technology around the world has already become or how rapidly it will most likely continue. At the end of 1975, 168 nuclear power reactors (generating capacity greater than 20 million watts of electricity (MWe)) were producing a total of about 73 000 MWe in 19 countries (table 1B.1). All of these countries except the Netherlands and Pakistan have additional commercial power reactors under construction. China has constructed one or two power reactors but these are used to supply electricity for China's uranium enrichment plant which is part of its nuclear-weapon programme. An additional nine countries have their first commercial power reactors under construction (table 1B.2). And many other countries, including Bangladesh, Cuba, Egypt, Indonesia, Iraq, Israel, Kuwait, Libya, Luxembourg, the Philippines, Poland, Romania, Saudi Arabia, South Africa, Thailand and Turkey, have announced plans to acquire power reactors.

By 1980, if the present forecast is realized, 29 countries will have installed nuclear power reactors with a total electrical generating capacity of about 219 300 MWe, about eleven times the 1970 figure (see table 1B.6). Looking further ahead, it is probable according to the latest predictions, that the 1980 figure will be multiplied more than sixteen-fold by the year 2000.[1] By this time, if the present trend continues, nuclear power reactors will be commonplace on all continents and it will be rare indeed to find a country without one.

A country with a nuclear power reactor has the capability to produce plutonium at a typical rate of about 100 kg per year for a 500 MWe reactor. Some research reactors (table 1B.5) can also produce plutonium at a significant rate, even though this rate is very much less than that for a power reactor.

Breeder reactors (table 1B.3) may actually use plutonium as fuel. The development and spread of all of these reactor types are, therefore, of considerable relevance to discussions of the ability to produce nuclear explosive devices.

[1] The most likely estimate of installed nuclear capacity forecasted for the year 2000 is 3 600 000 MWe (*IAEA Bulletin*, Vol. 17, No. 3, June 1975, p. 10).

Table 1B.1. Nuclear power reactors (capacity greater than 20 MWe) in operation, as of 31 December 1975

Country, name of plant	Location	Type of reactor[a]	Net power capacity *MWe*	Year of criticality[b]
Argentina				
Atucha CNA[c]	Lima, near Buenos Aires	PHWR	319	1974
Belgium				
Doel-1	Antwerp	PWR	390	1974
Doel-2	Antwerp	PWR	390	1975
Tihange-1	Tihange, Huy	PWR	870	1975
Bulgaria				
Kozloduy-1	Kozloduy	PWR	432	1974
Kozloduy-2	Kozloduy	PWR	432	1975
Canada				
Douglas Point	Douglas Point, Ontario	PHWR	206	1966
Gentilly-1	Gentilly, Quebec	HWLWR	255	1970
Pickering A-1	Pickering, Ontario	PHWR	514	1971
Pickering A-2	Pickering, Ontario	PHWR	514	1971
Pickering A-3	Pickering, Ontario	PHWR	514	1972
Pickering A-4	Pickering, Ontario	PHWR	514	1973
Rolphton NPD[d]	Rolphton, Ontario	PHWR	22	1962
Czechoslovakia				
Bohunice A-1	Jaslovské Bohunice	HWGCR	110	1972
France				
Bugey-1	Bugey, Ain	GCR	540	1971
Chinon-2	Avoine, Maine-et-Loire	GCR	200	1964
Chinon-3	Avoine, Maine-et-Loire	GCR	320	1966
Marcoule G-2	Marcoule, Gard	GCR	39	1958
Marcoule G-3	Marcoule, Gard	GCR	39	1959
Monts d'Arrée	Brennilis, Finistère	HWGCR	70	1962
Phénix	Marcoule, Gard	LMFBR	233	1973
St-Laurent-des-Eaux-1	St-Laurent-des-Eaux, Loir-et-Cher	GCR	480	1969
St-Laurent-des-Eaux-2	St-Laurent-des-Eaux, Loir-et-Cher	GCR	515	1971
SENA[e]	Chooz, Ardennes	PWR	270	1966
German DR				
Bruno Leuschner-1	Lubmin, Greifswald region	PWR	432	1973
Bruno Leuschner-2	Lubmin, Greifswald region	PWR	432	1974
Rheinsberg-1	Rheinsberg, Gransee region	PWR	62	1966
Germany, FR				
Biblis-A	Biblis, Rheinland-Pfalz	PWR	1 147	1974
Brunsbüttel	Brunsbüttel, Schleswig-Holstein	BWR	770	1975
Gundremmingen-1	Gundremmingen, Bavaria	BWR	237	1966
Karlsruhe MZRF[f]	Leopoldshafen, Baden-Würtemberg	PHWR	52	1965
Lingen KWL[g]	Lingen, Nordrhein-Westfalen	BWR	256	1968
Obrigheim KWO[h]	Mosbach, Baden-Württemberg	PWR	328	1968
Stade KKS[i]	Stade, Hamburg	PWR	630	1972
Würgassen KWW[j]	Würgassen, Hessen	BWR	640	1971

Country, name of plant	Location	Type of reactor[a]	Net power capacity *MWe*	Year of criticality[b]
India				
Rajasthan-1	Rana Pratap Sagar, near Kotah	PHWR	207	1972
Tarapur-1	Tarapur, near Bombay	BWR	190	1969
Tarapur-2	Tarapur, near Bombay	BWR	190	1969
Italy				
Garigliano	Sessa Aurunca, Caserta	BWR	150	1963
Latina	Borgo Sabotino, Latina	GCR	150	1962
Trino Vercellese	Vercellese, Vercelli	PWR	242	1964
Japan				
Fukushima-1	Ottozawa, Fukushima	BWR	439	1970
Fukushima-2	Futaba, Fukushima	BWR	760	1974
Fukushima-3	Futaba, Fukushima	BWR	760	1974
Genkai-1	Genkai, Saga	PWR	529	1975
Hamaoka-1	Hamaoka-cho, Aichi	BWR	516	1974
Mihama-1	Mihama, Fukui	PWR	320	1970
Mihama-2	Mihama, Fukui	PWR	470	1972
Shimane-1	Kashima, Shimane	BWR	439	1973
Takahama-1	Takahama, Fukui	PWR	780	1974
Takahama-2	Takahama, Fukui	PWR	780	1974
Tokai-1	Tokaimura, Ibaraki	GCR	154	1965
Tsuruga-1	Tsuruga, Fukui	BWR	340	1969
Netherlands				
Borssele	Borssele, Vlissingen	PWR	447	1973
Dodewaard	Dodewaard, Betuwe	BWR	52	1968
Pakistan				
Kanupp	Paradise Point, near Karachi	PHWR	125	1971
Spain				
José Cabrera-1	Almonacid de Zorita, Guadalajara	PWR	153	1968
Santa Maria de Garona	Santa Maria de Garona, Burgos	BWR	440	1971
Vandellos-1	Vandellos, Tarragona	GCR	480	1972
Sweden				
Barsebäck-1	Barsebäck, near Malmö	BWR	580	1975
Oskarshamn-1	Oskarshamn	BWR	440	1970
Oskarshamn-2	Oskarshamn	BWR	580	1974
Ringhals-1	Varberg	BWR	762	1973
Ringhals-2	Varberg	PWR	822	1974
Switzerland				
Beznau-1	Beznau, Doettingen	PWR	350	1969
Beznau-2	Beznau, Doettingen	PWR	350	1971
Mühleberg-1	Mühleberg, Bern	BWR	306	1971
UK				
Berkeley-1	Berkeley, Gloucestershire	GCR	143	1961
Berkeley-2	Berkeley, Gloucestershire	GCR	143	1962
Bradwell-1	Blackwater Estuary, Essex	GCR	125	1961
Bradwell-2	Blackwater Estuary, Essex	GCR	125	1962
Calder Hall-1	Calder Hall, Cumberland	GCR	50	1956
Calder Hall-2	Calder Hall, Cumberland	GCR	50	1956
Calder Hall-3	Calder Hall, Cumberland	GCR	50	1958
Calder Hall-4	Calder Hall, Cumberland	GCR	50	1958
Chapelcross-1	Annan, Dumfriesshire	GCR	50	1958

Country, name of plant	Location	Type of reactor[a]	Net power capacity MWe	Year of criticality[b]
Chapelcross-2	Annan, Dumfriesshire	GCR	50	1959
Chapelcross-3	Annan, Dumfriesshire	GCR	50	1959
Chapelcross-4	Annan, Dumfriesshire	GCR	50	1960
Dounreay PFR[k]	Dounreay, Scotland	LMFBR	250	1974
Dungeness A-1	Dungeness, Kent	GCR	205	1965
Dungeness A-2	Dungeness, Kent	GCR	205	1965
Hinkley Point A-1	Hinkley Point, Somerset	GCR	230	1964
Hinkley Point A-2	Hinkley Point, Somerset	GCR	230	1964
Hunterston A-1	Hunterston, Ayrshire	GCR	150	1963
Hunterston A-2	Hunterston, Ayrshire	GCR	150	1964
Oldbury-1	Oldbury on Severn, Gloucestershire	GCR	211	1967
Oldbury-2	Oldbury on Severn, Gloucestershire	GCR	198	1967
Sizewell A-1	Sizewell, Suffolk	GCR	210	1965
Sizewell A-2	Sizewell, Suffolk	GCR	210	1965
Trawsfynydd-1	Trawsfynydd, Wales	GCR	195	1964
Trawsfynydd-2	Trawsfynydd, Wales	GCR	195	1964
Windscale AGR	Windscale, Cumberland	AGR	32	1962
Winfrith SGHWR[l]	Winfrith Heath, Dorset	HWLWR	92	1967
Wylfa-1	Anglesey, Wales	GCR	420	1969
Wylfa-2	Anglesey, Wales	GCR	420	1970
USA				
Arkansas One-1	Russellville, Arkansas	PWR	850	1974
Duane Arnold	Palo, Iowa	BWR	535	1974
Big Rock Point	Charlevoix, Michigan	BWR	70	1962
Browns Ferry-1	Decatur, Alabama	BWR	1 065	1973
Browns Ferry-2	Decatur, Alabama	BWR	1 065	1973
Brunswick-2	Southport, North Carolina	BWR	821	1974
Calvert Cliffs-1	Lusby, Maryland	PWR	845	1974
Donald C Cook-1	Bridgman, Michigan	PWR	1 054	1975
Cooper	Brownsville, Nebraska	BWR	778	1974
Dresden-1	Morris, Illinois	BWR	200	1959
Dresden-2	Morris, Illinois	BWR	809	1970
Dresden-3	Morris, Illinois	BWR	809	1971
James A Fitzpatrick	Oswego, New York	BWR	821	1974
Fort Calhoun-1	Fort Calhoun, Nebraska	PWR	457	1973
Fort St Vrain	Platteville, Colorado	HTGR	330	1974
Robert E Ginna-1	Ontario, New York	PWR	489	1969
Haddam Neck	Haddam Neck, Connecticut	PWR	575	1967
Hanford-NP[m]	Richland, Washington	LWGR	860	1963
Edwin I Hatch-1	Baxley, Georgia	BWR	786	1974
Humboldt Bay	Eureka, California	BWR	63	1963
Indian Point-1	Indian Point, New York	PWR	265	1962
Indian Point-2	Indian Point, New York	PWR	873	1973
Kewaunee	Kewaunee, Wisconsin	PWR	551	1974
La Crosse	Genoa, Wisconsin	BWR	53	1967
Maine Yankee	Wiscasset, Maine	PWR	793	1972
Millstone-1	Waterford, Connecticut	BWR	652	1970
Millstone-2	Waterford, Connecticut	PWR	828	1975
Monticello	Monticello, Minnesota	BWR	559	1970
Nine Mile Point-1	Scriba, New York	BWR	600	1969
Oconee-1	Oconee, South Carolina	PWR	886	1973
Oconee-2	Oconee, South Carolina	PWR	886	1973
Oyster Creek-1	Toms River, New Jersey	BWR	640	1969
Palisades	South Haven, Michigan	PWR	700	1971
Peach Bottom-2	Peach Bottom, Pennsylvania	BWR	1 050	1973
Peach Bottom-3	Peach Bottom, Pennsylvania	BWR	1 050	1974

Country, name of plant	Location	Type of reactor[a]	Net power capacity *MWe*	Year of criticality[b]
Pilgrim-1	Plymouth, Massachusetts	BWR	655	1972
Point Beach-1	Two Creeks, Wisconsin	PWR	497	1971
Point Beach-2	Two Creeks, Wisconsin	PWR	497	1972
Prairie Island-1	Red Wing, Minnesota	PWR	520	1973
Prairie Island-2	Red Wing, Minnesota	PWR	520	1974
Quad Cities-1	Cordova, Illinois	BWR	809	1971
Quad Cities-2	Cordova, Illinois	BWR	809	1972
Rancho Seco-1	Sacramento, California	PWR	913	1974
H B Robinson-2	Hartsville, South Carolina	PWR	700	1970
San Onofre-1	San Clemente, California	PWR	430	1967
Surry-1	Gravel Neck, Virginia	PWR	788	1972
Surry-2	Gravel Neck, Virginia	PWR	788	1973
Three-Mile Island-1	Goldsboro, Pennsylvania	PWR	792	1974
Turkey Point-3	Turkey Point, Florida	PWR	693	1972
Turkey Point-4	Turkey Point, Florida	PWR	725	1963
Yankee Rowe	Rowe, Massachusetts	PWR	175	1960
Vermont Yankee	Vernon, Vermont	BWR	514	1972
Zion-1	Zion, Illinois	PWR	1 050	1973
Zion-2	Zion, Illinois	PWR	1 050	1972
USSR				
Beloyarsk-1	Sverdlovsk region	LWGR	94	1963
Beloyarsk-2	Sverdlovsk region	LWGR	194	1967
BN-350	Shevchenko	LMFBR	350	1972
Kola-1	Murmansk	PWR	410	1973
Kola-2	Murmansk	PWR	410	1975
Leningrad-1	Leningrad	LWGR	1 000	1973
Leningrad-2	Leningrad	LWGR	1 000	1975
Novo Voronezh-1	Novo Voronezh	PWR	196	1963
Novo Voronezh-2	Novo Voronezh	PWR	340	1969
Novo Voronezh-3	Novo Voronezh	PWR	410	1971
Novo Voronezh-4	Novo Voronezh	PWR	410	1973
Troitsk-1	Troitsk, Siberia	LWGR	100	1958
Troitsk-2	Troitsk, Siberia	LWGR	100	1958
Troitsk-3	Troitsk, Siberia	LWGR	100	1958
Troitsk-4	Troitsk, Siberia	LWGR	100	1958
Troitsk-5	Troitsk, Siberia	LWGR	100	1958
Troitsk-6	Troitsk, Siberia	LWGR	100	1958
VK-50	Dimitrovgrad, Ulyanovsk	BWR	50	1965
Totals				
Countries: **19**		Reactors; **168**	MWe: **73 073**	

[a] Several hundred types of reactors have been built or suggested, based on possible permutations of alternative fuels, moderator materials and coolant materials. But only three types of power reactors today have significant commercial importance: light-water reactors, graphite reactors and heavy-water reactors. Each is characterized by (*a*) the material used as the moderator—graphite, light water (ordinary water), or heavy water (water in which ordinary hydrogen (H_2) is replaced by deuterium (H_3)); and (*b*) the material used as the coolant—gas, light water or heavy water. The breeder reactor, still not a fully commercial technology, has been developed in two basic types: thermal reactors and fast reactors. But only the fast reactor which uses a liquid metal (sodium) as a coolant has been developed to the prototype-powerplant stage. The following abbreviations are accepted conventions for defining reactor types and are used in tables 1B.1, 1B.2 and 1B.3: (*a*) light-water reactors—BWR (boiling light water-moderated and -cooled), PWR (pressurized light water-moderated and -cooled); (*b*) graphite reactors—AGR (advanced gas-cooled graphite-moderated), GCR (gas-cooled graphite-moderated), HTGR (high-temperature gas-cooled graphite-moderated), LWGR (light water-cooled graphite-moderated); (*c*) heavy-water reactors—BHWR (boiling heavy water-moderated and -cooled), HWGCR (heavy water-moderated gas-cooled), HWLWR (heavy

water-moderated boiling light water-cooled), PHWR (pressurized heavy water-moderated and -cooled); and (*d*) breeder reactors—LMFBR (liquid-metal fast breeder).

[b] *Criticality* is the state of a nuclear reactor when it is sustaining a chain reaction. A nuclear power reactor usually can begin commercial operation within one year after achieving criticality.

[c] CNA=Comision Nacional de Energia Atomica.

[d] NPD=Nuclear Power Demonstration.

[e] SENA=Societé d'Energie Nucleaire Franco-Belge des Ardennes.

[f] MZRF=Mehrzweckforschungsreaktor (Multi-purpose Research Reactor).

[g] KWL=Kernkraftwerk Lingen GmbH.

[h] KWO=Kernkraftwerk Obrigheim GmbH.

[i] KKS=Kernkraftwerk Stade GmbH.

[j] KWW=Kernkraftwerk Würgassen.

[k] PFR=Prototype Fast Reactor.

[l] SGHWR=Steam-Generating Heavy-Water Reactor.

[m] NP=Nuclear Project.

Sources: News Review on Science and Technology, Institute for Defence Studies & Analyses, January–September 1975; *Nuclear Engineering International*, Vol. 20, Nos. 223–237, January–December 1975; *Power Reactors in Member States* (Vienna, IAEA, 1975); *Power and Research Reactors in Member States* (Vienna, IAEA, 1974); *Summary of World Broadcasts, Part 2, Eastern Europe Weekly Economic Report*, EE/W835-EE/W861 (Monitoring Service of the British Broadcasting Corporation, 1975, 1976); *Nuclear News*, Vol. 18, Nos. 10–15, August–December 1975 and Vol. 19, Nos. 1–2, January–February 1976.

Table 1B.2. Nuclear power reactors under construction, as of 31 December 1975

Country, name of plant	Location	Type of reactor[a]	Net power capacity *MWe*	Year of construction start	Projected year of criticality[b]
Argentina					
Cordoba	Rio de Tercero, Cordoba	PHWR	600	1974	1979
Austria					
Tullnerfeld-1	Zwentendorf, near Vienna	BWR	692	1971	1976
Belgium					
Doel-3	Antwerp	PWR	898	1974	1979
Brazil					
Angra dos Reis-1	Angra dos Reis, Itaorna	PWR	626	1972	1978
Bulgaria					
Kozloduy-3	Kozloduy	PWR	432	1972	1980
Kozloduy-4	Kozloduy	PWR	432	1972	1980
Canada					
Bruce-1	Tiverton, Ontario	PHWR	750	1971	1977
Bruce-2	Tiverton, Ontario	PHWR	750	1971	1976
Bruce-3	Tiverton, Ontario	PHWR	750	1972	1977
Bruce-4	Tiverton, Ontario	PHWR	750	1972	1978
Gentilly-2	Trois Rivières, Quebec	PHWR	600	1974	1978
Pickering B-1	Pickering, Ontario	PHWR	514	1974	1979
Pickering B-2	Pickering, Ontario	PHWR	514	1974	1980
Pickering B-3	Pickering, Ontario	PHWR	514	1974	1981
Pickering B-4	Pickering, Ontario	PHWR	514	1974	1981
Point Lepreau	Point Lepreau, New Brunswick	PHWR	635	1975	1980

Country, name of plant	Location	Type of reactor[a]	Net power capacity *MWe*	Year of construction start	Projected year of criticality[b]
Czechoslovakia					
Bohunice A-2	Jaslovské Bohunice	PWR	432	1973	1977
Finland					
Loviisa-1	Loviisa	PWR	420	1970	1976
Loviisa-2	Loviisa	PWR	420	1971	1977
Olkiluoto TVO-1[c]	Olkiluoto Island	BWR	660	1974	1978
France					
Bugey-2	Bugey, Ain	PWR	925	1972	1977
Bugey-3	Bugey, Ain	PWR	925	1973	1977
Bugey-4	Bugey, Ain	PWR	905	1974	1978
Dampierre-1	Dampierre-en-Burly, Loiret	PWR	905	1974	1979
Fessenheim-1	Fessenheim, Haut Rhin	PWR	898	1971	1976
Fessenheim-2	Fessenheim, Haut Rhin	PWR	898	1972	1977
Gravelines B-1	Dunkerque, Pas-de-Calais	PWR	925	1974	1979
Gravelines B-2	Dunkerque, Pas-de-Calais	PWR	925	1974	1979
St-Laurent-des-Eaux-3	St-Laurent-des-Eaux, Loir-et-Cher	PWR	1 300	1974	1979
St-Laurent-des-Eaux-4	St-Laurent-des-Eaux, Loir-et-Cher	PWR	1 300	1974	1980
Tricastin-1	Trois Chateaux, Drôme	PWR	925	1974	1979
Tricastin-2	Trois Chateaux, Drôme	PWR	925	1974	1980
German DR					
Nord 1–3	Lubmin, Greifswald region	PWR	430	. .	1977
Nord 1–4	Lubmin, Greifswald region	PWR	430	. .	1978
Germany, FR					
Biblis B	Biblis, Rheinland-Pfalz	PWR	1 240	1973	1976
Grafenrheinfeld	Rheinfeld, Bavaria	PWR	1 229	1975	1979
Isar KKI[d]	Ohu, Bavaria	BWR	870	1972	1976
Kalkar SNR-1[e]	Kalkar, Nordrhein-Westfalen	LMFBR	292	1973	1979
Krümmel KKK[f]	Krümmel, Elbe	BWR	1 260	1974	1977
Mühlheim-Kärlich	Mühlheim-Kärlich, Baden-Württemberg	PWR	1 215	1975	1978
Neckar GKN-1[g]	Neckarwestheim, Neckar	PWR	760	1972	1976
Philippsburg KKP-1[h]	Philippsburg, Baden-Württemberg	BWR	864	1970	1976
Unterweser KKU[i]	Esenshamn, Unterweser	BWR	1 230	1972	1976
Untrop THTR[j]	Untrop, Schmehausen	HTGR	300	1971	1977
Hungary					
Paks-1	Paks	PWR	432	1974	1980
Paks-2	Paks	PWR	432	1974	1980
India					
Kalpakkam-1	Kalpakkam, near Madras	PHWR	220	1969	1978
Kalpakkam-2	Kalpakkam, near Madras	PHWR	220	1969	1979
Narora-1	Narora, Uttar Pradesh	PHWR	220	1975	1981
Narora-2	Narora, Uttar Pradesh	PHWR	220	1975	1982
Rajasthan-2	Rana Pratap Sagar, near Kotah	PHWR	202	1968	1976
Iran					
Iran-1[k]	Bushehr, on the Persian Gulf	PWR	1 200	1975	1980

Country, name of plant	Location	Type of reactor[a]	Net power capacity *MWe*	Year of construction start	Projected year of criticality[b]
Italy					
Caorso	Caorso, near Piacenza	BWR	840	1970	1976
Cirene	Cirene, Latina	HWLWR	40	1967	1979
Japan					
Fugen ATR[l]	Myoin-cho, Fukui	HWLWR	165	1971	1977
Fukushima-4	Okuma Machi, Fukushima	BWR	760	1972	1976
Fukushima-5	Futaba-machi, Fukushima	BWR	760	1971	1976
Fukushima-6	Futaba-machi, Fukushima	BWR	1 067	1973	1977
Genkai-2	Genkai, Saga	PWR	559	1975	1979
Hamaoka-2	Hamaoka-cho, Aichi	BWR	814	1973	1978
Ikata	Nishiuwagun, Ehime	PWR	538	1973	1977
Mihama-3	Mihama-cho, Fukui	PWR	781	1972	1976
Ohi-1	Ohi-cho, Fukui	PWR	1 122	1972	1977
Ohi-2	Ohi-cho, Fukui	PWR	1 122	1973	1978
Onagawa-1	Onagawa, Miyagi	BWR	500	1972	1976
Tokai-2	Tokaimura, Ibaraki	BWR	1 067	1972	1977
Korea, South					
Ko-Ri-1	Ko-Ri, near Pusan	PWR	564	1970	1976
Mexico					
Laguna Verde-1	Laguna Verde, Veracruz	BWR	654	1973	1979
Laguna Verde-2	Laguna Verde, Veracruz	BWR	654	1973	1980
Spain					
Almaraz-1	Almaraz, Caceres	PWR	902	1973	1976
Almaraz-2	Almaraz, Caceres	PWR	902	1973	1978
Asco-1	Asco, Tarragona	PWR	902	1973	1977
Asco-2	Asco, Tarragona	PWR	902	1974	1978
Cofrente	Cofrente, Valencia	BWR	930	1974	1979
Lemoniz-1	Lemoniz, Vizcaya	PWR	902	1972	1976
Lemoniz-2	Lemoniz, Vizcaya	PWR	902	1974	1978
Sweden					
Barsebäck-2	Barsebäck, near Malmö	BWR	580	1972	1977
Forsmark-1	Forsmark, Uppland	BWR	900	1971	1978
Forsmark-2	Forsmark, Uppland	BWR	900	1973	1980
Ringhals-3	Varberg	PWR	900	1972	1977
Ringhals-4	Varberg	PWR	900	1973	1980
Switzerland					
Gösgen	Däniken, Solothurn	PWR	920	1973	1977
Taiwan					
Chin-shan-1	Shihmin Hsiang	BWR	604	1970	1976
Chin-shan-2	Shihmin Hsiang	BWR	604	1970	1977
Kuosheng-1	Wanli Hsian	BWR	950	1974	1980
UK					
Dungeness B-1	Dungeness, Kent	AGR	587	1966	1977
Dungeness B-2	Dungeness, Kent	AGR	587	1966	1977
Hartlepool-1	Seaton Carew, Durham	AGR	625	1968	1978
Hartlepool-2	Seaton Carew, Durham	AGR	625	1968	1978
Heysham-1	Heysham, Lancashire	AGR	625	1970	1978
Heysham-2	Heysham, Lancashire	AGR	625	1970	1979

Country, name of plant	Location	Type of reactor[a]	Net power capacity *MWe*	Year of construction start	Projected year of criticality[b]
Hinkley Point B-1	Hinkley Point, Somerset	AGR	621	1967	1976
Hinkley Point B-2	Hinkley Point, Somerset	AGR	621	1967	1976
Hunterston B-1	Hunterston, Ayrshire	AGR	621	1967	1976
Hunterston B-2	Hunterston, Ayshire	AGR	621	1967	1976
USA					
Arkansas One-2	Russellville, Arkansas	PWR	915	1971	1977
Beaver Valley-1	Shippingport, Pennsylvania	PWR	847	1970	1976
Beaver Valley-2	Shippingport, Pennsylvania	PWR	847	1975	1981
Bellefonte-1	Scottsboro, Alabama	PWR	1 189	1974	1980
Bellefonte-2	Scottsboro, Alabama	PWR	1 189	1974	1981
Davis Besse-1	Oak Harbor, Ohio	PWR	906	1971	1976
Browns Ferry-3	Decatur, Alabama	BWR	1 065	1968	1976
Brunswick-1	Southport, North Carolina	BWR	821	1969	1976
Calvert Cliffs-2	Lusby, Maryland	PWR	845	1968	1976
Catawba-1	Rock Hill, South Carolina	PWR	1 153	1974	1981
Clinton-1	Clinton, Illinois	BWR	933	1975	1981
Commanche Peak-1	Glen Rose, Texas	PWR	1 150	1974	1979
Commanche Peak-2	Glen Rose, Texas	PWR	1 150	1974	1981
Donald C Cook-2	Bridgman, Michigan	PWR	1 054	1969	1977
Crystal River-3	Red Level, Florida	PWR	825	1968	1976
Diablo Canyon-1	Diablo Canyon, California	PWR	1 060	1968	1976
Diablo Canyon-2	Diablo Canyon, California	PWR	1 156	1970	1977
Joseph M Farley-1	Dothan, Alabama	PWR	829	1970	1976
Joseph M Farley-2	Dothan, Alabama	PWR	829	1970	1977
Enrico Fermi-2	Newport, Michigan	BWR	1 093	1972	1980
Grand Gulf-1	Port Gibson, Mississippi	BWR	1 255	1974	1980
Grand Gulf-2	Port Gibson, Mississippi	BWR	1 255	1974	1984
Edwin I Hatch-2	Baxley, Georgia	BWR	795	1972	1978
Hope Creek-1	Salem, New Jersey	BWR	1 058	1974	1982
Hope Creek-2	Salem, New Jersey	BWR	1 058	1974	1984
Indian Point-3	Indian Point, New York	PWR	965	1969	1976
LaSalle-1	Seneca, Illinois	BWR	1 080	1971	1978
LaSalle-2	Seneca, Illinois	BWR	1 080	1971	1979
Limerick-1	Pottstown, Pennsylvania	BWR	1 100	1974	1980
Limerick-2	Pottstown, Pennsylvania	BWR	1 100	1974	1982
William McGuire-1	Terrell, North Carolina	PWR	1 180	1973	1977
William McGuire-2	Terrell, North Carolina	PWR	1 180	1973	1978
Midland-1	Midland, Michigan	PWR	491	1972	1981
Midland-2	Midland, Michigan	PWR	816	1972	1980
Millstone-3	Waterford, Connecticut	PWR	1 156	1974	1979
Nine Mile Point-2	Scriba, New York	BWR	1 100	1974	1981
North Anna-1	Mineral, Virginia	PWR	947	1971	1976
North Anna-2	Mineral, Virginia	PWR	907	1971	1977
North Anna-3	Mineral, Virginia	PWR	907	1974	1980
North Anna-4	Mineral, Virginia	PWR	907	1974	1981
Riverbend-1	Francisville, Louisiana	BWR	940	1975	1981
Salem-1	Salem, New Jersey	PWR	1 090	1968	1976
Salem-2	Salem, New Jersey	PWR	1 115	1968	1979
San Onofre-2	San Clemente, California	PWR	1 100	1973	1980
San Onofre-3	San Clemente, California	PWR	1 100	1973	1981
Sequoyah-1	Daisy, Tennessee	PWR	1 140	1970	1976
Sequoyah-2	Daisy, Tennessee	PWR	1 140	1970	1977
Shearon Harris-1	Bonsal, North Carolina	PWR	915	1975	1983
Shoreham-1	Shoreham, New York	BWR	819	1973	1978
South Texas-1	Palacios, Texas	PWR	1 250	1975	1982
St Lucie-1	Fort Pierce, Florida	PWR	850	1970	1976
Virgil C Summer-1	Broad River, South Carolina	PWR	900	1973	1978

Country, name of plant	Location	Type of reactor[a]	Net power capacity *MWe*	Year of construction start	Projected year of criticality[b]
Surry-3	Surry County, Virginia	PWR	858	1974	1983
Surry-4	Surry County, Virginia	PWR	858	1974	1984
Susquehanna-1	Berwick, Pennsylvania	BWR	1 050	1973	1980
Susquehanna-2	Berwick, Pennsylvania	BWR	1 050	1973	1982
Three-Mile Island-2	Goldsboro, Pennsylvania	PWR	905	1968	1978
Trojan	Prescott, Oregon	PWR	1 130	1971	1976
Waterford-3	Taft, Louisiana	PWR	1 125	1975	1980
Watts Bar-1	Spring City, Tennessee	PWR	1 169	1973	1978
Watts Bar-2	Spring City, Tennessee	PWR	1 169	1973	1979
WNP-1[m]	Richland, Washington	PWR	1 250	1975	1981
WNP-2	Richland, Washington	BWR	1 103	1973	1978
WNP-4	Richland, Washington	PWR	1 250	1975	1982
William H Zimmer-1	Moscow, Ohio	BWR	810	1972	1979
USSR					
Armenia-1	Ararat Valley, Armenia	PWR	400	. .	1976
Armenia-2	Ararat Valley, Armenia	PWR	400	. .	1976
BN-600	Sverdlovsk, Beloyarsk	LMFBR	600	1969	1977
Chernoblysk-1	Chernobyl, Ukraine	LWGR	1 000	1975	1980
Chernoblysk-2	Chernobyl, Ukraine	LWGR	1 000	1975	1981
Kalinin-1	Kalinin, upper Volga	. .	1 000	(1975)	1980
Kalinin-2	Kalinin, upper Volga	. .	1 000	(1975)	1980
Kola-3	Murmansk	PWR	440	1974	. .
Kola-4	Murmansk	PWR	440	1974	. .
Kursk-1	Kursk	LWGR	1 000	1971	1976
Kursk-2	Kursk	LWGR	1 000	1971	1976
Novo Voronezh-5	Novo Voronezh	PWR	1 000	1969	1976
Smolensk-1	Smolensk	LWGR	1 000	. .	. .
Smolensk-2	Smolensk	LWGR	1 000	. .	. .
South Ukraine-1	Nikolayev region, Ukraine	PWR	1 000	1975	. .
South Ukraine-2	Nikolayev region, Ukraine	PWR	1 000	1975	. .
West Ukraine-1	. .	PWR	440	. .	. .
West Ukraine-2	. .	PWR	440	. .	. .
Yugoslavia					
Videm Krsko	Videm Krsko, Slovenia	PWR	600	1974	1979
Totals					
Countries: **26**		Reactors: **176**		MWe: **149 729**	

[a] See footnote [a] to table 1B.1, page 32.
[b] See footnote [b] to table 1B.1, page 33.
[c] TVO=Teollisuuden Voima Osakeyhtio.
[d] KKI=Kernkraftwerk Isar.
[e] SNR=Schnellnuklearreaktor (Fast Nuclear Reactor).
[f] KKK=Kernkraftwerk Krümmel GmbH.
[g] GKN=Gemeinschaftkernkraftwerk Neckar.
[h] KKP=Kernkraftwerk Philippsburg.
[i] KKU=Kernkraftwerk Unterweser.
[j] THTR=Thoriumhochtemperaturreaktor (Thorium High-Temperature Reactor).
[k] Iran's first nuclear power plant has not yet been officially named.
[l] ATR=Advanced Thermal Reactor.
[m] WNP=Washington Nuclear Project.

Sources: See sources to table 1B.1, page 33.

Table 1B.3. World breeder reactor developments, as of 31 December 1975

Country, name of reactor (location)	Type of reactor	Status	Power capacity[a]	Year of criticality[b]	Comments
Brazil					
Cobra	Experimental fast breeder power reactor	Planned	. .	. .	Part of agreement signed with France 4 July 1975; design expected to be similar to Rapsodie and Phénix
France					
Rapsodie-Fortissimo (Cadarache)	Fast research reactor	In operation	40 MWt	1970	Converted from Rapsodie (critical 1967); used for testing LMFBR[c] fuel and other core materials
Phénix (Marcoule)	Liquid-metal fast breeder power reactor	In operation	233 MWe	1973	Prototype-scale LMFBR; first fast-breeder reactor to achieve full-power operation; in commercial operation since July 1974; pool design[d], sodium-cooled; fuel: UO_2 (19.2 per cent enrichment), PuO_2 (27.1 per cent enrichment); fuel inventory, 4 369 kg
Super Phénix (Creys-Malville)	Liquid-metal fast breeder power reactor	Planned	1 200 MWe	1980	Demonstration-scale LMFBR; preliminary site work began December 1974; decision to start plant construction expected early 1976; Italian and FRG company contribute to financing
CFBR-1 (Commercial Fast Breeder Reactor) (not selected)	Liquid-metal fast breeder power reactor	Planned	1 200 MWe	mid-1980s	First commercial fast breeder; definite decision to order expected at the end of 1978 or early 1979
CFBR-2 (Commercial Fast Breeder Reactor) (not selected)	Liquid-metal fast breeder power reactor	Planned	1 200 MWe	mid-1980s	Twin station to CFBR-1; Electricité de France (EdF) has announced that following these first two orders, one breeder may be ordered each year, or two every three years
Germany, FR					
SNEAK (Schnelle Null-Energie Anordnung) (Karlsruhe)	Fast research reactor	In operation	–	1966	Used to investigate the neutron physics of large fast breeder reactors
KNK II (Karlsruhe)	Experimental fast breeder power reactor	. .	19 MWe	(1975)	Converted from the sodium-cooled research reactor KNK into a fast-neutron reactor; information is not available on current status
SNR-1 (Kalkar)	Liquid-metal fast breeder power reactor	Under construction	292 MWe	1979	Prototype-scale LMFBR; construction, in cooperation with Belgium and the Netherlands, approximately 20 per cent complete
SNR-2 (Kalkar)	Liquid-metal fast breeder power reactor	Planned	1 200 MWe	1985	Commercial LMFBR; construction expected to begin after completion of SNR-1

Country, name of reactor (location)	Type of reactor	Status	Power capacity[a]	Year of criticality[b]	Comments
India					
Purnima	Fast research reactor	In operation	–	1972	Used to provide data on the use of plutonium in fast breeder reactors
FBTR (Fast Breeder Test Reactor) (Kalpakkam)	Experimental fast breeder power reactor	Under construction	15 MWe	1979	Design basically similar to Rapsodie but modified for power generation; French Atomic Energy Commission assisting in design and construction; will in particular be used in research on the breeding of fissile material in thorium
Iraq					
Unnamed (not selected)	Liquid-metal fast breeder power reactor	Planned	. .	. .	Bilateral agreement with France signed in November 1975 includes the eventual construction of an LMFBR similar to the Phénix, after construction of a PWR[c] plant
Italy					
PEC (Brasimone)	Fast research reactor	Under construction	. .	1978	Design similar to FFTF-1 (USA) but smaller; delays in starting project due to disagreements within Euratom
Japan					
Joyo (Oarai)	Liquid-metal fast breeder research reactor	Under construction	50 MWt	1976	Design and construction by Power Reactor Nuclear Fuel Development Corporation (PNC); reactor undergoing pre-criticality tests in December 1975
Monju (Monju)	Liquid-metal fast breeder power reactor	Planned	300 MWe	1982	Prototype-scale LMFBR under development by PNC; design work reported at an advanced stage
UK					
DFR (Demonstration Fast Reactor) (Dounreay)	Experimental liquid-metal fast breeder power reactor	In operation	14 MWe	1959	Loop design[e]; fuel, highly enriched uranium (75 per cent), natural uranium blanket; fuel inventory, 340 kg uranium; to be shut down in October 1976 since it is superseded by the PFR
PFR (Prototype Fast Reactor) (Dounreay)	Liquid-metal fast breeder power reactor	In operation	250 MWe	1974	Pool design; first prototype-scale fast breeder with complete core loading of mixed plutonium-uranium oxide fuel (PuO_2, 24 per cent enrichment; UO_2, 30 per cent enrichment); fuel inventory, 4 165.8 kg
CFR (Civil Fast Reactor)	Liquid-metal fast breeder power reactor	Planned	1 300 MWe	mid-1980s	Demonstration-scale LMFBR; most of design options have been decided but decision to order not likely before 1978

Country, name of reactor (location)	Type of reactor	Status	Power capacity[a]	Year of criti-cality[b]	Comments
USA					
EBR-2 (Idaho Falls)	Experimental fast breeder power reactor	In operation	16 MWe	1963	Pool design; originally fuelled witl highly enriched uranium (75 per cent); plutonium fuelling planned fuel inventory, 599.5 kg uranium
SPR-III (Albuquerque)	Prompt burst research reactor	In operation	. .	1974	Primary use will be testing of weapons electronic packages but will also be used for material studies for LMFBRs and to excite a nuclear-powered laser now under development
ETR (Engineering Test Reactor) (Idaho Falls)	Tank-type research reactor	In operation	175 MWt	1957	The Sodium Loop Safety Facility (SLFS), recently successfully tested by the Argonne National Laboratory, will use this reactor as an irradiation source for conducting safety tests on LMFBR fuel elements
FFTF-1 (Richland)	Liquid-metal fast breeder research reactor	Under construction	400 MWt	1978	Will be used to test breeder reactoı components in a high neutron flux; 150 MWe power equivalent but will not generate electricity; original cost estimate $87.5 mn, now $600 mn
FFTF-2 (not selected)	Liquid-metal fast breeder research reactor	Planned	. .	early 1980s	Large testing facility for LMFBR components, to be followed by the NCBR in 1987
Shippingport (Shippingport)	Breeder reactor	Planned	. .	(1977)	Reactor to be installed in ERDA[f] owned reactor at Shippingport; installation of core planned for 1976; expected to confirm that breeding can be achieved in an LWR system using a thorium-uranium 233 fuel cycle
Clinch River Breeder Reactor (Oak Ridge)	Liquid-metal fast breeder power reactor	Planned	350 MWe	1982	Prototype-scale LMFBR; original completion date 1978; cost estimate has increased from $699 mn to $1 700 mn; earliest possible date for start of site preparation is late 1976, for plant construction, mid-1977
NCBR (Near Commercial Breeder Reactor) (not selected)	Liquid-metal fast breeder power reactor	Planned	1 000–1 500 MWe	1987	Demonstration-scale follow-up to Clinch River; design concepts to be developed starting in 1976 by three competitive teams consisting of a reactor vendor and architect-engineer, under the sponsorship of ERDA and EPRI[g]
EBR-1 (Idaho Falls)	Experimental fast breeder power reactor	Shutdown	0.15 MWe	1951	Shutdown 1964
Enrico Fermi-1 (Lagoona Beach)	Experimental liquid-metal fast breeder power reactor	Shutdown	60 MWe	1963	Reactor accident in October 1966 due to blockage in coolant system; shutdown 1973
SEFOR (Southwest Experimental Fast Oxide Breeder Reactor) (Fayetteville)	Liquid-metal fast breeder research reactor	Shutdown	20 MWt	1969	Shutdown 1972; reactor donated tc University of Arkansas; reactivating reactor unlikely

Country, name of reactor (location)	Type of reactor	Status	Power capacity[a]	Year of criticality[b]	Comments
USSR					
SBR-5 (Obninsk)	Experimental liquid-metal fast breeder power reactor	In operation	12 MWe	1958	Nominal electrical output of 5 MWe was upgraded in 1972; loop design; experimental fuel irradiation facility comparable to DFR, EBR-2 and Rapsodie
BOR-60 (Dimitrovgrad)	Experimental liquid-metal fast breeder power reactor	In operation	12 MWe	1968	Loop design; fuel, UO_2 (90 per cent enrichment); fuel inventory, 0.176 tons U-235; two sodium loops used for testing steam generators
BN-350 (Shevchenko)	Liquid-metal fast breeder power reactor	In operation	350 MWe	1972	Prototype-scale LMFBR; fuel, PuO_2 (23.19 per cent enrichment), or UO_2; fuel inventory, 1 158.5 kg U-235; total power equivalent to electrical output of 350 MWe but only 150 MWe are produced; remaining power used for desalination project
BN-600 (Beloyarsk)	Liquid-metal fast breeder power reactor	Under construction	600 MWe	1977	Pool design; all enriched uranium oxide fuel loading; building work almost complete and reactor vessel installed; projected criticality date depends on component delivery
BN-1500 (not selected)	Liquid-metal fast breeder power reactor	Planned	1 500 MWe	1985	Commercial-scale LMFBR; design work under way; construction start unlikely before BN-600 begins operation
ARBUS (Dimitrovgrad)	Experimental fast breeder power reactor	Shutdown	0.5 MWe	1963	Shutdown 1968

[a] The power-generating capacity of any reactor which is, or will be, used to produce electricity is generally expressed in millions of watts of electricity (MWe), gross or net. In this table the net number of MWe is given. For reactors which are not used to produce electricity the power generating capacity, if any, is expressed in millions of watts of thermal power (MWt).
[b] See footnote [b], table 1B.1, page 33.
[c] See footnote [a], table 1B.1, page 33.
[d] In a pool-type reactor design, a large tank filled with sodium encloses the reactor core and blanket and all the primary heat-transfer equipment.
[e] In a loop-type design only the reactor vessel is filled with sodium. The liquid metal is circulated by pumps through heat-exchange loops mounted outside the reactor container.
[f] ERDA=Energy Research and Development Administration.
[g] EPRI=Electric Power Research Institute.

Sources: See sources to table 1B.1, page 33.

Table 1B.4. World nuclear power capacity in operation, as of 31 December 1975 and projected for 1980

	Total nuclear power capacity 1975 *MWe* (net)	Number of power reactors 1975 (>20 MWe)	Total nuclear power capacity 1980 *MWe* (net)	Number of power reactors 1980[a] (>20 MWe)
Argentina	319	1	919	2
Austria	–	–	692	1
Belgium	1 650	3	3 446	5 (1)
Brazil	–	–	626	1
Bulgaria	864	2	1 728	4
Canada	2 539	7	7 802	15
Czechoslovakia	110	1	1 838	5 (3)
Finland	–	–	1 500	3
France	2 706	10	14 462	22
German DR	926	3	1 786	5
Germany, FR	4 060	8	13 320	18
Hungary	–	–	864	2
India	587	3	1 229	6
Iran	–	–	1 200	1
Italy	542	3	1 422	5
Japan	6 287	12	19 066	28 (4)
Korea, South	–	–	1 769	3 (2)
Mexico	–	–	1 308	2
Netherlands	499	2	499	2
Pakistan	125	1	125	1
Romania	–	–	432	1 (1)
Spain	1 073	3	8 365	11 (1)
Sweden	3 184	5	8 264	11 (1)
Switzerland	1 006	3	5 933	8 (4)
Taiwan	–	–	2 158	3
UK	4 539	29	10 697	39
USA	36 593	54	86 690	103 (5)
USSR	5 464	18	19 624	36
Yugoslavia	–	–	1 400	2 (1)

Totals	**1975**	**1980**
Countries	**19**	**29**
Reactors	**168**	**345**
Capacity (*MWe*)	**73 073**	**219 164**

[a] The numbers in brackets indicate the number of reactors included in the total figure for reactors planned for operation in 1980 but not under construction as of 31 December 1975.

Sources: See sources to table 1B.1, page 33.

Table 1B.5. Research, experimental and power reactors in operation, as of 31 December 1975 and projected for 1980[a]

Country	Number of research and experimental reactors (<20 MWe)		Number of power reactors (>20 MWe)	
	1975	1980	1975	1980
Argentina	6	6	1	2
Australia	2	2	–	–
Austria	3	3	–	1
Bangladesh	–	1	–	–
Belgium	7	7	3	5
Brazil	3	3	–	1
Bulgaria	1	1	2	4
Canada	8	8	7	15
Chile	1	1	–	–
Colombia	1	1	–	–
Cuba	–	1	–	–
Czechoslovakia	3	3	1	5
Denmark	3	3	–	–
Egypt	1	1	–	–
Finland	1	1	–	3
France	24	24	10	22
German DR	2	2	3	5
Germany, FR	37	38	8	18
Hungary	2	2	–	2
India	4	6	3	6
Indonesia	1	2	–	–
Iran	1	2	–	1
Iraq	1	1	–	–
Israel	2	2	–	–
Italy	16	17	3	5
Japan	23	24	12	28
Korea, South	1	1	–	3
Libya	–	1	–	–
Malaysia	–	1	–	–
Mexico	2	2	–	2
Netherlands	6	6	2	2
Norway	2	2	–	–
Pakistan	1	1	1	1
Peru	–	1	–	–
Philippines	1	1	–	–
Poland	5	5	–	–
Portugal	1	1	–	–
Romania	1	1	–	1
South Africa	2	2	–	–
Spain	5	5	3	11
Sweden	3	3	5	11
Switzerland	6	6	3	8
Taiwan	2	2	–	3
Thailand	1	1	–	–
Turkey	1	1	–	–
UK	25	24	29	39
Uruguay	1	1	–	–
USA	119	125	54	103
USSR	32	32	18	36
Venezuela	1	1	–	–
Yugoslavia	3	3	–	2

Totals	**1975**	**1980**
Research and experimental reactors:		
Countries	**46**	**51**
Reactors	**374**	**391**
Power reactors:		
Countries	**19**	**29**
Reactors	**168**	**345**

[a] Except for states not members of the IAEA or where more recent information was available, the number of research and experimental reactors is taken from *Power and Research Reactors in Member States* (Vienna, IAEA, 1974). It has been assumed that the reactors under construction or planned at that time will have been completed by 1980 where there is no information to the contrary.

Sources: See footnote [a] above and sources to table 1B.1, page 33.

Table 1B.6. Build-up of nuclear power capacity, 1954–1980

Year	Number of countries	Number of reactors[a]	Total nuclear power capacity *MWe*	Country attaining nuclear power capacity that year
1954	2	2	7.5	USA, USSR
1955	2	2	7.5	–
1956	4	6	113	France, UK
1957	4	10	214	–
1958	4	18	750	–
1959	4	22	1 110	–
1960	5	24	1 300	FR Germany
1961	5	27	1 570	–
1962	7	41	2 990	Canada, Italy
1963	9	54	4 600	Japan, Sweden
1964	9	62	6 100	–
1965	9	66	7 100	–
1966	11	75	8 400	German DR, Switzerland
1967	11	81	10 100	–
1968	13	82	10 900	Netherlands, Spain
1969	15	90	15 000	Belgium, India
1970	15	99	20 000	–
1971	16	112	26 200	Pakistan
1972	17	130	35 000	Czechoslovakia
1973	17	151	48 000	–
1974	19	171	66 400	Argentina, Bulgaria
1975	19	181	73 200	–
1976	23	222	107 400	Austria, Finland, South Korea, Taiwan
1977	23	252	131 300	–
1978	24	277	152 100	Brazil
1979	26	310	177 400	Mexico, Yugoslavia
1980	29	357	219 300	Hungary, Iran, Romania

[a] Including experimental power reactors (capacity <20 MWe). In 1975, 13 experimental power reactors were in operation (Belgium–1; FR Germany–3; Japan–1; UK–1; USA–1; and USSR–6) with a total generating capacity of approximately 172 MWe. All power reactors which are currently under construction in the USSR (see table 1B.2) have been included in the total for 1980 unless another year of criticality is known to be projected.

Sources: See sources to table 1B.1, page 33.

Table 1B.7. Summary of the nuclear status of countries having at least one nuclear reactor or one element of the nuclear fuel cycle on their territory

Country	Power reactors 1975	Power reactors 1980	Uranium enrichment capability[a]	Fuel reprocessing capability[a]	Uranium resources <$30/lb[b]	Uranium producer 1975/76	Research reactor in operation[c]	Breeder reactor programme	NPT status[d]	NPT safeguards agreement[e]	Non-NPT safeguards agreement with IAEA[c]	Member of IAEA[c]	Member of Euratom[f]	Member of NEA[g]
Algeria					+							+		
Angola					+									
Argentina	+	+			+	+	+				+	+		
Australia			P	P	+	+	+		R	*		+		+
Austria		+					+		R	*		+		+
Belgium	+	+		p[h]			+		R	S		+	+	+
Brazil		+	P	P	+		+				+	+		
Bulgaria	+	+					+		R	*		+		
Canada	+	+	P		+	+	+		R	*		+		+
Central African Republic					+				R					
Chile							+				+	+		
Colombia					+		+		S		+	+		
Czechoslovakia	+	+		O	+		+		R	*		+		
Denmark					+		+		R	*		+	+	+
Egypt							+		S			+		
Finland		+			+		+		R	*		+		
France	+	+	O/C/Pp	O/C/Pp	+	+	+	+		nw		+	+	+
Gabon					+	+			R			+		
German DR	+	+					+		R	*		+		
Germany, FR	+	+	O/C	O/C/P	+	+	+	+	R	S		+	+	+
Greece							+		R	*		+		+
Hungary		+					+		R	*		+		
India	+	+		O/C	+	+	+	+			+	+		
Indonesia							+		S		+	+		
Iran		+					+		R	*		+		
Iraq							+		R	*		+		
Israel							+				+	+		
Italy	+	+		Pp	+		+	+	R	S		+	+	+
Japan	+	+	P	O/C/P	+	+	+	+	S		+	+		+
Korea, South		+		P			+		R	*		+		
Mauritania					+									

Mexico		+			+	+	+		R	*		+		
Netherlands	+	+	O/*p*				+		R	S		+	+	+
Niger					+	+						+		
Norway							+		R	*		+		+
Pakistan	+	+		P			+				+	+		
Philippines							+		R	*		+		
Poland							+		R	*				
Portugal					+	+	+				+	+		+
Romania		+					+		R	*		+		
South Africa			O/P		+	+	+				+	+		
Spain	+	+		O	+	+	+				+	+		+
Sweden	+	+	P	P	+		+		R	*		+		+
Switzerland	+	+					+		S		+	+		+
Taiwan		+					+		R		+			
Thailand							+		R	*		+		
Turkey					+		+		S		+	+		+
UK	+	+	O/*p*	O/C/*p*	+		+	+	R	nw		+	+	+
Uruguay							+		R	S	+	+		
USA	+	+	O/P*p*	C/P*p*	+	+	+	+	R	nw		+		
USSR	+	+	O	O	+	+	+	+	R	nw		+		
Venezuela			P				+		R		+	+		
Yugoslavia		+			+		+		R	*		+		
Zaire			P		+		+		R	*		+		

[a] Commercial- or pilot-scale facility on country's territory: O=in operation; C=under construction; P=facility planned or under consideration; *p*=additional capacity planned for existing facility.

[b] The Nuclear Energy Agency (NEA) has defined world uranium resources in two ways: first according to the type of resource in geological terms, second according to a hypothetical market price. Geologically, ore deposits are classified as *reasonably assured resources* (RAR) or *estimated additional resources* (EAR), the difference being the reliability of the geological estimate. There are three price categories (per pound U_3O_8): (a) less than $15; (b) $15 to $30; and (c) $30 to $100 (these categories correspond to $10, $10–15 and $15–30 in the NEA's 1973 report). The recent escalation of the market price of uranium emphasizes that the NEA price levels should not be interpreted too literally in making economic assessments of nuclear power costs but they nevertheless serve as a useful indication of the competitive value of a country's uranium resources.

[c] As of 31 December 1975.

[d] As of 31 December 1975. R=ratified; S=signed.

[e] As of 31 December 1975. *=in force; S=signed; nw=nuclear-weapon state.

[f] Euratom=European Atomic Energy Community.

[g] NEA=Nuclear Energy Agency of the Organization for Economic Cooperation and Development (OECD).

[h] The Eurochemic reprocessing plant in Mol has been shut down and future reopening is doubtful, but under consideration.

Sources: See sources to table 1B.1, page 33; *Facts on Nuclear Proliferation*, a handbook prepared for the Committee on Government Operations, US Senate, by the Congressional Research Service, Library of Congress (Washington, US Printing Office, 1975) pp. 105–107 and 127–129; *Oversight Hearings on Nuclear Energy—International Proliferation of Nuclear Technology*, Hearings before the Subcommittee on Energy and the Environment of the Committee on Interior and Insular Affairs, US House of Representatives, 21, 22 and 24 July 1975 (Washington, US Government Printing Office, 1975) pp. 42–43; Poole, L. G., "World Uranium Resources", *Nuclear Engineering International*, Vol. 20, No. 224, February 1975, pp. 95–100; "The Nuclear Fuel Cycle", *Nuclear Engineering International*, Vol. 20, No. 237, December 1975, pp. 1015–1020; Rippon, S., "Reprocessing—What Went Wrong?", *Nuclear Engineering International*, Vol. 21, No. 239, February 1976, pp. 21–27.

2. Conflict

Square-bracketed numbers, thus [1], *refer to the list of references on page 59.*

The ending of the war in South Viet-Nam was a major event in 1975. So was the conflict in Angola. But other conflicts continued and some new ones began.

Many definitions of war are possible. One, given by Professor Kende, [1] defines war as any armed conflict in which all of the following criteria occur:

1. Activities of regular armed forces (military police forces, and so on) at least on one side—that is, the presence and engagement of the armed forces of the government in power.
2. A certain degree of organization and organized fighting on both opposing sides, even if this organization extends to organized defence only.
3. A certain continuity between the armed clashes, however sporadic. Centrally organized guerilla forces are also regarded as making war, insofar as their activities extend over a considerable part of the country concerned.

On the basis of this definition, Kende lists 119 wars during the period 1945–1975. The total duration of these conflicts exceeded 350 years. The territory of 69 countries and the armed forces of 81 states were involved. Since September 1945 there was not a single day in which one or several wars were not being fought somewhere in the world. On an "average day" about 12 wars were fought.

I. *The end of the Second Indo-China War (1961–1975)*

The war in Indo-China was finally brought to an end in 1975. This was an event of considerable significance for a number of reasons. The war illustrated the great dangers of intervention by a major power in a local conflict. For many years the war acted as a barrier to the emerging détente between the United States and the Soviet Union. It provoked an enormous increase in the US defence budget which, on the one hand, caused a marked deterioration in the US balance of payments and its economic position generally; and, on the other hand, financed the development of a host of new military technologies. The products of these new technologies are now being made available to an increasing number of other countries.

For the peoples of Indo-China, 1975 marked the beginning of a new era but one which confronts them with a tremendous task of social and economic reconstruction. Many of the techniques of warfare used in Indo-China

Table 2.1. Measures of US effort during the Second Indo-China War: troop and munition data, by year

Year	US forces committed[a] *thousands*	US forces killed in action[b] *number*	Proportion killed in action *no./thousand*	US munitions expended[c] *mn kg*	US herbicides expended[d] m^3
1961	..	..	..	..	..
1962	9	42	5	..	65
1963	15	78	5	..	283
1964	16	147	9	..	1 066
1965	60	1 369	23	286	2 516
1966	268	5 008	19	998	9 599
1967	449	9 377	21	1 965	19 394
1968	535	14 589	27	2 696	19 264
1969	539	19 414	17	2 561	17 257
1970	415	4 221	10	1 970	2 873
1971	239	1 381	6	1 453	38
1972	47	300	6	1 792	–
1973	..	219	..	543	–
Total	**(2 592)**	**46 145**	**18**	**14 265**	**72 354**

[a] The number of US military forces committed is from a US Department of Defense release of 19 March 1973 and represents numbers in South Viet-Nam on 30 June of each year.
[b] The number of US forces killed in action (K.I.A.) is from a US Department of Defense release of 28 November 1973 and represents all deaths resulting from hostile actions by enemy forces. These data therefore do not include the 1014 then missing in action (M.I.A.) nor do they include the 10320 military deaths not the result of actions by hostile forces.
[c] US munition expenditures from reference [30].
[d] US herbicide expenditures from reference [30].

proved to be particularly devastating to the environment on which a primarily agricultural population depends and a long-term hazard remains from the huge quantities of unexploded munitions remaining in the ground (see also chapter 4).

The Second Indo-China War is classed as a local war and the weaponry employed (with modest exceptions) as conventional. It was, however, an innovative war in that one of the great powers attempted to subdue the peasant peoples of several nations through the profligate use of remotely delivered and often technologically advanced weapons.

The Second Indo-China War—the longest and perhaps most costly of any war in which the USA has been involved—is a difficult one to summarize satisfactorily. Overt US involvement began quite subtly around 1961, built up slowly to a rather diffuse climax around 1968, and then trailed off inauspiciously during 1973 (see table 2.1). During this extended period, US armed forces attempted in South Viet-Nam to cope with a persistent and mobile enemy guerilla force numbering perhaps 600000 [2]. Throughout the war, the USA maintained physical, on-the-ground control of only a tiny fraction of South Viet-Nam. That portion, however, contained in its fragments the various important urban areas of the country and a large majority of its population. One of the underlying reasons for the enormous US investment

Table 2.2. Measures of US effort during the Second Indo-China War: munition data, by region

	On an area basis		On a population basis	
Region	US munition expenditure *kg/ha*	US herbicide expenditure *l/ha*	US munition expenditure *kg/capita*	US herbicide expenditure[a] *l/capita*
S. Viet-Nam	587	4.2	577	4.1
M.R. I	1 166	4.4	1 066	4.0
M.R. II	268	2.0	669	4.9
M.R. III	1 431	12.7	890	7.9
Without Saigon			1 833	16.3
M.R. IV	134	1.7	77	1.0
N. Viet-Nam	67	. .	57	. .
Cambodia	42	. .	113	. .
Laos	94	. .	773	. .
Total	**189**	**1.0**	**306**	**1.6**

[a] To convert any of the above herbicide volume data to average kilogrammes of active ingredients, multiply by 0.7569.

Source: Reference [30].

in munitions against South Viet-Nam was summed up quite well by Kipp, chief historian of the US Strategic Air Command. In an article aptly and bluntly entitled "Counterinsurgency from 30 000 Feet" [3a], Kipp begins with a quote from some US Army general asserting that "you don't fight this fellow rifle to rifle. You locate him and back away. Blow the hell out of him and then police up" [3b]. Kipp subsequently explains that "the unparalleled lavish use of firepower as a substitute for manpower is an outstanding characteristic of U.S. military tactics in the Vietnam war".

Elsewhere in Indo-China, the situation was rather different. The United States attempted no on-the-ground control of North Viet-Nam, and in Cambodia and Laos essentially only of their capital cities. The US wars against North Viet-Nam, Cambodia and Laos—mounted mostly from the air—were in large measure ancillary to and in support of its war against South Viet-Nam. Indeed, as shattering as the war was to each of the countries of Indo-China, it was South Viet-Nam that absorbed the major fury of the US assault, particularly its Military Region III (see table 2.2). It was South Viet-Nam that had to absorb 71 per cent of total US munition expenditures as well as virtually all of the chemical anti-plant agents and mechanized landclearing.

In North Viet-Nam (a region accounting for 8 per cent of total US munition expenditure), an attempt was made to destroy the modest industrial capacity and entire transportation system of that nation. This was done in order to prevent it from contributing to the war in South Viet-Nam either directly or as a conduit from elsewhere—or at least to impede such efforts to a significant extent [4–5]. Rather than the fields and forests—such common targets in South Viet-Nam—in North Viet-Nam it was the artifacts of man that were singled out for destruction, including the factories, power plants, railroads, bridges, docks, hospitals, schools, churches, dams, sea-walls and virtually all other permanent structures visible from the air. Only Hanoi and Haiphong were in large part spared. Several outside observers have described the systematic destruction they encountered in North Viet-Nam (see, for example, references [6–9]). The USA also bombed North Viet-Nam for reasons disarmingly referred to as "strategic persuasion" [5], a widely decried strategy (see, for example reference [10]). Still another authoritative objective of the bombing of North Viet-Nam was an attempt to bolster thereby the morale of the Saigon régime [11].

The long secret bombing campaign against Laos (16 per cent of total US munition expenditures) was in large part aimed at disrupting the supply routes to South Viet-Nam, the so-called Ho Chi Minh Trail [12–14]. The remainder of the Laotian and most of the Cambodian effort (the latter representing 5 per cent of total US munition expenditures) was to crush the dispersed enemy guerilla forces by remote control.

It thus appears evident that the USA was loath to commit its army to the sustained ground war (with its attendant high casualties) necessary to achieve a military victory over its enemies. Certainly its ground force in South Viet-Nam was far too small by traditional standards—by a factor of between three and ten—to attain such an end there. Indeed, as one indication of this, US monthly battle deaths were (as already noted) twice as high during the Korean War as during the Second Indo-China War, and fully 15 times as high during World War II. In the past, the USA attempted to compensate for this deficit in military manpower by occasional punitive ground raids (the so-called search-and-destroy missions); these were carried out most often in South Viet-Nam, sometimes in eastern Cambodia, and on rare occasions in southeastern Laos. However, the primary means for attempting to tilt the military balance in its favour was the employment by the USA of technologically sophisticated weapons and techniques and the lavish expenditure of remotely delivered munitions [15–16].

A number of the cost-intensive rather than manpower-intensive counterinsurgency techniques practised by the USA against its guerilla enemy in South Viet-Nam are especially important in the context of war-related environmental disruption. High on the list of inescapably anti-ecological tactics was forest destruction carried out primarily to deny the enemy freedom of movement, staging areas and cover in general. Another was repeated crop destruction, primarily to deny the enemy local sources of food and other resources. Still another was the continuing disruption of the supply lines from the surrounding countries, primarily to deny the enemy logistical, manpower and other support. And finally, there is the matter of forced relocation of indigenous civilians into the US-controlled areas, again denying the enemy logistical, manpower and other support.

Table 2.3. Measures of US effort during the Second Indo-China War: Indo-China casualties of war, by region

Thousands

Region	Mid-war population[a]	Killed[b]		Wounded[b]		Dis-placed
		Military[c]	Civilian	Military[c]	Civilian	
S. Viet-Nam	17 633	200	450	500	1 000	12 000
N. Viet-Nam	19 446	(750)	(50)	(1 500)	(100)	1 000
Cambodia	6 649	(10)	(150)	(20)	(300)	3 000
Laos	2 891	(40)	(50)	(80)	(100)	1 000
Total	**46 619**	**1 000**	**700**	**2 100**	**1 500**	**17 000**

[a] Population data are from reference [30].

[b] Casualty data are combined from reference [21] and reference [31]. Figures not available from either of these sources are estimated on the basis of insights gained from a number of sources (see references [21, 23–24]), these additions being identified with parentheses. One must hasten to add, however, that none of the above figures (with or without parentheses) is overly reliable.

[c] By way of comparison, the military casualties sustained by the USA (with its 1969 population of 201 million) were 46 000 killed in action, 153 000 wounded in action (with hospital care required), and 1 000 missing in action. There were an additional 10 000 accidental deaths [32].

By considering most of rural South Viet-Nam and its neighbours as a "free-fire zone"—perhaps 90 per cent—and, in fact, directing seemingly endless harassing and interdiction (H&I) strikes over the length and breadth of rural Indo-China, the USA was able forcibly to depopulate much of the region. J. Schell [17] reproduces the text of a leaflet which the USA would drop onto such regions that was meant to explain this strategy to the hapless local civilian residents. It ends with the warning that "those of you who choose to remain in the area will be considered hostile and in danger". As has been ferretted out by Kennedy [18–22] and others [23–25], this policy resulted in millions of Indo-Chinese deaths and maimings and in further millions of refugees (see table 2.3). At least 17 million people were driven off their ancestral lands by the destruction of their hamlets, fields and paddies and by the threat and actuality of continued bombing. In South Viet-Nam—where an estimated two-thirds of the population was displaced—this bombing and shelling were substantially reinforced by herbicidal crop destruction [26–27] and even to a certain extent by mechanized landclearing with so-called Rome ploughs.

Amongst other weapons used by the USA in Indo-China are a number of those currently being considered by the international community for possible prohibition under the Geneva Conventions [28]. These weapons include napalm and other incendiary weapons [29], very high-velocity, small-calibre rifle ammunition, small antipersonnel mines scattered indiscriminately from aircraft, flechettes, antipersonnel cluster bombs, fuel-air explosives, and so on. (Weapons such as these were the subject of a Conference of Government Experts held, under the auspices of the International Committee of the Red Cross, at Lugano, Switzerland from 28 January to 26 February 1976.)

The precipitous withdrawal of remaining US forces in March and April 1975 left large quantities of matériel in the possession of the new administration. It has been suggested that some of this matériel may be sold to international dealers while other equipment may be available to sympathetic forces elsewhere. In the meantime, C-130 aircraft have been used to transport supplies to Laos while personnel carriers with their armour removed have been used experimentally as heavy tractors. Sophisticated internal communications systems built by the USA are also believed to be in use.

The US withdrawal from the area also led to a process of reaccommodation between a number of the allies of the USA and the new régimes in Indo-China and also with China and the Soviet Union. In spite of considerable debate in the United States, no signs have appeared as yet to objectives; rather, efforts have been made to expand island bases (such as that at Diego Garcia) and long-range logistics capabilities to facilitate intervention anywhere on the globe without the same degree of dependence upon large bases subject to local political complications.

II. *Angola—a second Viet-Nam?*

In 1975—the same year that saw the end of the Viet-Nam War—the civil war in Angola escalated into an increasingly internationalized conflict, often referred to as a "second Viet-Nam".

When the last Portuguese troops left Africa, from Luanda on the eve of 11 November 1975, two Angolan states were proclaimed: the People's Republic of Angola, led by the socialist MPLA movement, and the People's Democratic Republic, led by the two rival anti-socialist FNLA and UNITA movements. The state of civil war between the MPLA and FNLA dates back to 1961, to the outbreak of the anti-colonial war. The third force, UNITA, was added to this inter-movement struggle in 1966.

The coup in Portugal in April 1974 led to the dissolution of its African empire. Guinea-Bissau became independent already in 1974, followed in 1975 by Cape Verde, São Tomé and Principe, and Mozambique. But in the case of Angola, the transition to independence brought on a renewal of the civil war, aggravated by great-power intervention.

In 1974 only UNITA was based inside Angola, but the movement was in a static condition with its supporters among the Ovimbundu people in the south. Its guerilla force was made up of 600 poorly armed men claiming no successes and no failures, no foreign aid, and no recognition from the Organization of African Unity (OAU).

The FNLA was in 1974 still based in Zaire, as it is today, claiming a guerilla force of some 15 000 among the Bakongo people and drawing its recruits from the Angolan refugees in Zaire. The movement had a number of camps along the Zaire–Angolan border and conducted occasional hit-and-run raids into Angola.

The MPLA was severely weakened by a leadership crisis, with a guerilla force of some 3 000, based in the Congo and Zambia. Dr Neto's position was seriously challenged and intra-movement fighting reached a point where the OAU considered withdrawing recognition.

One year after the coup in Portugal, the MPLA and FNLA each numbered around 20 000 men, according to Portuguese estimates, and UNITA claimed as many as 22 000 but only half of them armed.[1]

The foreign interests vested in the outcome of the war in Angola are not a new phenomenon, dating back to 1961, when the USA from the outset supported Holden Roberto's FNLA via Zaire. The MPLA secured Soviet military aid from 1964 when the movement had managed to reorganize after the initial disasters, and was conducting a successful military campaign. But the internationalization of the Angolan conflict pending independence took on much larger proportions than ever was the case for instance in Mozambique or Guinea-Bissau. One main reason for this internationalization was obviously the existence of the three movements, representing in fact two incompatible parties to the conflict. Another main condition lies in the fact that Angola constitutes a "prize" entirely unique, in comparison with the other Portuguese colonies. Angola's oil, mineral and agricultural resources are such that it is considered one of the richest countries in Africa—in the future it will be comparable with South Africa. Until 1974, coffee was the main export item, since surpassed by earnings from the export of crude oil. Most of it, some 8 million tons, came from the Cabinda enclave where Gulf Oil has 120 offshore wells. By 1974, the taxes and revenues paid by Gulf to the Angolan government made up 40 per cent of the budget income. The Cabinda reserves are generally estimated to be at least 300 million tons. On 1 August 1975, Cabinda was nominally declared independent from Angola by a movement called FLEC, which came into existence after the coup in Portugal and is reportedly supported by Zaire. The territory is held by the MPLA, however.

Angola is the world's fifth diamond exporter, with the Portuguese Diamang company holding a near-monopoly. The iron-ore deposits at Cassinga in southern Angola are said to be among the world's richest. The Krupp concern has invested in Cassinga together with German, Dutch, Australian and US banks. There are also deposits of copper, gold and titanium. Finally, the country's strategic position on the Atlantic side of the shipping route

[1] There are many other estimates of the size of the respective liberation movements. Many sources give the strength of the FNLA as 30 000 by the end of 1975, as against 15 000 for the MPLA. On the other hand, the military advances of the MPLA during the latter half of 1975 do not support reports of a decisive FNLA superiority.

round the Cape of Good Hope cannot have escaped the notice of foreign observers and aid donors.

Regional powers also have vested interests in Angola. The oil and mineral exports from Zaire and Zambia go through Angola. South Africa has paid most of the Cunene River (the Ruacana Falls) project undertaken in 1969 jointly with the Portuguese and an international consortium, on the Cunene River, which constitutes part of the border between Angola and South African-ruled Namibia. In terms of financial investment, the Cunene River project has not attracted so much attention as its counterpart, the Cabora Bassa project in Mozambique, and is usually referred to as a purely agricultural project. But the electricity from Cunene will supply energy also to the gigantic Rossing uranium mine in Namibia.

The general pattern of military aid to the FNLA and the MPLA shows that the big Western powers, China and South Africa are contributing to the FNLA, while the Soviet Union, Cuba and a number of East European states are providing military aid to the MPLA. Furthermore, the OAU has split on the Angolan issue, with the former Portuguese colonies, Algeria, Botswana, Guinea, Senegal and Somalia firmly on the side of the MPLA. The MPLA was also recognized by Viet-Nam, Syria and Brazil. Zaire remains the committed supporter of the FNLA. Recognition of the MPLA-proclaimed Angolan state on 11 November 1975 followed the same pattern as military aid to the MPLA: the Soviet Union immediately recognized the Luanda government, followed by the socialist bloc. The Scandinavian governments withheld recognition, pending a military victory, which is also the official policy line of the OAU, followed by several African states, such as Tanzania and Zambia. But no country, not even Zaire, has to date recognized the FNLA/UNITA government.

The details of foreign military aid to the warring parties in Angola will have to await future confirmation, but broadly the following is known.

During 1975, the amount of Soviet military aid to the MPLA was significantly increased, and subsequently highlighted through official US protests in the United Nations and elsewhere. This aid dates back to 1964, when the MPLA initiated armed operations in Cabinda, but up to 1974 the deliveries seem to have consisted only of small arms. From 1973 reports appeared that the MPLA was using the portable anti-aircraft missile SA-7, but no confirmation appeared until 1975. The small arms of Soviet origin in use with the MPLA forces include 3-inch mortars, recoilless cannons of which some are mobile, bazookas and light firearms [33].

There seems to have been a temporary halt in Soviet military aid following the coup in Portugal and pending the solution to the MPLA's inner controversies. In the summer of 1975, however, fresh reports appeared of armoured cars, some of Czech manufacture, in MPLA possession [34]. A few of these may have carried the AT-3 "Sagger" antitank missile.

From October 1975, Soviet arms supplies increased again. Several reports, including US intelligence reports, mention heavy supplies to the Congo, from where the equipment was transferred by airlift or ship to Angola. The arms included tanks, rocket-launchers and machine-guns [35].

The first reports of MiG-21 fighters also appeared in October. According to UNITA's leader Jonas Savimbi, about 12 planes were based outside Angola and intended for the MPLA [36].

Later reports stated that the 12 MiG-21s had been delivered to Luanda, and were piloted by the Portuguese Air Force who had undergone conversion training with the MiG-21 in Cuba. A further 20 MiG-21s are reportedly based in the Congo for the future MPLA Air Force.

Soviet military aid to the MPLA up to the end of 1975 was valued at $100 million by US sources, also reporting the presence of some 200 Soviet advisers in Luanda [37]. In addition to the aircraft, large airlifts in November brought in heavy artillery, armoured cars, 122-mm rockets and the SA-7 missile [38].

Cuban assistance follows a pattern established in Guinea-Bissau a few years earlier [39]. But Cuban military aid has been much more substantial in Angola and has been bitterly criticised by the United States. In October three Cuban ships were observed off the shore of Angola, reportedly delivering 49 lorries and armoured vehicles to the Congo harbour of Pointe Noire for transit to Luanda. The ships also brought 1 000 Cuban volunteers [40]. The exact number of Cuban military personnel in Angola was by the end of the year generally given as 6 000, but other estimates vary between 5 000 and 9 000 [41].

The FNLA is said to have received US and French weapons clandestinely via Zaire, in increasing amounts from the summer of 1975. The arms include a dozen French-designed Panhard armoured vehicles, heavy machine-guns and rocket-launchers [33].

France was said to have supplied arms and volunteers secretly to the FNLA, which brought a public denial from the French government. Some 2 500 whites, of whom many are French, were reportedly fighting on the side of the FNLA and UNITA [42].

US and NATO arms appeared in the field in August. In the same month, the FNLA claimed to have Mirage planes available, presumably in Zaire [43].

President Mobutu of Zaire subsequently stated that the Mirage 5 bombers in the Zaire Air Force would be put at FNLA service in a future combat against MiG-21s [44].

The FNLA embryo air force reportedly consisted of 450 men, including Portuguese personnel receiving helicopter training in Zaire. According to the FNLA, aircraft were promised by the UK, France, FR Germany and Spain. Two battalions of the so-called Portuguese Liberation Army, comprising supporters of the old Portuguese régime and anti-communist Portuguese Angolans, were serving with the FNLA [45].

By the end of the year, however, none of the movements had yet used any of these aircraft in combat.

During the autumn there were also reports of strong military aid from abroad to UNITA—which prior to 1974 received no weapons whatever—including, for example, armoured vehicles from Zambia [43].

The FNLA stands out as the sole Angolan movement to have received substantial Chinese backing, which further complicates the pattern of foreign interests in Angola. During President Mobutu's visit to China in early 1974, an agreement was signed for military aid to the FNLA in Zaire. According to this agreement, China sent 112 military instructors to Zaire to train FNLA guerillas who were to form a regular army division of up to 15 000 men. Of these, two-thirds were to be equipped with Chinese arms and the remainder would be fitted out by Zaire. In June and August 1974, the Chinese instructors arrived. Chinese arms supplies continued through the summer of 1975, but were then decreased and had virtually ceased by the end of the year, after having negatively influenced China's image in Black Africa.

Dr Kissinger asked Congress for an extra $18 million in arms aid for Zaire, but this was subsequently vetoed and the USA had by the end of the year found itself unable to escalate or openly come to the aid of the anti-communist movements in Angola.

The actual chronology of events in the war in Angola during 1975 follows the pattern of military aid.

On 15 January 1975, an independence agreement was signed between Portugal and the three liberation movements, setting the date of Angola's independence at 11 November. The interim government was composed of all three movements and the Portuguese military government, and a ceasefire was proclaimed. But there was in practice no actual ceasefire, and fighting resumed on a large scale already in March.

The FNLA enjoyed some military successes during the spring. Of the 500 000 white population in Angola, some 200 000 had left the country by August. During the battles between the MPLA and FNLA in May alone, some 4 000 dead were estimated [46]. The tide turned in favour of the MPLA from mid-1975, however; it was able to drive the other two movements out of Luanda. By October, the MPLA was in possession of 11 of the 16 cities, including all the ports, while the FNLA was back in its base area in the north and UNITA was besieged on the central highlands around the cities of Nova Lisboa and Silva Porto. By then it was evident that Balkanization of the country at independence was inevitable, insofar as it was clear that both the MPLA and FNLA intended to proclaim a government without actually controlling the whole country.

In August, South African troops crossed the border into Angola from Namibia. According to Secretary Brand Fourie of the South African Foreign Ministry, a 30-man patrol had been dispatched to protect the workers at the

Cunene River project 20 miles inside Angola, in the face of the escalating civil war. But according to the MPLA, a force of 800 South Africans were fighting against it on the side of UNITA in the south and this force was heading for the city of Sa da Bandeira, 150 miles north of the Namibian frontier. According to the MPLA this was a provocation undertaken with the approval of the USA, Zaire, the UK and FR Germany [42]. Sa da Bandeira was captured from the MPLA in October. The FNLA and UNITA set up a common front in the by now fully-fledged civil war. This front broke down later as a result of intra-fighting. Subsequently, the South African authorities have confirmed their involvement in Angola. Defence Minister P. W. Botha said at a press conference in Johannesburg on 27 November that the Soviet presence in Angola would be a threat to the Cape sea route, not only endangering South Africa's position but also world trade and the oil supply route between the Persian Gulf and the NATO countries [47]. According to official South African announcements, 11 soldiers were killed in Angola during November. By then several cities, including the vital harbour of Lobito, had been captured by UNITA jointly with the South African troops. The connection between FNLA/UNITA and South Africa was bound to have a negative influence on the Black African states. In December, the Nigerian government recognized the MPLA with the motivation that South Africa's fighting on the side of UNITA in Angola was enough to discredit the anti-communist side.

The reaction of the United States to developments in Angola has been increasingly intensive. From September, open warnings have been given to the Soviet Union and Cuba about further involvement in Angola. In the case of Cuba, this brought a reply by Dr Castro to the effect that Cuba would continue its aid to the MPLA as well as its foreign policy line in general without asking US permission. The US government has accused the Soviet Union of introducing great-power rivalry into Africa for the first time since the Congo civil war. The US ambassador to the United Nations, Daniel P. Moynihan, addressing the General Assembly on 8 December 1975, said that "Soviet military activities in Africa are aimed at colonizing the continent" [48].

Further, the US government has emphasized that it is not going to get militarily involved in Angola, but "if the subversion of Angola continues, it will be impossible for any government in Washington to remain indifferent and the reaction could have serious long-range consequences, which could more than off-set for Cuba and the Soviet Union the somewhat dubious benefits of their African adventure". [48]

The official Soviet reaction has involved no denial of its aid to the MPLA, defining the Angolan situation as one in which "imperialist neocolonial forces have started an intervention in Angola disguised as a Civil War" [49].

Consequently, in addition to regarding the Angolan civil war as the end of a colonial era, it may also be the beginning of an extensive new war in Southern Africa, involving other regional and outside powers. In any event, the solution of the Angolan war will be of significance to the remaining white-ruled states in the region, that is, to Rhodesia, Namibia and the Republic of South Africa. By the end of 1975 it seemed as if the sole solution will have to be a military victory by one or the other side. UN intervention is not wanted and the OAU summit meeting in early 1976 failed to reach any agreement whatever on Angola.

By then, however, it was still unclear if the United States would finally decide to extend open military aid to the FNLA, and whether the South African troops were to be withdrawn or not. A complete military victory by the MPLA in 1976 may thus either pacify the area or lead to an even more serious escalation.

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3. The arms build-up in the Middle East

I. *Introduction*

Throughout the post-war period the area generally known as the Middle East has been a focal point of international attention. The region has long been regarded as strategically important both geographically, as the link between Europe, Asia and Africa, and increasingly over time, as a major source of oil supplies. The area was marginally involved in World War II but was directly and continuously involved in the subsequent Cold War with the bitter Arab-Israeli dispute providing a situation which the major powers were long inclined to exploit rather than attempt to resolve.

These circumstances, together with historical regional tensions and rivalries, have produced an exceedingly rapid and enduring expansion of the military forces in the countries of the region. Until quite recently the arms race and repeated wars between the Arab countries and Israel focussed attention on the area. This competition continues with undiminished vigour but it has recently been supplemented by an even more spectacular arms build-up in the countries of the Persian Gulf area, largely as a result of the huge increase in oil revenues which greatly reduced financial restrictions on national ambitions.

II. *Military expenditure*

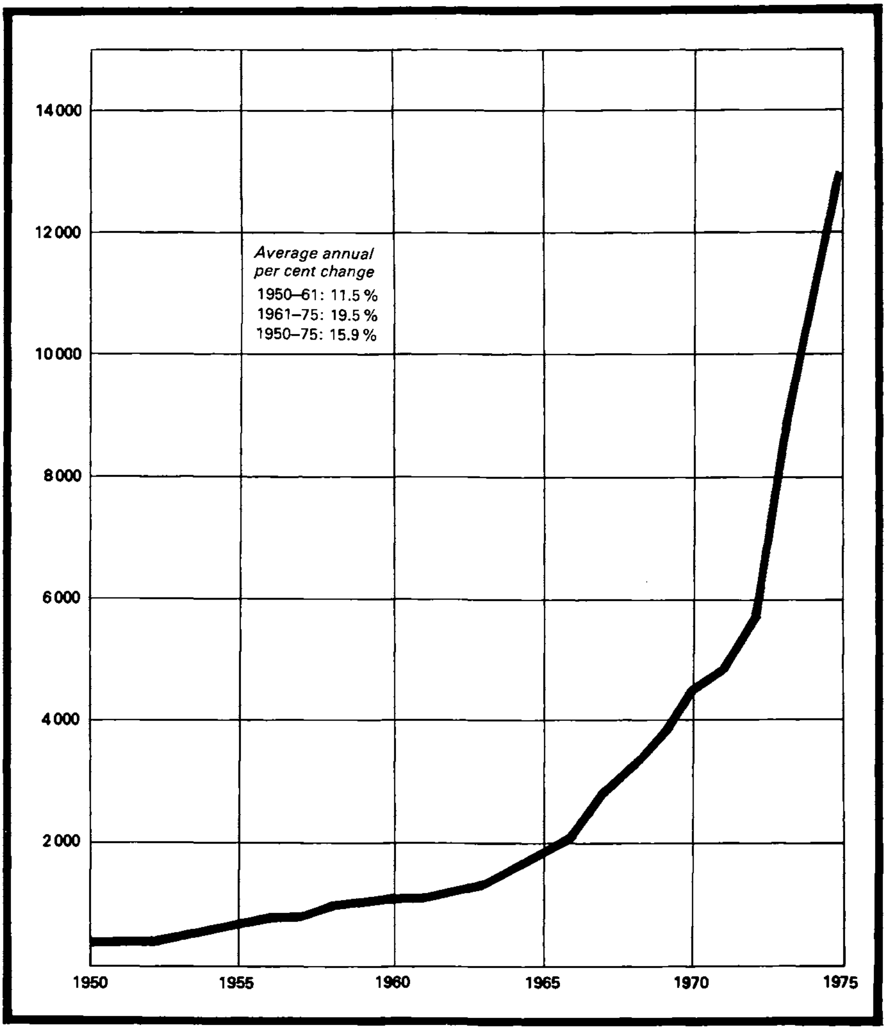
In 1974 (the most recent year for which relevant data are available) per capita gross national product (GNP) for the Middle East region as a whole was about $845 and per capita military expenditure about $135. In other words, nearly 16 per cent of the combined GNPs of the Middle East countries was being devoted to military purposes. This extraordinary degree of militarization is the result of a steep and virtually uninterrupted upward trend in military expenditures over the past 25 years (see chart 3.1).

On the average, the quantity of financial resources devoted to armaments in the Middle East has increased at an annual rate of nearly 16 per cent since 1950. Between 1950 and 1961 the average annual rate of increase was comparatively modest at 11.5 per cent, although even this rate was nearly double the world average over the same period (6.3 per cent). Since 1961, however, the average annual rate of increase has been 19.5 per cent, or about seven times the world average for the same period (2.8 per cent).

There is no parallel in the post-war period for sustained rates of increase in real military expenditure such as these. To find a comparable rate of

Chart 3.1. Military expenditure in the Middle East, 1950–1975

US $ mn, at constant (1970) prices

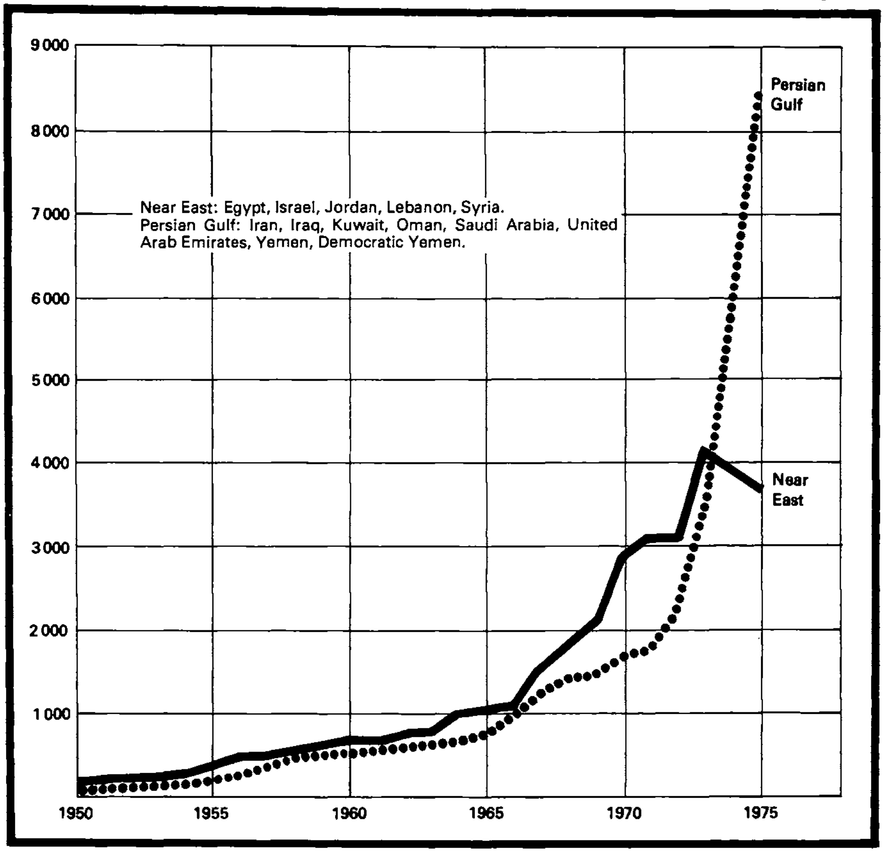


escalation in the resources devoted to military uses it is necessary to go back to the arms race that preceded World War II when the major industrial powers tripled their combined military expenditures in the five-year period 1933–38.

Chart 3.2 shows the relative trends of military expenditure in the Near East (the countries more or less directly involved in the Arab-Israeli dispute) and in the Persian Gulf area. Although this division is to some extent arbitrary, chart 3.2 reveals a number of points of interest. First, the level and trend of military expenditure in the Persian Gulf have not lagged significantly behind that of the Near East except for the period 1966–72. Despite this, however, the cumulative value of arms imports by the Near East over the period

Chart 3.2 Military expenditure in the Near East and the Persian Gulf, 1950–1975

US \$ mn, at constant (1970) prices



Source: Appendix 6A.

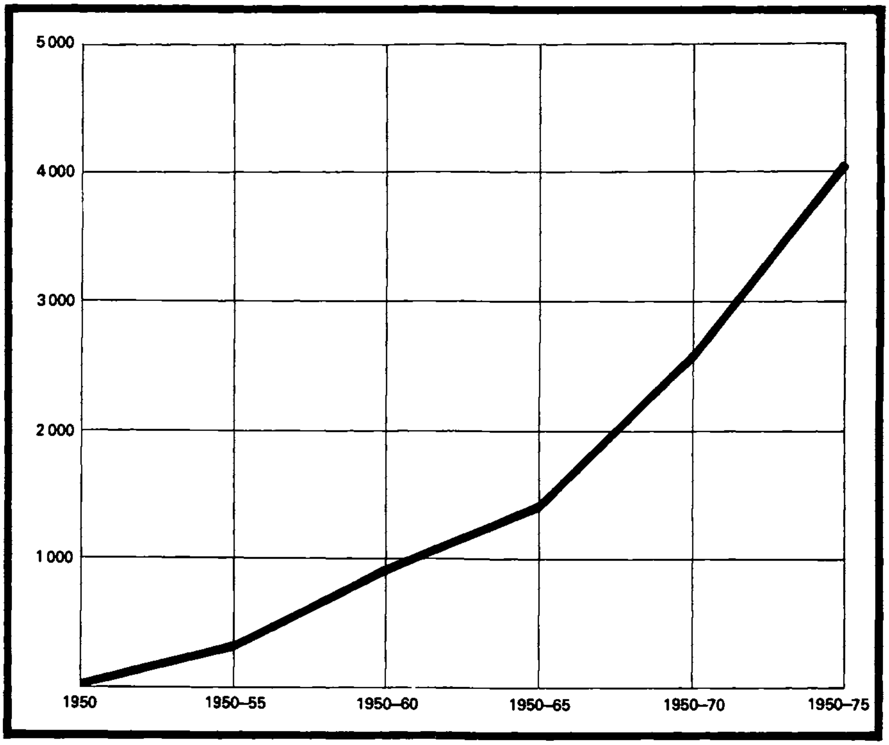
1950–75 exceeds that by the Persian Gulf by a factor of nearly 2:1. The reason for this, of course, is that the Near East countries—particularly Israel, Egypt and Syria—have received huge quantities of arms on a grant or concessionary basis. In addition, Egypt and Syria have received substantial financial assistance from the oil-rich Arab states.

A second point of interest is that a significant acceleration of military expenditure in the Persian Gulf began as early as 1966, long before the oil crisis and the large increase in oil revenues. Nevertheless the impact of the latter development is still readily apparent.

III. *Military arsenals: quantitative and qualitative aspects*

Quantitatively the flow of weapons into the Middle East has been extremely large, the result of rapidly increasing regional military budgets and intense

Chart 3.3. Cumulative deliveries of jet combat aircraft (excl. trainer versions) to the Middle East, 1950–1975



Source: SIPRI arms trade registers.

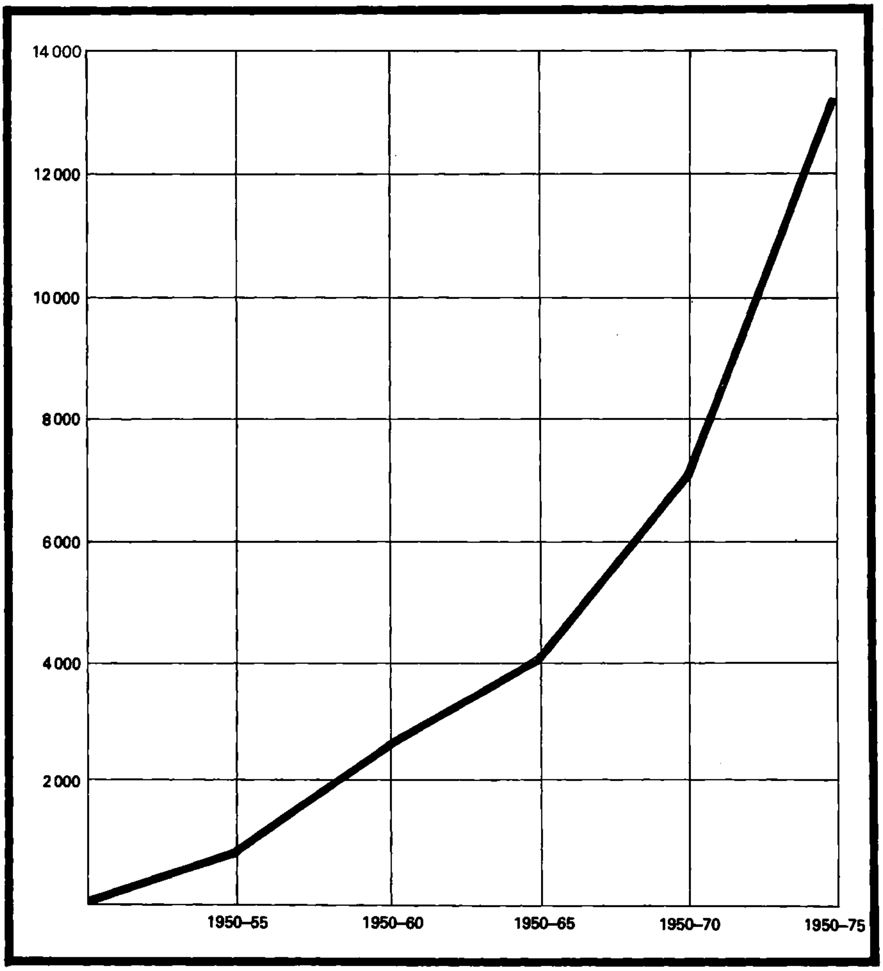
great-power rivalry yielding large weapon transfers on a grant or concessionary basis. SIPRI arms trade records show that about 4 100 jet combat aircraft (excluding trainer versions of combat types) were transferred to Middle East countries between 1950 and 1975 (see chart 3.3). Similarly, cumulative deliveries of heavy, medium and light tanks amount to about 13 500 (chart 3.4).

To establish existing force levels of these weapons is considerably more difficult. Over a 25-year period equipment wears out and is destroyed in accidents. Also the Middle East region has experienced three major wars, all of which involved heavy losses of equipment. And finally, of course, the arsenals are not static due to deliveries of new equipment and the transfer of older equipment both within and out of the region. Nevertheless it appears that operational jet combat aircraft in the Middle East numbered about 2 300 at the end of 1975; the equivalent number for tanks was approximately 10 500.

To give these force levels some perspective it can be pointed out that they compare favourably with NATO forces in Europe: approximately 3 000 tactical aircraft and 12 250 main battle tanks.

Apart from their huge size, the other striking feature of the military arsenals in the Middle East is the high proportion of up-to-date equipment despite the

Chart 3.4. Cumulative deliveries of tanks (main battle and light) to the Middle East, 1950–1975



Source: SIPRI arms trade registers.

fact that no country in the region (with the partial exception of Israel) has any indigenous capacity to develop and manufacture major weapons (see appendix 6E). In fact, the introduction of successive generations of major conventional weapon systems into the region has been just as rapid as in the countries developing these weapons. Furthermore the delay between the introduction of a new weapon in the originating country and its delivery to one or more Middle East countries appears to have steadily diminished. In some cases there has been essentially no delay, the outstanding examples being the Soviet MiG-23 and the US F-14 and F-15 fighters.

Tables 3.1 and 3.2 show the range of jet combat aircraft and missile systems introduced into the Middle East over the past 25 years. These tables have been arranged to emphasize the continuous upgrading of the arsenals and the

Table 3.1. Major jet combat aircraft introduced into the Middle East, 1950–1976

Designation	Description	Supplier country/ year first operational	Middle East country/ year of initial delivery
Meteor	Fighter	UK/1945	Egypt/1950, Israel/1953, Syria/1953
Vampire	Fighter	UK/1946	Egypt/1953, Iraq/1953, Lebanon/1953, Jordan/1955, Saudi Arabia/1957
F-84 Thunderjet	Fighter	USA/1947	Iran/1956
MiG-15 Fagot	Fighter	USSR/1948	Egypt/1955, Syria/1955, Iraq/1958
Il-28 Beagle	Light bomber	USSR/1949	Egypt/1955, Iraq/1959, Syria/1963 .
F-86 Sabre	Fighter-bomber	USA/1949	Iraq/1955, Saudi Arabia/1957, Iran/1959
MiG-17 Fresco	Fighter	USSR/1952	Egypt/1957, Syria/1957, Iraq/1958, South Yemen/1969
Ouragan	Fighter	France/1952	Israel/1955
Hunter	Fighter	UK/1954	Iraq/1957, Lebanon/1957, Jordan/1958, Kuwait/1964, Saudi Arabia/1966, Abu Dhabi/1970, Qatar/1971
MiG-19 Farmer	Fighter	USSR/1955	Iraq/1960, Egypt 1961
Tu-16 Badger	Medium bomber	USSR/1955	Egypt/1962, Iraq/1962
Mystère IV A	Fighter	France/1955	Israel/1955
Vautour II A	Fighter-bomber	France/1956	Israel/1957
Vautour II B	Light bomber	France/1956	Israel/1960
A-4 Skyhawk	Attack	USA/1956	Israel/1968
Super Mystère	Fighter	France/1957	Israel/1959
F-104 Starfighter	Interceptor	USA/1958	Jordan/1967
MiG-21 Fishbed	Fighter	USSR/1959	Egypt/1962, Iraq/1963, Syria/1967
Su-7B Fitter A	Attack	USSR/1959	Egypt/1967, Iraq/1967, Syria/1969
Lightning	Interceptor	UK/1960	Saudi Arabia/1966, Kuwait/1968
F-4 Phantom	Fighter-bomber	USA/1961	Iran/1968, Israel/1969
Mirage III	Fighter	France/1961	Israel/1962, Lebanon/1968, Egypt/1974, Saudi Arabia/(1975)
F-5A Freedom Fighter	Light fighter	USA/1963	Iran/1965
Su-11 Fishpot C	Interceptor	USSR/1966	Syria/1975
Mirage V	Fighter-bomber	France/1968	Abu Dhabi/1973
MiG-23 Flogger	Fighter	USSR/1971	Syria/1973, Iraq/1974, Egypt/1975
Su-17 Fitter C	Attack	USSR/1972	Egypt/1972
Mirage F-1	Fighter	France/1973	Kuwait/1976
F-5E Tiger II	Light fighter	USA/1973	Iran/1974, Jordan/1975, Saudi Arabia/1975
Kfir	Fighter	Israel/1974	Israel/1974
F-14 Tomcat	Fighter	USA/1974	Iran/1976
F-15 Eagle	Fighter	USA/1975	Israel/1976

Source: SIPRI arms trade registers.

speed with which new systems have been introduced into the Middle East. Even so they only tell half the story. Many of the aircraft and missile systems listed have been subject to continuous development and improvement in the originating country and Middle East countries have frequently acquired successive models.

A few examples will illustrate this. The F-4 Phantom aircraft acquired by Iran in 1968 were "D" models which became operational in the USA in 1966. Subsequently Iran and also Israel acquired the "E" model which became operational in the USA in 1968. Israel currently operates three models of the Skyhawk—the A-4E, A-4F and A-4N. These versions became operational in the USA in 1962, 1967 and 1972, respectively. The same applies to several other aircraft and missile systems including the Soviet MiG-21 and French Mirage III/V fighter and the Soviet SA-2 Guideline surface-to-air missile.

Table 3.2. Missile systems introduced into the Middle East, 1956–1976

Type	Designation	Range *km*	Supplier country/ year first operational	Middle East country/ year of initial delivery
Surface-to-surface	Frog-3, unguided	45	USSR/(1960)	Egypt/1968
	SS-1C, Scud mobile	725	USSR/1963	Egypt/1973, Syria/1974, Iraq/1975
	Frog-7, unguided	60	USSR/1965	Egypt/1971, Syria/1973
	Lance mobile	140	USA/1972	Israel/1975
Ship-to-ship	Styx	40	USSR/1959	Egypt/1962, Syria/1966, Iraq/1972
	Sea Killer	25	Italy/(1971)	Iran/1971
	Gabriel	41	Israel/(1971)	Israel/1971
	Exocet	70	France/1973	Iran/1976
Surface/ ship-to-air	SA-2 Guideline mobile	50	USSR/1958	Iraq/1962, Egypt/1963, Syria/(1967)
	MIM-23A Hawk mobile	35	USA/1959	Israel/1963, Iran/1964, Saudi Arabia/1966
	Thunderbird I mobile	(60)	UK/1960	Saudi Arabia/1966
	SA-3 Goa	30	USSR/1961	Egypt/1970, Syria/1972, Iraq/1972
	Seacat shipborne	5	UK/1962	Iran/1966
	FIM-43A Redeye portable	(3)	USA/1964	Israel/(1975), Jordan/1976
	SA-4 Ganef mobile	70	USSR/1964	Egypt/(1973)
	SA-7 Grail portable	10	USSR/(1966)	Egypt/1973, Syria/(1973)
	MIM-72 Chaparral mobile	(18)	USA/1967	Israel/1974
	SA-6 Gainful mobile	60	USSR/1970	Egypt/1972, Syria/1973
	Tigercat mobile	5	UK/1970	Iran/(1969), Jordan/(1969), Qatar/1970
	Crotale mobile	9	France/1971	Saudi Arabia/(1975)
	Rapier mobile	(6)	UK/1971	Iran/1971
	MIM-23B Hawk mobile	46	USA/1973	Iran/1975, Saudi Arabia/(1975), Kuwait/(1975), Jordan/1976
	Blowpipe portable	3	UK/1974	Israel/(1976)
	SA-9 Gaskin mobile	short-range	USSR/1974	Syria/(1975)
Air-to-surface	AS-1 Kennel	100	USSR/1956	Egypt/(1961)
	AGM-12 Bullpup	11–17	USA/1959	Israel/1969
	AS.30	12	France/1961	Israel/1962
	AGM-45 Shrike	(16)	USA/1964	Israel/1970
	AS-5 Kelt	320	USSR/1968	Egypt/(1971)
	AGM-65 Maverick	26	USA/1973	Israel/1973, Iran/(1974), Saudi Arabia/(1975)
Air-to-air	AIM-7 Sparrow III	medium-range	USA/1958	Iran/1968, Israel/1969
	Atoll	short-range	USSR/(1960)	Egypt/1962, Iraq/(1963), Syria/1967
	AIM-9B Sidewinder	short-range	USA/1962	Iran/1968, Israel/(1972), Jordan/1975, Saudi Arabia/1975, Kuwait/1976
	R.530	medium-range	France/1963	Israel/1966, Lebanon/1968, Egypt/1974, Saudi Arabia/(1975), Kuwait/1976
	Red Top	medium-range	UK/1963	Saudi Arabia/(1966), Kuwait/1968
	Anab	short-range	USSR/(1964)	Syria/1975
	Shafrir	(short-range)	Israel/(1969)	Israel/(1969)
	AIM-54 Phoenix	long-range	USA/1974	Iran/1976
Antitank	SS-10 manually guided	1.5	France/1956	Israel/1956
	Entac manually guided	2.0	France/1957	Israel/1963
	SS/AS-11 manually guided	3.0	France/1958	Israel/(1963), Iran/1970, Abu Dhabi/1975, Kuwait/1975, Lebanon/1975, Saudi Arabia/1975
	AT-1 Snapper manually guided	2.3	USSR/(1960)	Egypt/1962, Syria/1972
	Cobra manually guided	1.6	FR Germany/(1961)	Israel/1962
	SS/AS-12 manually guided	6.0	France/1962	Iran/1970, Egypt/1974

ype	Designation	Range km	Supplier country/ year first operational	Middle East country/ year of initial delivery
	Vigilant manually guided	1.4	UK/(1963)	Kuwait/1962, Saudi Arabia/1964
	Harpon semi-automatic	3.0	France/1964	Abu Dhabi/1975, Kuwait/1975, Saudi Arabia/1975
	AT-3 Sagger manually guided	3.0	USSR/(1965)	Egypt/1972, Syria/1972
	Swingfire semi-automatic	4.0	UK/1969	Iran/1974
	BGM-71 TOW semi-automatic	3.0	USA/1970	Iran/1971, Israel/1973, Jordan/1974, Kuwait/1975, Lebanon/1975, Oman/1975

ource: SIPRI arms trade registers.

It is clear that, in terms of major conventional weapon systems, the Middle East arsenals are among the most up-to-date in the world. Of the 2300 front-line combat aircraft mentioned earlier, well over one-half are new-generation MiG-23s and F-5Es and late-model MiG-21s, F-4s, A-4s and Mirage IIIs. Similarly nearly one-half the number of tanks are current types—T-62, M-60, AMX-30 and Chieftain. However, in recent years several Middle East countries have gone beyond the acquisition of advanced major weapons to seek military capabilities usually associated only with the major powers and weapons and equipment that are representative of the current frontiers of military technology. Examples of the former include tankers for the aerial refuelling of combat aircraft (Iran and Israel) and the large-scale use of helicopters both for troop mobility and antitank warfare (Iran, Israel and probably Saudi Arabia in the near future). Examples of the latter are sophisticated airborne early-warning systems (the E-2C Hawkeye aircraft for Israel and either the E-2C or the E-3 AWACS aircraft for Iran); TV-guided and laser-guided air-to-surface missiles and unpowered bombs (Israel, Iran and Saudi Arabia); electronic countermeasure and counter-countermeasure systems (Israel); and the battlefield use of remotely piloted vehicles (Israel).

Israel and Iran are in the vanguard of this movement but several other countries in the region are clearly determined to go in the same direction. The point has now been reached that in the USA military officials are endeavouring to frustrate Israeli attempts to acquire, for example, the ALQ-119 aircraft-mounted radar-jamming pod and advanced digital processors for the rapid tuning and directing of jammers against multiple or frequency-hopping radars. The latest systems in these areas are the result of ten to 15 years of research and development work and military officials are understandably reluctant to see this new technology disseminate as soon as it becomes available, particularly to so volatile a region as the Middle East. A related concern in the case of Israel is the country's demonstrated ability to modify and improve imported weapons and equipment and thereby offer competitive systems in the international market for arms.

IV. *Defence industry and military infrastructure*

Throughout the post-war period the countries of the Middle East have been utterly dependent on external sources for their armaments. This is still true at the present time and will undoubtedly remain true for the foreseeable future. Nevertheless several countries are determined to reduce this dependence, and to base their military capability to the extent possible on indigenous facilities.

Israel is by far the most advanced in this regard with an indigenous capability to maintain, overhaul and repair virtually all its military equipment. In addition, it has a significant and growing indigenous weapon development and production capability. In Egypt a major expansion in the defence industry is planned through the Arab States Military Industrial Organization with an aircraft assembly and repair plant in Egypt and related facilities in other participating countries, notably Saudi Arabia.

In Iran virtually every major weapon deal concluded in recent years has included the establishment of an appropriate maintenance and repair facility and the training of Iranian personnel in the relevant skills. This has been the case with the F-14 Tomcat fighter, the AH-1J attack and B.214A utility helicopters, and the Phoenix long-range air-to-air missile. Similarly, if Iran concludes the deal for an additional 1 200 Chieftain main battle tanks it plans to produce these under licence.

As a final indication of the clear determination of some Middle East countries to acquire a comprehensive military capability over the long term, mention must be made of the large military infrastructure projects under way or planned. In the Persian Gulf area, particularly in Iran, huge sums are being spent on army, air force and naval bases, headquarters and command centres and communication networks.

V. *Future developments*

Although oil revenues, which directly or indirectly support the armament programmes of nearly all the Middle East countries except Israel, have not increased as rapidly as expected, all existing contracts for weapons and equipment will almost certainly be carried through. And as appendix 6F shows, existing commitments are very extensive indeed.

In 1976 three new combat aircraft will enter Middle East arsenals for the first time—the F-14 Tomcat to Iran, the F-15 Eagle to Israel and the Mirage F-1 to Kuwait. Deliveries will continue of (*a*) MiG-23, MiG-21, F-4E, A-4E, F-5E and Mirage III combat aircraft, (*b*) T-62, M-60, AMX-30 and Chieftain main battle tanks and Scorpion light tanks, (*c*) missile systems of nearly all varieties—surface-to-surface, surface-to-air, air-to-surface, ship-to-ship, air-to-air and antitank and (*d*) a large assortment of helicopters, trainers, transport aircraft and light strike/COIN aircraft.

On the whole, naval forces have not been emphasized, with ongoing and imminent deliveries consisting mostly of fast patrol craft with both gun and missile armament. Israel will soon receive three coastal submarines reportedly equipped with Blowpipe short-range anti-aircraft missiles. Iran, however, constitutes a very significant exception with six ocean-going submarines, four 7 800-ton "Spruance"-class destroyers and 12 missile-armed patrol boats on order together with two 2 500-ton logistical support ships and one 11 000-ton fleet replenishment vessel under construction. These units will supplement what is already by far the largest navy in the Persian Gulf. To support its existing and prospective fleet Iran is constructing a large naval complex at Chah Bahar on the Arabian Sea. Perhaps in response to these developments, Saudi Arabia, which currently has virtually no naval forces, has contracted for the construction of two naval bases, and is negotiating with the USA for the acquisition of 19 naval vessels, including destroyers, frigates and missile-armed patrol boats.

VI. *Conclusions*

The arms build-up in the Middle East shows every sign of being out of control. The futility of attempts to avoid conflict by trying to preserve a dynamic military balance between opposing parties has been amply demonstrated by the three Arab-Israeli wars. The complexity of the present situation has in any case reduced the feasibility of maintaining some form of balance virtually to zero unless, of course, the arms-supplying countries—particularly the USA, the USSR, France and the UK—all agreed to stop or limit their supplies.

The whole Middle East region is in a state of extreme flux as many of the countries embark on ambitious programmes to modernize and industrialize their societies. Thus, massive structural and societal changes will take place together with very large and growing military arsenals. Both these phenomena increase the probability of regional instability and conflict. Certainly the continued unrestrained sale of armaments can only exacerbate an already dangerous situation.

4. Environmental and ecological warfare[1]

Square-bracketed numbers, thus [1], *refer to the list of references on page 85.*

I. *Introduction*

War has two main impacts on the environment.[2] One is the damage done during fighting, either deliberately or incidentally. Deliberate damage may be caused to deny cover to enemy troops, to destroy food crops, to terrorize the population and so on. The other is the deliberate use of artificial changes in the environment as a method of warfare. For a number of reasons, there is increasing concern about both of these phenomena, even though currently the former is a considerably more real danger than the latter. Concern about the possible development of environmental weapons, is, however, certainly justified because of ongoing efforts to produce such artificial environmental effects as the modification of weather (by, for example, influencing the production of rain, fog or hail). Even if these effects are being developed initially for peaceful purposes, they clearly may have military applications.

One reason for current interest in the impact of war on the environment is simply the general widespread concern for the biosphere. Another is that recent wars, particularly those in Indo-China, have dramatically demonstrated just how devastating modern warfare can be to the environment. The use of herbicides and defoliants to destroy nearly one-half of the forest of South Viet-Nam was the first time the biosphere had been systematically assailed for military purposes. Yet another reason is that discussions about an international treaty to ban environmental methods of warfare have focussed attention on the issue (see chapter 8, section IV).

Although the understanding of the mechanisms of some of the methods of environmental modification has not advanced to the stage where their short- or long-term ecological effects can be predicted, the potential use of such modifications as weapons of war has already been realized, to some extent, in weather modification. Rainfall can be produced, or increased or decreased by seeding clouds with suitable chemicals. The technology of increasing rainfall has reached a certain degree of maturity as indicated by the rain-making missions flown during the war in Southeast Asia. In fact, a classified rain-making programme was conducted in

[1] This chapter is based on papers by B. M. Jasani, R. Huisken, M. Lumsden and J. Goldblat in *Ambio*, Vol. IV, No. 5–6, 1975.
[2] On the use of raw materials for military purposes, see appendix 4 C.

Southeast Asia from 1967 to 1972, seeding clouds from the air, using silver and lead iodide to increase normal monsoon rainfall [1].

Most of the research concerning environmental modification[3] has been done on weather modification. Recently the effects caused by the depletion of the ozone layer surrounding the earth have also received considerable attention.

II. *Weather and climate modification*

Man has modified the atmosphere purposely and also inadvertently by his activities on earth. In the latter case weather and climate modification has been brought about by changing the character of the earth's surface, by adding energy to the atmosphere from artificial sources and by adding matter to the atmosphere. The effect of changing the surface character of the earth, first, alters the way in which solar radiation is absorbed at the earth's surface and retransmitted to the atmosphere. Second, changes in the frictional resistance to the wind occur. The addition of energy to the atmosphere is caused mainly by the burning of fossil fuels. Matter is added to the atmosphere by combustion and by many other activities such as a number of industrial and agricultural practices. All of these processes have been proposed, and some of them have also been tried, for intentional modification of the weather and climate.

This interest shown in recent years in the deliberate modification of weather and climate has attracted considerable attention. Until about a decade or so ago, interest was directed purely toward the peaceful applications of such modifications but a considerable amount of research has been carried out recently in the use of methods of weather and climate modification as weapons of war.

Weather modification

Rain and snow modification

It is possible to modify rainfall or snowfall only under certain conditions. It has been suggested that rain or snow modification could be used in warfare as either a tactical or a strategic weapon. In the former case it might be used as a direct weapon. Increasing the rainfall, for example, could interfere with the movement of troops and supplies. Increasing the snowfall by cloud seeding in mountainous areas could make transport and communications in such areas more difficult. As a strategic weapon, rain could be modified by cloud seeding over a long period over one's

[3] For a more detailed study of environmental modification, see Jasani, B. M., "Environmental Modifications—New Weapons of War?", *Ambio*, Vol. IV, No. 5–6, 1975.

own country, so that rainfall could either be increased or decreased in neighbouring states when the seeded clouds pass over them. However, controlled precipitation is not always possible and successful, as seen in Viet-Nam (see appendix 4A).

Weather modification does not consist in the modification of rain alone, but also fog, hail, severe storms, cloud electricity and lightning modifications.

Fog modification

Two forms of fog exist: warm fog in which droplet temperature is above 0°C and cold fog in which the droplets are in supercooled condition and their temperature is at or below 0°C. There are three techniques used to modify fog. The first is based on seeding, the second on heating and in the third technique, warm and drier air is forced to mix with the moist air in the fog.

To dissipate warm fog usually either hygroscopic particles, solution drops, or both are used. In order to dissipate cold fog, it is usually sprayed with dry ice, silver iodide, solid carbon dioxide or liquid propane.

Besides these, there are other methods, such as the use of lasers and the injection of ions or charged drops into the fog to disperse it.

Some of the above methods have been successfully used to dissipate supercooled fog. In such cases as large airports, the use of propane from the ground is favoured to dry-ice seeding. However, warm fog is much more frequent, so that considerable effort is being put into developing methods for its dissipation. The three methods mentioned above are being investigated thoroughly. The helicopter down-wash mixing method is a simple and inexpensive one but it is limited to situations where small clearings are required. Hygroscopic particle seeding is useful but not for all warm fogs. The seeding equipment is inexpensive but the seeding material is costly and the seeding procedure difficult. The thermal technique, although very costly, is effective on all warm fog.

The control of ice fog depends on how man controls sources of moisture and nuclei which lead to its formation. At present it is not possible to dissipate ice fog once it has formed.

Fog is formed when moist air is cooled. As the humidity approaches saturation point, small water droplets obscure visibility. This suggests some possible methods of artificially producing fog. For example, if heat is removed from the atmosphere, the humidity of the air will be raised to near-saturation. But this method requires large amounts of energy and is cumbersome. On the other hand, where the relative humidity is well below 100 per cent, fog could be produced using hygroscopic seeding materials. The hygroscopic particles, because of their affinity for water vapour, will initiate condensation. In both these methods, the likelihood of fog formation will depend considerably on wind conditions.

As a weapon of war, fog control is envisaged as a tactical weapon. If fog is generated, for example, along coasts or major roads, enemy traffic could be impeded. In conjunction with other weapons, fog could be created and used as a screen for moving troops and supplies. On the other hand, dispersal of fog may assist bombing missions or rescue operations.

It can be seen from the discussion about the technology of fog modification that the natural constraints and imperfect technology limit the use of fog modification as a weapon.

Hail modification

At a recent meeting in Moscow, the Soviet success in modifying hail clouds for peaceful purposes was described and it may well be that it is this success that has stimulated Soviet interest in the prohibition of environmental weapons [2]. It was claimed that some four million hectares of crops are currently being protected by hail suppression. Hail-formation zones in clouds approaching the protected areas are detected by radar at ranges of up to about 40 km. Anti-aircraft guns and missiles fire explosives and substances into the clouds to stimulate the crystallization of supercooled drops and thereby to prevent the formation of large hailstones. According to Fyodorov, the technique reduces hail damage by four to five times.

Lightning modification

Lightning causes considerable damage, particularly by igniting fires. In a thunderstorm, positive and negative electric charges are produced, the former being transported upwards and the latter downwards. The reasons for such polarization are not yet clearly understood, but there is some evidence suggesting that the ice phase plays an important role in the generation and distribution of these electric charges. The charges are neutralized periodically by lightning, which occurs when the electric field in the cloud or in the surrounding air reaches a critical value.

Basically, three methods have been used in attempts to modify the intensity and frequency of lightning flashes. The first method consists of cloud seeding with silver iodide from ground-based generators. The technique is based on the idea that the ice crystals which result from the seeding will serve as additional points for corona discharge, thus increasing the leakage current between the two charge layers. However, it is equally possible that the increased number of ice crystals might lead to an increase in the rate of generation of the electric charges. The results obtained with this technique are, however, not yet conclusive.

The second method is based on the same principles as above, but instead of seeding the cloud to produce ice crystals, millions of tiny metallic needles are released into a thunderstorm. It has been shown that this method increases corona discharge, but no positive indications are obtained as to the reduction of lightning.

Some results from very limited, early (1960s) experiments showed that lightning could be modified by cloud seeding. Modification of lightning by chaff seeding is still in its infancy. The problems are still not fully understood.

The third method is based on sudden perturbation of the electric field. A method based on this principle has been used, in which lightning is triggered artificially by launching small rockets carrying a thin steel wire, one end of which is connected to the ground [3–4].

Use of lightning modification has been suggested as a means of tactical warfare. Lightning could be made to strike enemy positions where there are large concentrations of men or war material. But such use is not feasible at present since the mechanism of lightning itself is very poorly understood. The limited frequency and extent of thunderstorms also make lightning modification a very dubious weapon of war.

Modification of severe storms

The interest in the control of severe storms arises from the fact that they are among the most destructive of all natural phenomena, causing enormous amounts of damage to property and lives. There are two types of such storms, tornadoes and hurricanes.

Modification of tornadoes. Tornadoes are the more violent of these storms but they are of small diameter, do not last long and the destruction caused by them is confined to a narrow track. The energy stored in tornadoes is, however, very large—equivalent to some 50 kt of TNT. They consist of violently rotating columns of air in contact with the ground and they also produce hail and lightning.

Very little is known about tornadoes at present, and therefore not many attempts have been made to modify them. Some possible ways of modifying them have, however, been suggested. One method consists in modifying the flow of wind close to the surface of the earth and another method consists in altering the precipitation processes by seeding.

Hurricane modification. Of the two types of storms, hurricanes are the more destructive. The energy stored in a hurricane could be of the order of 1 000 mt of TNT. For example, during the 1960s, each of the two hurricanes Betsy (1965) and Camille (1969) caused, in the United States, damage worth more than $1 000 mn [5]. Hurricanes are formed over warm tropical waters and begin dissipating soon after moving over either cool water or land.

There are two basic features of hurricane formation which are important from the point of view of their modification. One is the fact that the transfer of latent heat from the sea surface to the air inside the storm is essential if a hurricane is to reach and retain significant intensity. The second feature is that the energy of the hurricane is released by convection in highly organized convective scale circulations. In order to modify a hurricane, therefore, the flux of energy from the sea surface to the atmosphere could be modified by techniques used for inhibiting evaporation. A second method of hurricane modification could be to try to modify the rate of release of latent heat in the small portion of the storm occupied by the organized active convective scale motion, so that the heating is redistributed, thus weakening the storm. If the clouds in the hurricane are modified by seeding, the storm may be modified. No positive results, however, have been obtained.

Theoretically, it is possible to use hurricanes and other storms as weapons by enhancing, dissipating or guiding them by means of cloud seeding or other techniques. A controlled hurricane could be used against a country with an extensive coastline. In order to generate a hurricane, heat transfer from the sea to the atmosphere is essential. The evaporation from large volumes of water can be modified by spreading thin layers of materials, such as oil, over the water surface. This technique, together with cloud seeding, could in theory be used to guide a hurricane to destroy enemy coastal defences. However, attempts at storm modification made so far have not yielded positive results, so the use of such phenomena as weapons appears to be purely speculative.

Climate modification

Climate is a result of very complex physical, chemical and dynamical processes and their interaction in the ocean and atmosphere and at the land surface. In order to understand this interaction, models of processes leading up to the formation of climate have been constructed [6]. During the past two decades or so, attempts have been made to understand the climate with the use of these models and high-speed computers. Studies such as those of the effect of variation in cloudiness on the heat balance of the earth-ocean-atmosphere system have been carried out using such techniques [7].

Modification of the climate could be brought about primarily through changes in the radiative and thermal budget of the atmosphere. The energy of the atmosphere stems largely from radiation from the earth, which in turn receives its energy from solar radiation. Any activity, therefore, that alters the reflectivity of the earth or the radiation absorption properties and mechanism of the atmosphere, may produce variations in the energy and heat budget, causing changes in climate. The properties of the atmosphere are changed by, for example, introducing aerosols into it. The effect of the aerosols in the atmosphere is to reduce the amount of solar radiation reaching the earth's surface because the aerosols absorb and reflect back some of the radiation falling on them. This would result in a change in the heat balance, causing a change in the climate. However, the behaviour of the aerosols in the atmosphere is complex and not well understood. Some studies suggest that the effect of added aerosol on the radiation balance is dependent not only on its intrinsic optical properties but also on its distribution within the atmospheric system and the pre-existing atmospheric and surface reflectivity [8].

The temperature of the atmosphere may be changed by altering the reflectivity of the earth's surface, for example, by covering it with soot or a layer of asphalt. Another example of this is snow cover; thawing can be accelerated by covering the snow surface with coloured material. This would affect the heat exchange between the atmosphere and the earth's surface, which in turn would cause certain changes in the meteorological processes. There have been speculations about the effects of ice covers and arctic oceans on climate. Results of an extensive study of this have indicated that melting of arctic ice would not necessarily trigger a dramatic change in the climate [9]. There is, however, little agreement at present on this.

It is theoretically possible to change ocean currents by using hydro-engineering, or to create new currents for attaining considerable temperature changes. Climate is a result of a temporary equilibrium of a very complex set of hydrometeorological processes which exert their influence upon the entire surface of the earth. Such temperature changes would upset or modify this equilibrium state, causing a climatic modification.

One important man-made method suggested to modify the atmospheric processes is the suppression of evaporation from lakes and reservoirs. This could be achieved by spreading a thin film of oil (monomolecular layer) on the surface of the water so that evaporation is suppressed. It is thought that evaporation from water surfaces depends on wind shear rather than wind velocity. The monolayer affects the wind shear so that the suppression of evaporation may actually be due to the effect of the monolayer on diffusion and convection rather than vaporization [10].

Modification of climate is, on the whole, still in the realm of theoretical possibility, but it is envisaged as a strategic weapon which could, for example, be used to destroy the enemy's agricultural pattern. A number of methods have been suggested above which could be used as triggering mechanisms for climate modification. However, it is only when these triggering mechanisms start a number of other processes in a predetermined way in the general circulation pattern in the atmosphere that climate modification may result. And this is where the difficulty lies. Not all the atmospheric processes are clearly understood, so they cannot be predicted. It is thought that it may not be possible to achieve such changes in large-scale atmospheric circulation in the coming two or three decades [11].

III. *Manipulation of certain electromagnetic radiation*

A considerable amount of discussion is taking place at present on the biological effects of electromagnetic radiation in the region of wavelengths shorter than 300 nm (1 nm$=10^{-9}$ metre). This is the wavelength region of ultraviolet radiation. If more ultraviolet radiation than the present level reaches the earth, it would have adverse effects on all biological life. Such an increase could be obtained by removing certain gases, particularly ozone, from the atmosphere.

Ozone is located mainly in the stratosphere at an altitude ranging from 10 to 50 km. It is a minor but extremely important constituent of the earth's atmosphere. The small amount of ozone is essential to protect the life on earth from lethal ultraviolet (UV) radiation of wavelengths shorter than 300 nm since radiation of wavelengths shorter than this is mostly absorbed by ozone.

A few effects of increased UV radiation on biological systems may be worth mentioning. Skin cancers are caused by exposure to intense UV radiation. Plant photosynthesis is inhibited and growth arrested, leading in some cases to the death of the plant. There is little doubt that if a reduction in the concentration of ozone to 50 per cent of its present value could be achieved, it would have far-reaching effects on the biological systems on earth [12].

There are two methods available for modifying the ozone layer. One is to use an ozone-reactive chemical to reduce the amount of ozone from a small area, thereby exposing a small region on the earth to intense UV radiation. Another technique is to use nuclear explosions within the ozone layer to make a "hole" in it above the enemy territory.

It is clear that man has within his reach the ability to cause large reductions in the content of the atmospheric ozone but whether he can use it as a weapon will depend on his precise knowledge of the diffusion rate of ozone into the depleted area and the wind conditions in the stratosphere. Both these factors determine the time for which the region below on earth is exposed to ultraviolet radiation. Moreover, the ozone layer is not a well-defined layer, but there is a vertical distribution of the atmospheric ozone, and it may therefore not be so easy to create a small ozone-depleted area.

IV. *Modification of oceans and earthquakes*

The properties of the atmosphere are not well understood, but the mechanisms of oceans and earthquakes are even less well understood. Very limited attempts have been made to modify earthquakes and only theoretical suggestions have been put forward as to how the oceans could be modified.

Ocean modification

The behaviour of the oceans is still not fully understood, but during the past two decades or so methods have been devised for predicting the surface-wave and surface-wind distribution. Some knowledge about certain ocean currents is available, but their variability is not fully known. Therefore, instabilities that may exist within the oceanic circulation and which may be manipulated have not been identified, so any discussion on the modification of ocean currents is largely speculative.

Tsunamis—an extremely violent type of tidal wave—constitutes another such area of speculation. These often result when sediments and rocks perched on the continental shelf fall or slide into the deep ocean, or occur as a result of earthquakes. Vast quantities of energy are released by the movements of such sediments and rocks. A series of phased explosions could be used to create such movements.

Another method of creating tsunamis may be to use nuclear explosions, either under water or along the base of a large ice sheet, causing it to slide outward into the water. If large ice velocities are achieved, this could create tsunamis causing enormous damage to coastal regions.

Earthquake modification

The mechanisms causing earthquakes are not yet very well understood, although much progress has been made in recent years by application of the plate-tectonics theory. According to this theory, the earth's crust is divided into several large plates, roughly corresponding to the continents, which slowly move relative to one another. These motions cause large strains to be built up in the crust material, and the strains are mainly confined to special regions, for example, around the Pacific. Earthquakes, which are the results of the sudden release of such strains, are thus also highly localized. Strains in the crust material could also be built up by other means, such as uneven distribution of heat production from decaying radioactive elements. Artificially stimulated release of crustal strains—the triggering of earthquakes—could be obtained principally by two methods. The first is by explosions powerful enough to shake the ground in large areas and trigger strain-releasing movements of the crust material. In the second method, the strain energy is released by pumping in water, which could provide lubrication, causing adjacent blocks of rocks to slip. Series of small earthquakes were detected when water was pumped underground near Denver, Colorado.

The water technique of triggering an earthquake is clumsy and easily detectable. On the other hand, if the strain pattern in a region of the earth's crust is accurately known, it may be theoretically possible to release the strain and cause an earthquake in that region by remotely placed, phased or timed explosions.

The modern theory of plate tectonics suggests that most earthquakes would take place at or near plate boundaries. This would further restrict the use of earthquake modification as a weapon to certain parts of the earth, making it still more unlikely to be used as a means of warfare.

V. *Modification of certain electrical behaviour of the atmosphere*

A more exotic form of geophysical modification is that of the electrical behaviour of the atmosphere. There exists an ionized region high in the earth's atmosphere called the ionosphere, which extends from about 50 km to hundreds of kilometres above the earth's surface. The ionosphere has a complex structure, consisting of several layers of ionized atmospheric atoms and molecules. The ionization is mainly caused by solar ultraviolet and X-ray radiation, which also means that the ionospheric structure during the day is different from that during the night, when the solar radiation is obscured.

Both the ionosphere and the earth's surface conduct electricity in such a way as to cause, for example, radio waves to be reflected. This phenomenon is used in long-distance radio communication, where the radio waves are reflected back and forth between the ionosphere and the ground. If, however, the ionosphere is modified, for example by means of a nuclear explosion, radio communication could be hampered.

Another use of this ionosphere-earth wave guide may be to propagate very low-frequency radiation through it in such a way that this may possibly influence the behaviour of individuals through the interaction of this radiation with the electrical activity of the brain. Some of the electrical activity of the brain has very low frequencies, about five cycles per second. This activity is often referred to as the alpha rhythm or alpha activity of the brain. Like any wave guide, the ionosphere-earth wave guide will tend to sustain only certain radio frequencies, the lowest resonant frequency being at about eight cycles per second [13]. This type of radiation is difficult to detect because of its long wavelength.

The effect of weak oscillating fields on human behaviour is being studied; very little is known about it at present. The field strengths used in some experiments have been a few hundredths of a volt per centimetre. The results of exposing subjects to such fields for up to about 15 minutes show that there is a small but measurable deterioration in the general performance of the individuals [13]. Such field strengths, however, are some 1 000 times greater than the observed natural oscillations in the ionosphere-earth wave guide. If methods could be devised to produce greater field strengths of such low-frequency oscillations, either by natural (for example, by lightning) or artificial means, then it may become hypothetically possible to impair the performance of a large group of people in selected regions over extended periods.

VI. *Ecological damage in modern warfare*

Modern conventional warfare can cause enormous damage; just how much damage, is shown by the effects of three new military tactics used by the USA in Viet-Nam to deny the enemy access to large land areas—extensive bombing and shelling, herbicide spraying, and land-clearing [14].

The US bombing of Viet-Nam was extraordinarily extensive. Between 1965 and 1973, the USA dropped on South Viet-Nam alone some 11 million bombs [14]. Together with about 217 million artillery shells, the total weight of US high-explosive munitions used in South Viet-Nam was more than seven million tons. Incredible though it sounds, this was equivalent to dropping one Hiroshima-sized atomic bomb on South Viet-Nam every five days throughout the seven-year period. It has been calculated that the total area of environmental damage done by this vast quantity of munitions is equivalent to 50 per cent of the area of the whole country.

Another serious and long-lasting environmental effect of high-explosive munitions arises from the craters they produce. Calculations show that the craters in South Viet-Nam have a combined surface area of about 148 000 hectares and a combined volume of 2 000 million cubic metres. And from these figures it is concluded that "the direct damage from conventional high-explosives to the biota of South Viet-Nam, both immediate and delayed, combined with the indirect damage to it via habitat disruption, has resulted in what may well be the most serious (and least recognized) long-term ecological impact of the Second Indo-China War" [14].

Chemical anti-plant agents or herbicides were extensively used in Viet-Nam, for the first time ever, to destroy forest cover, food plants and industrial crops. About 1.7 million hectares of South Viet-Nam (about 10 per cent of the whole area) were sprayed with herbicides.

> The employment of chemical anti-plant agents or herbicides can readily lead to the serious debilitation of local ecosystems: first, by so-called nutrient dumping [a serious and long-lasting effect arising from the loss of nutrients in leaves which are caused to drop]; second, by the destruction of the extant vegetational community; and third, by the loss of the animal community, largely via habitat destruction. A decimated plant community on tropical upland sites is likely to become replaced by an ecologically inferior, long-lasting plant community, one with a significantly lesser plant and animal species diversity, a greatly reduced biomass, and a decreased level of productivity. Moreover, a decimated coastal mangrove ecosystem seems to remain desolate for some very lengthy period of time. Finally, when an herbicidal attack is used to destroy either food or industrial crops, this can lead not only to ecological damage, but to social havoc as well [14].

The third military innovation, extensive land-clearance, involved the use of so-called Rome ploughs—33-ton armoured tractors, each equipped with a blade to shear and push over trees of almost any size. These massive vehicles were used to destroy forest and crops, and to raze villages. A company of 30 tractors—a normal working group—could remove heavy jungle at a rate of about 40 hectares per day and light jungle at a rate of 160 hectares per day. In all, 350000 hectares of forest land in South Viet-Nam were cleared in addition to thousands of hectares of rubber plantations, fruit orchards and fields (including their irrigation systems) [14]. Severe and long-lasting ecological debilitation followed this land clearance. The cleared areas were "occupied with long-lasting biotic communities of low plant and animal species diversity, reduced biomass, and diminished productivity".

Measures to prohibit environmental warfare

In July 1973, the US Senate passed a resolution calling on the US government to seek agreement with other governments on a treaty providing for "the complete cessation of any research, experimentation, and use of any environmental or geophysical modification activity as a weapon of war". One year later, during the Nixon-Brezhnev talks, a joint statement was issued to the effect that the United States and the Soviet Union would take up the matter of environmental warfare bilaterally. But in September 1974 the Soviet Union stole a march on the USA by proposing to the UN General Assembly a convention to prohibit action to influence the environment, including the weather and climate, "for military and other purposes incompatible with the maintenance of international security, human well-being and health". The proposed convention included a long list of activities to be banned, such as weather modification, the stimulation of seismic waves, interference with the ozone layer, the disturbance of the land surface causing erosion, and the disturbance of the ecology of the vegetable and animal kingdoms. The activities cited in the proposal are a strange mixture of the possible and the futuristic—in fact, most of the conceivable ways of influencing the environment are listed.

In August 1975, the United States and the Soviet Union submitted to the Conference of the Committee on Disarmament (CCD) in Geneva identical draft conventions in which each state party would undertake "not to engage in 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 another state party". This initiative was the culmination of a series of secret meetings held by the two powers after the Nixon-Brezhnev meeting. The US-Soviet draft convention is less ambitious (and possibly, therefore, more politically realistic) than the earlier Soviet proposal and it takes into account the UN discussion of the Soviet proposal. In it, "environmental modification techniques" are defined as techniques 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, so as to cause such effects as earthquakes and tsunamis (tidal waves), an upset in the ecological balance of a region, or changes in

weather patterns (clouds, precipitation, cyclones of various types and tornadic storms), in the states of the ozone layer or ionosphere, in climatic patterns, or in ocean currents.

VII. *Discussion*

At present the use of geophysical techniques of warfare poses a number of problems. Various techniques employed for weather modification are useful only under certain meteorological conditions which occur only at certain times of the year and only in certain areas. None of these variables would be completely controllable by man. Moreover, these techniques are indiscriminate in their effects, and would thus involve civilian populations. Furthermore, since it is difficult to limit the areas affected, weather modification, and more so climate modification, may also affect the nearby neutral states, as well as the state carrying out such activities.

One of the disturbing aspects of geophysical modification is that such operations could be carried out covertly. A state could seed clouds over its own territory, knowing that this could cause changes in the rainfall or snowfall over the neighbouring state. The state downwind could attribute such changes to natural fluctuations. A more serious aspect of the development of geophysical warfare is that the threat to peace may not only come from the actual use of such techniques, but from the fears and perceptions which states may develop about what others could be doing to them by the use of such techniques. It may become possible to blame, rightly or wrongly, adverse changes in one's own weather, climatic or other conditions on others. At present it is not always possible to determine sufficiently accurately whether or not changes in the weather and climate are caused by man. Under such circumstances, the development of such techniques as weapons of war could only increase the conflict and tensions arising from such disasters as crop failures resulting from droughts or floods.

Should the development of the technology continue for its use in war, it would be very difficult to check its proliferation. The techniques of cloud seeding are relatively cheap and widely accessible, so that many countries could potentially use them for military purposes. Acceptance of climate and weather modification as legitimate means of warfare will certainly jeopardize the development and use of the technology for peaceful purposes.

VIII. *Conclusions*

It has been established that the artificial seeding of certain types of clouds can modify their structure and in some cases can initiate and increase precipitation. Seeding experiments carried out on cumulus clouds have not, so far, shown very positive results. This is because modification of such clouds depends not only on the amount, nature and method of the treatment, but also on the initial conditions of the cloud-environment system. As for the modification of orographic clouds, some carefully planned experiments indicate that orographic clouds with temperatures in the range of at least approximately −10°C to −20°C can be modified by artificial seeding.

Of the two methods most commonly used to dissipate fog, namely, the ground-based heating through combustion of hydrocarbon fuels and the airborne dry-ice seeding methods, the former is the more successful for warm fog dissipation. Both methods have been used to dissipate supercooled fog with limited success. The dispersion of supercooled fog by seeding with solid carbon dioxide is also well established. But, at present, there is no practical method available for ice-fog dispersion. It has not been established whether or not hail and lightning can be suppressed. The Soviet Union claims to have developed a technique for hail suppression which reduces damage to crops caused by hail by four or five times.

Only a very limited amount of lightning modification work has been carried out. Experiments in lightning modification by cloud seeding have yielded results suggesting that in some instances, lightning can be modified. Similarly, the modification of hurricanes is also extremely uncertain because of the large natural variability of hurricanes. Moreover, the number of experiments performed in hurricane modification is limited. Too little is known about tornadoes at present to attempt to modify them. As for the other techniques, most of them are still more theoretical and speculative.

Nevertheless, the prospect of gross interference with the weather or climate for military purposes is so disturbing (perhaps instinctively) to most people that there would be massive support for a ban on geophysical weapons—even more so because, unless banned, these weapons will almost certainly be developed. But certain existing military tactics are so damaging to the environment, and the consequences of their use so out of proportion to any conceivable military need, that their prohibition is much more urgent. Heading the list, as shown by recent warfare, are the use of herbicides and strategic bombing.

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Appendix 4A

Weather processes

The phenomenon of weather comprises rain, snow, hail, severe storms such as tornadoes and hurricanes, and lightning. There are, in nature, two basic processes—dynamic processes and microphysical processes—which are involved in the formation of clouds, an essential part of the weather system. In the first process, air containing water vapour rises and expands under the lower pressure which exists at high altitudes in the atmosphere. The mechanism by which the separate drops and hence clouds are formed is described by the second process. Both these processes interact strongly. The dynamic processes determine the rate at which vapour becomes available for condensation and concentration; the size and the nature of the airborne particles determine, according to the microphysical processes, the rate at which the vapour condenses to form clouds.

In the dynamic process, the upward motion of air, which can range from 0.01 to 10 metres per second, determines the type of clouds formed.

This vertical motion of air and its duration determine the size of the particles formed in the clouds by condensation. For a particular distribution of sizes and nature of condensation nuclei, the greater the total upward displacement of air, the larger the drop which forms.

The microscale processes include nucleation of liquid droplets or ice particles and their growth.

The process of ice formation on ice nuclei is complex and still not completely understood, but it appears to be initiated by the surface of the ice nuclei, which are often crystalline particles. The ice formation in the atmosphere may involve either direct deposition of water on ice nuclei or the condensing of water which then crystallizes into ice.

Drops formed by condensation on nuclei during the ascent of moist air have radii mostly in the range of between one and 20 micrometers (1 $\mu m = 10^{-6}$ m). Such drops fall with speeds between 0.01 and 5 cm/s. As mentioned above, the smallest upward air speed could be of the order of 1–10 cm/s so that most of the drops would not fall to the ground as rain. They may also evaporate. This means that once a drop or ice crystal has formed, it must grow to a large size before falling as rain.

The radii of the smallest raindrops (drizzle) are about 100 μm and those of large raindrops range from 0.5 to 3 mm. Drops formed in the clouds must be even larger, since their sizes are reduced by evaporation on the way to the ground. Such large drops could not be formed by condensation alone, since there are many condensation nuclei in the cloud which compete for condensation.

There are two processes which appear to produce such large drops. In one the particles grow by collision and coalescence; the other is the three-phase or Bergeron-Findeisen process. The collision and coalescence process is not a simple one but basically in this process, larger than average droplets (of the order of 20 μm in radius) formed by condensation falling through the cloud may collide and coalesce with small droplets in their paths. A number of such droplets increase in size fairly rapidly and by the time they leave the cloud, they may be sufficiently large to survive evaporation in the dry air and reach the ground as raindrops. This is the only process which can produce precipitation from clouds which are at temperatures above 0°C.

For the Bergeron-Findeisen process to take place, a mixed cloud consisting of water and ice crystals is required. At a given temperature, the vapour pressure over ice is less than that over water. Therefore, if both phases are present at the same time in a water cloud, the ice crystals will grow at the expense of the supercooled drops since there is a vapour pressure gradient between the drops and the ice crystals. This causes the drops to evaporate and the ice crystals to grow by diffusion. The ice crystals begin to fall faster than the remaining cloud droplets and begin to collect the droplets by the collision and coalescence process.

Artificial precipitation

The brief considerations of some of the basic processes involved in the cloud and rain (precipitation) formations given above suggest how the cloud structure, its development and precipitation could artificially be altered. There are two basic methods: in one the dynamic processes are altered and in the other the microphysical processes of cloud and precipitation formation and growth are altered.

Artificial change of dynamic processes

Direct influence of the air flow patterns would require considerable amounts of energy, making it very costly and impractical. Changes are possible at local levels where only a small volume of air is involved. For example, frost on farms can be prevented and, under certain circumstances, fogs can be dissipated by the addition of heat. Change is feasible, however, if, instead of adding energy to the atmosphere, energy arriving in the atmosphere is redistributed.

The energy of the circulating air in the atmosphere is derived from solar radiation. The average amount of radiant energy falling on the outer limits of the earth's atmosphere is 338 W/m^2 (watts per square metre); slightly less than 20 per cent of that is absorbed by the atmosphere. About 35 per cent of the energy is scattered and reflected back into space by the air, the clouds and the earth's surface. The remaining 45 per cent or about 150 W/m^2 is absorbed by the earth's surface [1].

Some of this absorbed energy is used up in heating the atmosphere from below. A total of only about 5 per cent of the energy absorbed by the earth is dissipated into the atmosphere. Although this amount of energy is small, it is continuously dissipated into the atmosphere. If any artificial weather modification is to be realized by introducing energy into the atmosphere, it would have to be supplied at a rate which is at least a significant fraction of 150 W/m^2, the amount of radiant energy absorbed. This amount, 150 W/m^2, corresponds to burning about 15 $tons/km^2/h$ of oil [1]. This is of the same order as the energy conversion in certain cities and industrial centres, but the method is clearly not a very practical one for deliberate weather modification.

Artificial modification of microphysical processes

Since considerable amounts of energy are required to modify weather by altering the dynamic processes, it is usual to change the weather by altering the microphysical processes. This is achieved by introducing into the clouds materials such as water droplets, dry ice, solid CO_2, silver and lead iodide or liquid propane; these are known as seeding agents which change the characteristics and the nature of the cloud particles.

Addition of large condensation nuclei (for example, large hygroscopic nuclei such as sodium chloride) and introduction of large water drops by spraying have been tried in order to start precipitation from cumulus clouds. However, fewer attempts to initiate ice-crystal formation have been made on these clouds than on supercooled clouds. Seeding clouds with large hygroscopic nuclei or with water spray, both of these larger than the drops present in the clouds, could produce large drops by the collision and coalescence processes sufficiently rapidly to lead to precipitation.

For any particular type of cloud and dynamical structure, the most efficient results are obtained if optimum size and concentration of seeding particles are used and an optimum time and region for their introduction have been chosen. Theoretical computation of the effects of seeding cumulus clouds with hygroscopic particles, for example, have shown that different treatments might either increase or decrease the amount of rain developing in a given time. Similarly, in clouds which are at temperatures below 0°C, seeding with ice nuclei could start the precipitation process earlier and increase, decrease or stop the precipitation process altogether. It is, therefore, necessary to know the natural ice-nucleus content of a cloud and to be able to predict the effects of seeding. The prediction is made difficult by the fact that the theory of ice formation is not fully developed. Moreover, it is difficult to regulate the rate of introduction of seeding nuclei. It is, however, possible to know, in broad terms, the effects of seeding on various types of clouds. For example, the introduction of the nuclei into a supercooled fog or stratus cloud results in the conversion of the cloud to ice crystals, which then fall out, clearing the fog or cloud.

Considerable amounts of precipitation could be produced from orographic clouds which result from moist air flowing over mountain ranges. There is a continuous air flow so that new moisture condenses as the old is removed by precipitation.

Cumulus clouds formed by convection could also be suitable for production of significant amounts of precipitation. Often the tops of such clouds, where the maximum temperature is in the range of −20°C, do not have the amounts of ice nuclei necessary for natural production of precipitation. In such cases introduction of appropriate amounts of ice nuclei into the clouds could be useful.

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Appendix 4B

Human ecology

The independent use of air power led during World War II to the area bombing of cities—a strategy explicitly designed to destroy the urban environment in which the working forces engaged in war production lived.

More recently, the massive use of air and surface munitions in a different kind of war has been seen in Indo-China. Most of the munitions expended (which amount to about the quantities used in World War II) were used in rural rather than in urban areas, but since the majority of the human population of the countries of Indo-China are rural dwellers, a considerable proportion has been affected by the ecological effects of the war.

The bombing of industrialized countries during World War II provided many examples of the destructive capability of modern weapon systems.

Germany and Japan were subjected to very extensive attacks on the urban environment. Area attacks on German cities accounted for 434 000 tons of bombs, about half a million deaths, 780 000 wounded, 32 800 hectares of built-up areas devastated, including an estimated 3 600 000 dwelling units, and 7 500 000 people rendered homeless [1–2]. About half the bomb tonnage dropped on Germany was made up of incendiary bombs, the other half consisting of high-explosive bombs.

Crude measures of ecological effects are provided by indices of industrial and agricultural production. Strategic bombing was mainly intended to reduce industrial production, either by direct attacks on industrial establishments or by affecting the morale of the workers. Studies carried out after the war by the British and US strategic bombing surveys showed that the decline in industrial production was much less than expected and could hardly have been a decisive factor in the German or Japanese defeat [2].

However, in the immediate post-war period, industrial production in Germany and Japan was reduced to 20–30 per cent of the pre-war level, due to the combined effects of strategic bombing, blockade and military occupation. Agricultural production was also reduced, more so in Germany than in Japan owing to the military operations involved in the occupation of Germany, large movements of population from the primarily agricultural eastern parts of the country, and perhaps also due to the higher degree of dependency of Germany agriculture upon industrial production.

It was in this end-of-the-war and post-war period that the social system could no longer cope with the environmental impact. In Japan it is reported that "the inhabitants of the cities were seriously undernourished ...

Malnutrition was responsible for many deaths among injured people weakened by undernourishment" [3]. In Germany, the infant mortality rate rose to that of an underdeveloped country and in Berlin reached the extraordinary figure of 359.4 per thousand in 1945. This indicates a nearly total breakdown of the society and its ability to provide food, sanitation and public health facilities.

In most of the countries which were subject to large-scale land warfare, industrial production was a minor factor in the economy. Much more serious were the effects on agricultural production, which is essential for the survival of the population. Agricultural production in poor countries appears to require much more time for recovery than does industrial production. Even two years after the war, the UN reported that Austria, Greece, Hungary, Italy, Poland and Yugoslavia still required emergency aid.

The war in Indo-China, 1961–1975

The war in Indo-China from 1961 to 1975 was characterized by the very extensive use of conventional high-explosive munitions, incendiaries and chemical agents.[1]

It is impossible to measure the full ecological impact of large-scale warfare in underdeveloped countries due to the lack of statistical data.

Statistics compiled by the US Senate Subcommittee on Refugees make it clear that the war caused hundreds of thousands of people to flee their homes every year. In January 1975 the Subcommittee estimated a cumulative total of 11 683 000 refugees and displaced persons (including 210 000 from Cambodia and two million temporarily displaced during the Tet offensive in 1968) [5]. An estimated two million of these displaced persons were not officially registered as refugees but were living in Saigon or other cities.

The mass exodus from rural to urban areas caught authorities unprepared, and led to the creation of vast refugee camps and urban slums in cities which lacked the economic base to support large increases in population. This in turn led to a rapid deterioration of the urban environment. The cities lacked adequate potable water, sanitation and even public transport; a liberal import policy, intended to dampen inflation, contributed to traffic chaos and a level of air pollution in Saigon which killed trees along the boulevards dating from the French colonial era. As US forces—a major source of income and employment—were removed, a vast army of the unemployed and disabled, including veterans, orphans, war widows, prostitutes and drug peddlers, emerged, taking to the streets to demonstrate against a political organization which failed totally to cope with the stresses of the situation [6].

[1] The widespread destruction of the natural environment in South Viet-Nam is described in reference [4].

The situation in Laos and Cambodia was, apparently, even worse than in South Viet-Nam.

The experience of World War II showed that, given the appropriate political conditions, it is relatively easy to reconstruct the constructed environment. But two types of war destruction are much more difficult to repair: damage to the natural environment and damage to the social fabric—the complex tissue of social, cultural and family relations which spell the differences between a human "population" and a "society".

Prospects for future wars

The conclusion that conventional forces, when deployed in large-scale military operations in predominately agricultural countries, may cause destruction as disastrous for the population as the strategic bombing of cities is a sobering one.

Extrapolation is a hazardous procedure, but trends since World War II seem to indicate a greater future likelihood of wars in the third world than in Central Europe or other parts of the developed world. At the present time few countries have the capability to mount large-scale strategic air attacks; but an increasing number of third world countries are equipping relatively large armies with tanks, artillery, missiles, ground attack aircraft and other heavy military equipment. The wars in Nigeria and Bangladesh have demonstrated the potential for disaster which such militarization of the third world can incur.

There can be little doubt that future large-scale wars in the third world would exacerbate all the major problems already present in these areas: malnutrition, disease, rapid urbanization, unemployment, inflation and lack of investment. Further, since those countries depend almost entirely on imports of weapons to fight major wars, military investments with which to conduct such wars do little to increase the economic base required to support their populations; indeed, they will result in increased debts to the arms suppliers and in the squandering of precious national resources.

Thus, future wars will probably be most detrimental to the very societies which can least afford them.

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Appendix 4C

Military use of raw materials

The acquisition and processing of raw materials has inevitable environmental ramifications and in recent years these ramifications have generated increasing concern, particularly since the demand for raw materials shows no signs of abating and since there is a consequent necessity to expand the scale and intensity of the effort to satisfy this demand. A neglected feature of this general phenomenon is the consumption of raw materials for military purposes. This appendix is an attempt to sketch the dimensions of this form of consumption.

At one time industrial capacity and security of access to raw materials were among the primary indices of a nation's military potential. And, as World Wars I and II demonstrated, these indices were quite appropriate. Perhaps the single most important factor that determined the outcome of World War II was the eventual ability of the Allied Powers to achieve overwhelming superiority in the instruments of war, that is, to outproduce their opponents by an increasingly wide margin.

However, the extraordinary advances in military technology since World War II and, in particular, the accumulation of most stockpiles of nuclear weapons by the United States and the Soviet Union have greatly reduced the expectation of prolonged wars of attrition. As a result the relative importance of natural resources to the military potential of states, particularly the major powers, has declined. The technological intensity of modern weapons and the resultant fall in the share of raw materials in the total cost of producing such weapons has had a similar effect.

However, if natural resource endowments no longer figure as prominently in the military potential of states as they once did, what appears to have escaped general notice is the scale on which resources are now consumed for military purposes in times of peace. From the point of view of the military consumption of raw materials, two features of the post-war period are particularly relevant.

First, and most important, is the size of the military establishments maintained in peacetime. On the average, annual world military expenditure since World War II has been more than five times as large as the average in the inter-war period, excluding the effects of inflation. In fact, as table 4C.1 shows, the volume of resources consumed annually for military purposes has increased thirtyfold over the course of this century. At the present time the world diverts about 6 per cent of its total output to military uses. For

Table 4C.1. World military expenditure[a]

US $ bn, at constant (1970) prices

Year		Year	
1908	9.0	1954	126.7
1913	14.5	1955	127.4
1925	(19.3)	1956	126.5
1926	(19.6)	1957	128.8
1927	(21.5)	1958	126.8
1928	21.5	1959	131.7
1929	21.7	1960	130.8
1930	23.2	1961	143.7
1931	21.9	1962	157.6
1932	20.3	1963	164.1
1933	20.1	1964	162.2
1934	23.9	1955	162.2
1935	32.6	1966	178.6
1936	47.1	1967	196.9
1937	58.8	1968	209.2
1938	61.6	1969	212.9
1948	64.7	1970	209.0
1949	67.9	1971	208.2
1950	73.5	1972	211.7
1951	107.0	1973	212.3
1952	137.2	1974	213.2
1953	140.9	1975	213.8

[a] Gaps in the chart are explained as follows: Before World War I, figures exist only for 1908 and 1913. After World War I, reasonably accurate figures are available for 1928 and onwards. Figures for 1925–1927 can be adequately estimated (figures in parentheses). The post-World War II series begins in 1948 because expenditure in the first two post-war years was dominated by wartime levels of forces.

Source: SIPRI worksheets.

many years during the post-war period, this fraction was even higher, around 8–9 per cent. In contrast, before World War I and during the inter-war years before the outset of the arms race preceding World War II, some 3 to 3.5 per cent of total world output was devoted to military uses. It can reasonably be inferred, therefore, that the consumption of raw materials for military purposes has increased dramatically.

Second, whereas the quest for technological superiority has reduced the relative importance of raw materials in the production of weapons, it has also created a rapid turnover of weapons (see appendix 6D). The design, development and production of weapon systems is now a continuous, indeed overlapping, cycle.

To be more precise on the quantity of raw materials consumed for military purposes is very difficult. Statistics on the worldwide military consumption of raw materials are simply not available. As is often the case in this field, accurate statistics exist only for the United States. Nevertheless, the USA currently accounts for more than 30 per cent of world military expenditures and, given its predominant position as an arms producer, it probably accounts for a significantly higher fraction of the total worldwide

Table 4C.2. US military use of selected raw materials as a percentage of total use

Per cent

Raw material	
Bauxite	*14.0*
Copper	*13.7*
Lead	*11.3*
Zinc	*11.0*
Nickel	*9.7*
Molybdenum	*9.3*
Tin	*8.8*
Chromium	*7.6*
Iron	*7.5*
Manganese	*7.5*
Petroleum	*4.8*

Source: See reference [1].

military consumption of raw materials. Very similar orders of magnitude apply for the Soviet Union. A rule of thumb could be that worldwide military consumption of raw materials is unlikely to be less than double that of the USA.

Table 4C.2 gives, for selected raw materials, the percentage of total US consumption directly attributable to the military. In 1970 the USA was still heavily involved in Viet-Nam so that the percentages are somewhat inflated compared to "normal" military consumption. For example, by 1973, military consumption of petroleum had declined to 3.7 per cent of total US consumption. But even so, it is apparent that the military comsumption of these materials is by no means negligible. To give some indication of actual quantities, during fiscal year 1971 shipments of aluminium (bauxite) by US industry totalled about 4.9 million tons so that more than 0.6 million tons was consumed by the military. Similarly, US military requirements accounted for about 249 thousand tons of copper. By way of comparison, copper production in China in 1970 was estimated at 109 thousand tons.

As the performance parameters specified for weapon systems become more demanding, so the use of special-property material increases. An example is titanium in the case of aircraft. The F-8 and the F-105, both US combat aircraft produced in the 1950s, had 8–10 per cent of their airframe weights composed of titanium. Present generation aircraft, such as the F-15 Eagle and F-14 Tomcat, have between one-quarter and one-third of their airframe weights composed of titanium. And the SR-71, a US strategic reconnaissance aircraft capable of cruising at three times the speed of sound, is constructed almost entirely of titanium and its alloys. It is not surprising, therefore, that in 1972 the estimated military demand for titanium in the USA was 4 800 tons, or about 40 per cent of total US demand for this metal [2].

With thousands of aircraft and ground vehicles and hundreds of ships, the

Table 4C.3. The impact of disarmament on the demand for raw materials[a]

Raw material	Net demand changes after reallocation of military expenditures
Bauxite	−4.60
Chromite	+0.08
Copper	−2.35
Iron ore	+0.18
Lead	−2.83
Manganese	+0.16
Molybdenum	−2.64
Nickel	−1.68
Tin	−1.69
Zinc	−1.73
Petroleum, crude	+1.63

[a] Assumes disarmament (zero military expenditure) in the industrialized countries and a reallocation of military expenditures to peaceful uses.

Source: See reference [3].

US military establishment is understandably a massive user of petroleum. Estimated consumption for fiscal year 1974 was 232.5 million barrels after economy measures were taken in view of the oil crisis; in fiscal year 1973 consumption was 273 million barrels. This is more than double the pre-Korean War level of consumption but less than 70 per cent of the level prevailing at the height of the Viet-Nam War when the US military was consuming in excess of 1 million barrels per day. It should also be pointed out that these figures exclude the petroleum products consumed in the production of weapons and military equipment. Using present US consumption as a basis, annual worldwide consumption of petroleum for military purposes can be crudely estimated at 700–750 million barrels. This should be compared with 360 million barrels for the whole of Africa and 825 million barrels for South Asia and the Far East (excluding China and Japan).[1]

Another indication of the scale on which raw materials are consumed for military purposes is given in table 4C.3. The figures are estimates of what would happen to the total demand for selected raw materials if the industrialized countries disarmed (that is, reduced their military expenditures to zero) and reallocated their military expenditures to non-military ends. The fact that for seven of the 11 raw materials studied, total demand remains lower after the hypothetical reallocation of expenditure, is indicative of the scale of the military demand for these materials.

Before concluding, it is appropriate to digress somewhat and point out that raw material consumption is but one facet of the general relationship between resources and armaments. At the broadest level it can be argued that the competitive accumulation of armaments and the importance at-

[1] Based on the daily rate of consumption on 31 December 1973.

Table 4C.4. Military expenditure as a percentage of gross domestic product: selected underdeveloped countries, 1960–73

Per cent

Country	1960	1965	1970	1973
Brazil	2.0	2.5	1.9	2.3
Chile	2.6	2.0	2.5	3.6
Egypt	5.6	7.7	18.0	31.4
India	1.9	3.6	3.0	3.4
Iran	4.2	4.7	6.3	6.7
Iraq	7.1	9.2	11.1	. .
Israel	6.6	7.9	23.6	33.3
Jordan	19.4	12.8	17.8	14.7[a]
Kenya	0.4	1.0	1.1	1.7
Libya	. .	1.4	9.8	(6.8)
Morocco	2.3	2.4	2.6	3.1[a]
Pakistan	2.8	4.0	3.7	6.0
Peru	2.4	2.9	2.9	2.9
Syria	. .	7.9	9.6	13.8[a]
Tanzania	. .	0.8	1.9	2.4
Zambia	1.1	1.8	1.3	5.4[b]

[a] 1974.
[b] 1972.
Source: See reference [4].

tached to military strength have distorted the allocation of resources both nationally and internationally. Many countries encourage the establishment and maintenance of defence and defence-related industries to an extent that would not be justified if purely economic criteria were applied. Similarly, the pattern of international trade is distorted by prohibitions on the export to adversary nations of materials and products that may contribute to their military potential.

At another level, one can point to the blatant contrast between the resources devoted to armaments and the assistance provided by the industrialized nations to the underdeveloped countries. The diversion of a mere 5 per cent of the combined military expenditures of the developed countries would double the existing volume of official development assistance provided annually to the underdeveloped countries. There is probably no more vivid indicator of the distorted priorites which have prevailed over the post-war period. It should be mentioned here that many underdeveloped countries are also devoting a large and rapidly growing quantity of their scarce resources to armaments. Table 4C.4 shows the trend in the proportion of gross domestic product (GDP) devoted to armaments in selected underdeveloped countries. In reading these percentages it should be remembered that the weighted average for the whole world has been declining for the past several years and is now about 6 per cent. Collectively, the underdeveloped countries have increased their share of total world military expenditure from 4.6 per cent in 1960 to 10.8 per cent in 1974. The effect of military expenditure on economic development is not a subject that has been extensively explored but it is worth pointing out that the establishment and maintenance of modern military forces are particularly expensive in terms of foreign exchange and skilled manpower, resources that are usually in short supply in underdeveloped countries.

Finally, mention should be made of military research and development (R&D). Advancements in science and technology have brought enormous benefits to the world community and hold the key to the solution of a range of major problems facing the world today. Yet a vast sector of the intellectual and physical resources engaged in research and development have been and still are working to achieve military objectives—to make aircraft fly faster, bullets more lethal and missiles more accurate. Of the cumulative world R&D efforts since World War II, a fraction approaching one-half has been military R&D. Whatever might be said of the civilian "spin-off" from military R&D, it is becoming increasingly apparent that the world community may not be able to afford the loss of these resources.

Conclusions

It is now being recognized that the growing scarcity, and in some cases imminent exhaustion, of many important raw materials has profound implications for the future well-being of mankind. The grossly uneven pattern of consumption of raw materials is at this moment a hotly debated subject as part of the general endeavour to forge a new world economic order. It can only be a matter of time before it is explicitly recognized that the waste of natural resources by any country is not a loss to that country alone but a loss to the world community. And, of course, resource consumption for military purposes is the largest and clearest form of waste and this waste is even more highly concentrated in the industrialized countries than is resource consumption in general.

The purpose of this appendix has been to give an indication of the scale of resource consumption, particularly raw materials, for military purposes. On the basis of the available data this could only be done in a sketchy manner. It is worth stressing, therefore, that modern armed forces are technology-intensive and capital-intensive and will almost certainly become increasingly so in the future. This, together with the fact that the world's armed forces consume annually a quantity of resources (both human and material) valued at about $250 billion suggests strongly that the consumption of raw materials for military purposes is very large indeed. After all, $250 billion is equivalent to the world's total output in the year 1900 or, to give it a more contemporary perspective, it is equivalent to the combined current gross national products of the 65 countries in Latin America and Africa.

References

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3. *Economic and Social Consequences of the Arms Race and of Military Expenditures,* Report of the Secretary-General, United Nations, New York, 1972, p. 48.
4. *World Armaments and Disarmament, SIPRI Yearbook 1975* (Almqvist & Wiksell, Stockholm, Stockholm International Peace Research Institute).

5. Reconnaissance satellites

Square-bracketed numbers, thus [1], refer to the list of references on page 119.

I. *Introduction*

Until 1975, only the Soviet Union and the United States possessed the reconnaissance satellite capability to inspect foreign territory.[1] On 26 July 1975, the People's Republic of China launched an earth satellite (China-3) with orbital characteristics typical of a reconnaissance satellite. China's first two satellites, launched into orbit in 1970 and 1971, did not have such orbital characteristics and were thus probably not capable of reconnaissance missions.

China-3 and the two subsequent Chinese satellites launched in 1975 have low perigees[2] (of the order of 180 km), and the use of a different launch vehicle permitted the presence of a camera on board the satellite which would be used to monitor, for example, Soviet troop movements and military installations particularly along the Sino-Soviet border.

The USA and the USSR have in 1975 continued to launch photographic reconnaissance satellites at about the same rate as in 1973 and 1974, that is, about five per year by the USA and about 30 by the USSR. The photographic and other types of reconnaissance satellites launched in 1975 by these two states, and those launched by the People's Republic of China, are discussed in this chapter.

II. *Chinese reconnaissance satellites*

The People's Republic of China was the fifth nation to launch a satellite and the third to launch a reconnaissance satellite.[3] The first Chinese satellite, China-1 (1970-34A), was launched on 24 April 1970 and was placed in a highly elliptical orbit with a perigee of 441 km and an apogee of 2 380 km.

[1] The use of reconnaissance satellites for verification purposes became an internationally recognized activity when the SALT I agreements were signed in 1972 (see *SIPRI Yearbook 1973* and *SIPRI Yearbook 1974*). Since then, however, the number of satellites launched and their technological capabilities indicate that reconnaissance satellites are not being used solely to verify the implementation of these agreements (see *SIPRI Yearbook 1975*).

[2] The orbital path of a satellite is generally elliptical. The point on the orbit nearest the earth is called the perigee and that farthest from the earth is called the apogee.

[3] The other four nations include the Soviet Union, the United States, France and Japan. The former two have an extensive military reconnaissance satellite programme whereas France and Japan have not, so far, launched any military-oriented reconnaissance satellites.

The orbital period[4] of the satellite was 114 minutes. The characteristics of the orbit of China-2 (1971-18A), launched on 3 March 1971, were similar.

The first Chinese satellite with an orbit characteristic of a typical reconnaissance satellite was China-3, launched on 26 July 1975. This satellite was probably launched using a modified version of the long-range (3 500-mile) CSS-X3 missile [1]. China launched its satellites from the Shuang-Cheng-Tzu space facility approximately 1 000 miles west of Peking. It is interesting to note that, so far, China's is the heaviest of any state's first satellite: China-1 had a payload of about 170 kg as compared with the payloads of 84 kg and 14 kg of the first Soviet (Sputnik 1) and US (Explorer-1) satellites, respectively.

The second Chinese satellite weighed about 220 kg but the weights of subsequent satellites have not been published. It is believed, however, that China-4 and China-5 weighed between 2 700 and 4 500 kg [2–3]. The secrecy about the payloads and specific functions of these satellites, together with the statements made in Hsinhua News Agency reports about the satellite programme being geared to "preparedness against war", leads one to believe that China-3 may well be the first of a series in a Chinese military reconnaissance satellite programme.

Although it was reported that China-3 was brought down intentionally there is some doubt about this as the satellite had already been in orbit for 50 days and the orbital characteristics appeared to be those of a naturally decaying satellite [4].

Since the launch of China-3, China-4 and China-5 have been orbited, the latter with orbital parameters similar to those of China-3. It is interesting to note that, unlike the other Chinese satellites, the orbital inclination[5] of China-4 was 62° and that after six days a data capsule was recovered [5]; a large piece remained in orbit for a further 27 days.

It is difficult to determine with certainty which of these satellites were photographic reconnaissance satellites and which were on missions similar to those of the US Earth Resources Technology Satellites (ERTS). Identification is made particularly difficult since these satellites transmit signals only when they are directly over China. China-3 might have been the first satellite with a camera on board [6] but China-4 was probably the only Chinese satellite which performed a photographic reconnaissance mission using a high-resolution camera since part of its payload was recovered. The orbital characteristics of these satellites are given in table 5.1 (see tables in section VI, below).

The ground tracks[6] of China-3 were calculated for the initial period of 14

[4] The time required for a satellite to go round the earth once is called its period.
[5] The angle between the orbital plane of the satellite and the equatorial plane of the earth is known as the orbital inclination.
[6] The ground track is defined as the projected path traced out by a satellite over the surface of the earth.

Chart 5.1. World map: some militarily interesting regions

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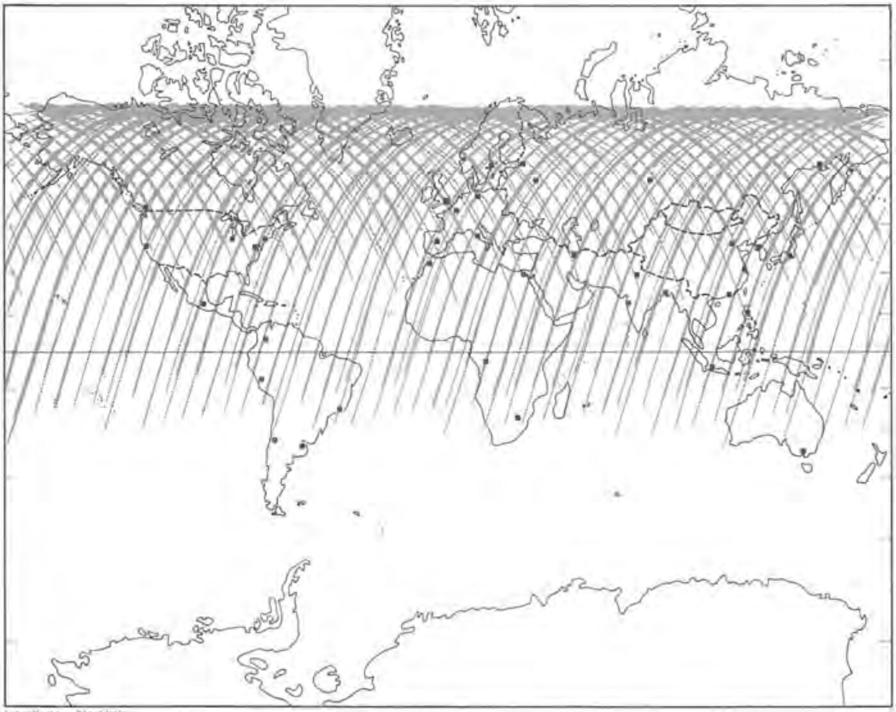
Chart 5.2. Ground tracks of China-3 (1975-70A) for 14 days of its orbital life



LiberKartor, Stockholm

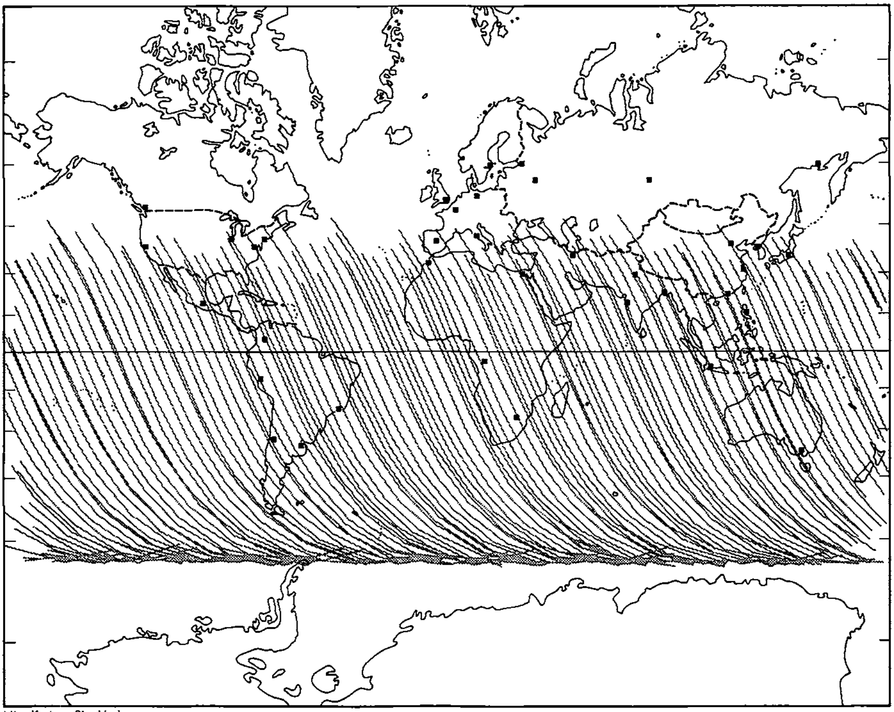
days of its flight; these are shown in chart 5.2. The satellite passed over various regions of the earth during daylight with the sun low in the sky at 15°. It can be seen that the satellite ground tracks are not concentrated over any particular region of the earth. A similar picture was obtained when the satellite's ground tracks were calculated for a period in the middle of its orbital life. Ground tracks for China-4 were calculated for only the first six days of its orbital life since on the sixth day a capsule was ejected from the satellite and it returned to earth. The ground tracks of this satellite are shown in chart 5.3.

III. *US reconnaissance satellites*

Photographic and ocean-surveillance satellites

The United States launched only four photographic reconnaissance satellites during 1975. Of these, two were the large "Big Bird" satellites and the remaining two were close-look and ocean-surveillance satellites. Fewer US

Chart 5.3. Ground tracks of China-4 for six days of its orbital life



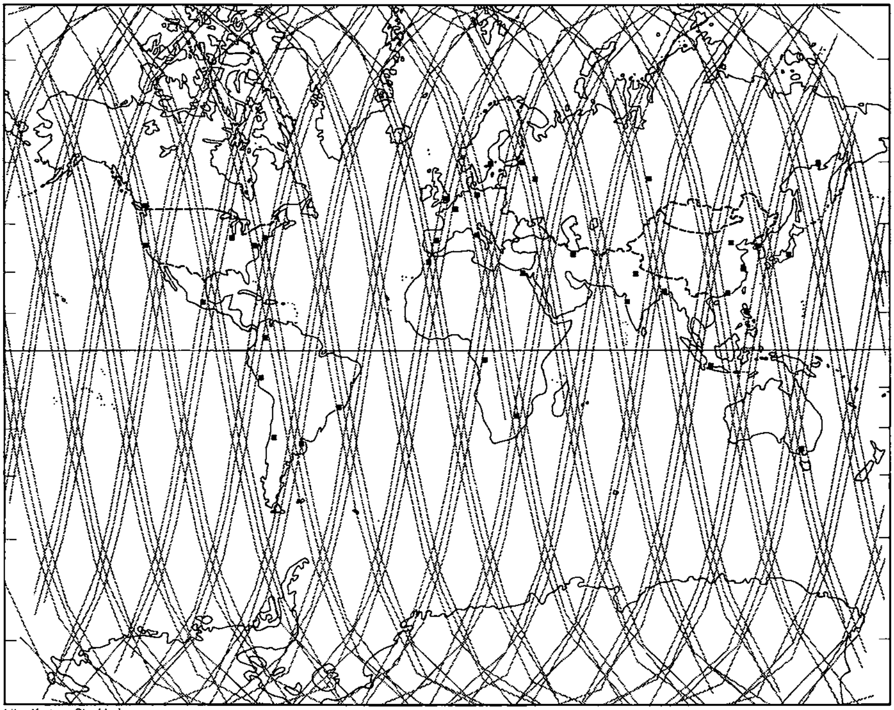
photographic reconnaissance satellites have been launched in recent years because the lifetimes of these satellites are increasing almost every year. The first "Big Bird" satellite launched in 1971, for example, had a lifetime of only 52 days compared with the lifetime of 150 days of the satellite launched on 8 June 1975.

The lifetime of the close-look satellites has increased approximately sevenfold; a satellite of this type launched on 9 October 1975 had a lifetime of 52 days compared with the lifetime of seven days for a very early satellite launched in July 1966. This has resulted in fewer US close-look satellites being launched each year; only two were orbited in 1975 and three in each of the years 1973 and 1974.

It has been suggested that such close-look satellites might also be performing ocean-surveillance missions [7]. In chart 5.4 the ground tracks of a satellite of this type (USAF 1975-98A) are shown for a period of only three days, for reasons of simplicity. Ground tracks for longer periods show that the satellite covers practically the whole of the earth's surface, since it is performing both close-look and ocean-surveillance tasks.

The orbital characteristics of these satellites are given in table 5.2.

Chart 5.4. Ground tracks of a US ocean-surveillance satellite (1975-98A) for a three-day period



Early-warning satellites

After a gap of some two years, the United States launched, on 18 June 1975, a satellite with orbital characteristics typical of those of early-warning satellites, that is, in an equatorial geosynchronous orbit.[7] The satellite carries an experimental payload to test a new type of infrared sensor which will permit more accurate mid-course trajectory tracking of a missile. Such a device might be used in a new generation of early-warning satellites. Another possibility is that it is a prototype satellite of a smaller, low-cost version of the present early-warning satellites [8]. An integrated missile early-warning system (IMEWS) was also launched on 14 December 1975 but the satellite developed some technical difficulty, the cause of which is still not known [9].

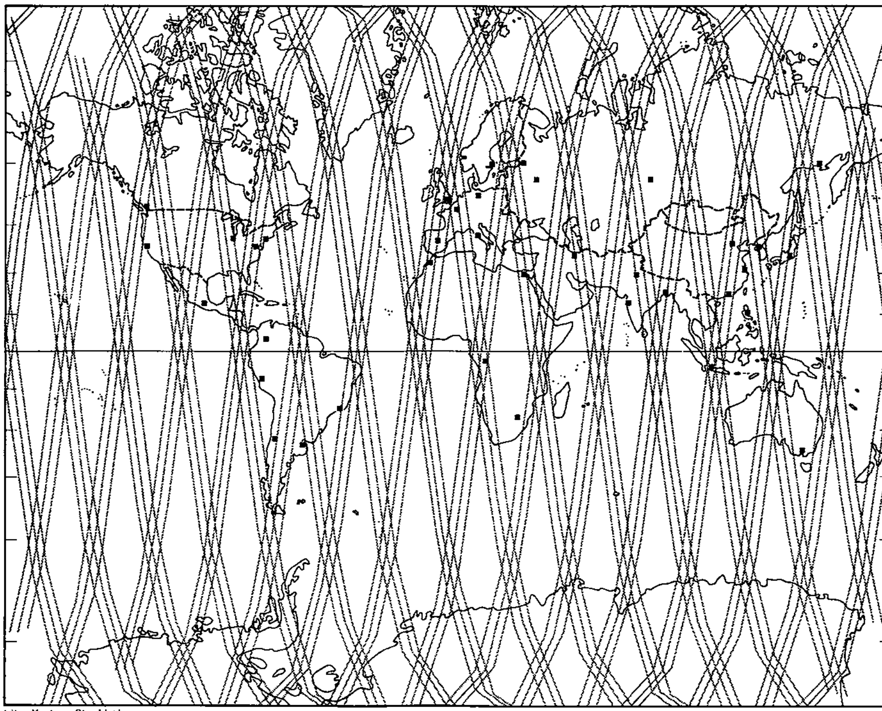
The orbital characteristics of these satellites are given in table 5.3.

Electronic reconnaissance satellites

No electronic reconnaissance satellites appear to have been launched by the USA during 1975. The US electronic satellites are usually octagonal in

[7] When a satellite orbits the earth above the equator at the same rate as the earth rotates about its own axis, then the satellite is said to be in a geosynchronous equatorial orbit.

Chart 5.5. Ground tracks of a US electronic surveillance satellite for a three-day period



shape and weigh about 60 kg. Such satellites are carried and launched into their independent near-circular orbits with higher perigees by the "Big Bird" photographic reconnaissance satellites. Although the "Big Bird" satellite launched on 4 December 1975 ejected an object into an independent orbit, its orbit was elliptical with a perigee and an apogee of 236 km and 1 558 km, respectively. Therefore, this may not have been an electronic reconnaissance satellite. The weight and the shape of the satellite are not known.

Ground tracks of a typical US electronic reconnaissance satellite (USAF 1974-20C) are shown in chart 5.5. For simplicity, these ground tracks are for a period of only three days but a seven-day period shows that the satellite covered the earth's surface extensively without concentrating over any specific areas.

Satellite Data System

There has been some speculation about the US Satellite Data System (SDS) satellites, particularly since the United States Air Force (USAF) has attempted to keep the orbital parameters of some of these satellites secret. The first of these satellites was launched on 20 Mach 1971 using the Titan-

3B rocket. It was announced that the satellite will provide communication links to Strategic Air Command bombers operating in the polar regions. In the case of this satellite, it was learnt that its orbital inclination was 63° with a perigee of 390 km and an apogee of 33 800 km.

Two additional SDS spacecraft have been launched since SDS-1: one, SDS-2, on 21 August 1973 and the other, SDS-3, on 10 March 1975. Although the initial orbital parameters of the latter satellite were reported to the United Nations, no further details have been published [10]. The first two of these satellites were experimental satellites while the third, SDS-3, is believed perhaps to be monitoring signals from the Soviet Molniya satellites [11]. The initial orbital parameters of the SDS-3 satellite are an orbital inclination of 63.5°, apogee of 39 337 km, perigee of 295 km and period of 11.7 hours. These parameters are very similar to those of the Molniya communication satellites.

IV. *Soviet reconnaissance satellites*

Photographic reconnaissance satellites

The Soviet Union has continued to launch short-lived photographic reconnaissance satellites. During 1975, the Soviet Union launched 33 photographic reconnaissance satellites, excluding Cosmos-758 (see below). Twenty of these, or 50 per cent, which manoeuvred in orbit, were close-look satellites carrying high-resolution camera systems. The remaining ones performed area-surveillance missions. Amongst the Soviet area-surveillance satellites, Cosmos 720 and Cosmos-759 were dual-purpose satellites; besides performing the usual military reconnaissance missions, the satellites also conducted tasks similar to those of the US ERTS satellite [12].

Another interesting satellite which might belong to this series was Cosmos-758. The satellite, launched from Plesetsk, exploded after only four days in orbit. It has been implied that this satellite might have been part of the Soviet Satellite Intercept tests or that it might have been exploded intentionally after a mission failure [13]. It has also been suggested that the satellite was on a photographic reconnaissance mission carrying a high-resolution camera [14]. It is difficult to be certain about this satellite because it was orbited at the unusual orbital inclination of 67°—unusual for a Soviet reconnaissance satellite. Moreover, the satellite tracking group at Kettering in the UK did not receive any signals before the satellite exploded. During the satellite's one-day flight, no signals were received by this group to suggest the nature of its mission [15].

Orbital characteristics of all the Soviet photographic reconnaissance satellites are given in table 5.4.

Electronic reconnaissance satellites

The Soviet Union has continued to launch its electronic reconnaissance satellites at orbital inclinations of about 71° and 74°; the orbital period of the satellites with 71° orbital inclination is about 92 minutes and that of the 74° satellites about 95 minutes. Seven such satellites were launched last year from Plesetsk.

The ground tracks of one of these satellites, Cosmos-749, calculated for the period of 14 days of its flight, are plotted in chart 5.6. It can be seen that, unlike the US electronic reconnaissance satellite, the Soviet satellite ground tracks repeat themselves and thus cover only specific regions of the earth. Therefore, in order to get a fuller coverage, a number of satellites with different orbital parameters have to be used. In fact, a number of satellites appear to fall in a regular pattern. For example, the orbital planes of the satellites with an orbital period of 95 minutes are spaced at 45° intervals. There appear to be six such satellites operating at a time [16]. If eight were used, then the ground tracks of the satellites would be 3° apart, giving a much wider coverage of the earth's surface. Orbital characteristics of all the Soviet electronic reconnaissance satellites are given in table 5.5.

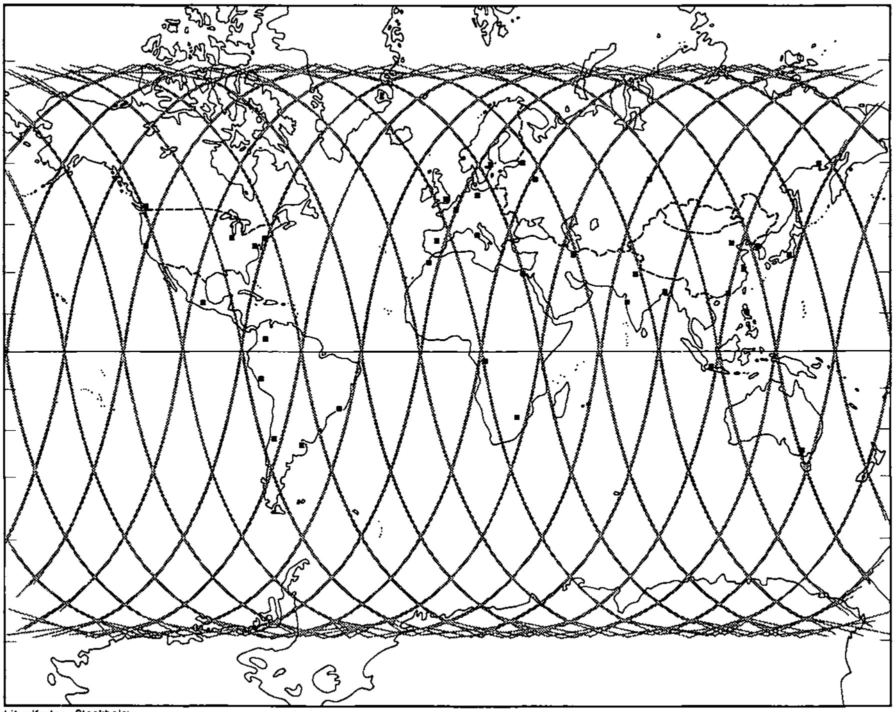
Ocean-surveillance satellites

The Soviet Union has been using satellites to survey the oceans of the world since 1973. These satellites perform their ocean-surveillance missions in pairs: for example, Cosmos-651 and Cosmos-654 launched in 1974, and Cosmos-723 and Cosmos-724 launched in 1975. An important feature of the satellites is that they perform the ocean-surveillance mission while in orbits with perigees and apogees of about 250 km and 260 km, respectively. After a few weeks, the satellites are manoeuvred into their new parking orbits of larger perigees and apogees of about 870 km and 930 km, respectively. It is believed that the satellites are equipped with radar systems which are powered by generators using radioactive nuclides. The satellites remain in their parking orbits until the radioactivity of the power generator decays [17]. Typical ground tracks of an ocean-surveillance satellite are shown in chart 5.7. Orbital characteristics of all the Soviet ocean-surveillance satellites are given in table 5.6.

Early-warning satellites

In 1974, the Soviet Union launched two satellites into synchronous orbits: Cosmos-637 on 26 March, and Molniya 1S on 29 July. The former satellite was launched to study synchronous orbit-launch techniques and the satellite parameters in that type of orbit [18]. Molniya 1S was launched for television and radio broadcast experiments [19]. However, it has been suggested that

Chart 5.6. Ground tracks of a Soviet electronic surveillance satellite, Cosmos 749 (1975-62) for a 14-day period[a]



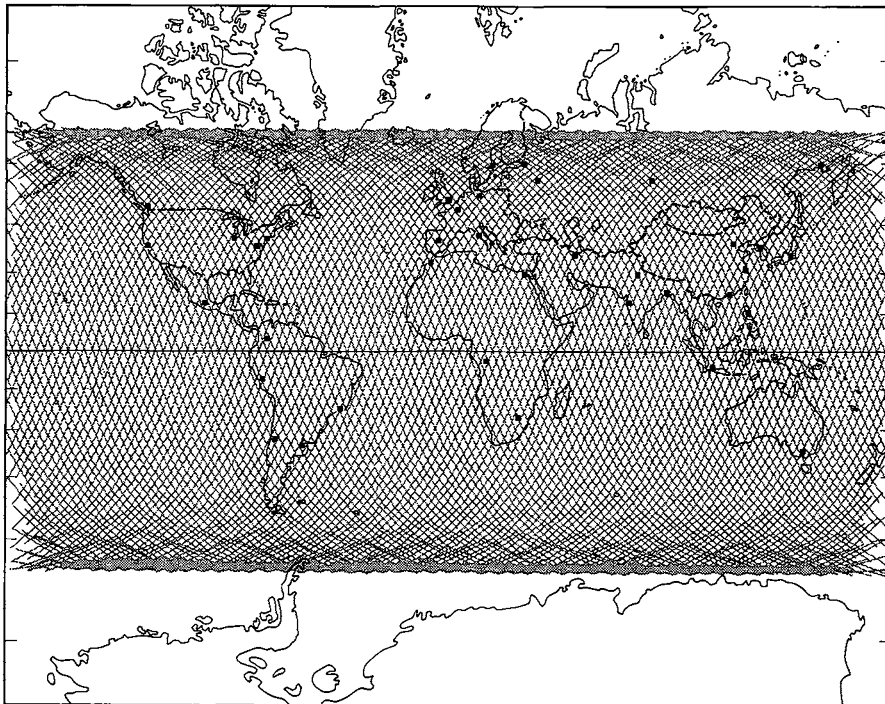
[a] Compare these ground tracks with those in chart 5.5.

the recently launched Cosmos-775 is probably the first Soviet early-warning satellite [20]. It was placed in a synchronous orbit, the plane of which was inclined at 0.03° to the equatorial plane. The perigee and the apogee of the orbit were 35 737 km and 36 220 km, respectively. The satellite was placed into a position over the Atlantic Ocean where it could observe any US submarine-launched ballistic missiles (SLBMs) [21].

V. *Conclusions*

The longer orbital lives of US photographic reconnaissance satellites have enabled the United States to perform its reconnaissance activities from space with only a small number of satellites. In 1975, for example, the United States launched only four photographic reconnaissance satellites compared with 34 for the Soviet Union. The first US "Big Bird" satellite to be launched in 1975 had an orbital life of 150 days and the second such satellite launched in December is expected to orbit the earth for about the same number of days.

Chart 5.7. Ground tracks of a Soviet ocean-surveillance satellite for a 14-day period



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At least half the number of photographic reconnaissance satellites of either state carry high-resolution cameras to perform close-look missions. The US Agena-D area-surveillance satellites employing the Titan-3B rocket may also be performing ocean-surveillance tasks. However, the frequency of these satellites is also decreasing; for example, five such satellites were launched in 1970 and only two in 1975. It is possible that the "Big Bird" may eventually perform all the types of mission.

The orbital inclination determines the range of latitudes over which the satellite flies on each revolution. For observations of an area situated at high latitude, a near-90° inclination orbit is necessary. This is apparent from charts 5.5, 5.6 and 5.7 which show the ground tracks of the US electronic reconnaissance satellite at an orbital inclination of 94°, of the Soviet electronic reconnaissance satellite at an orbital inclination of 74° and of the Soviet ocean-surveillance satellite at an orbital inclination of 65°, respectively. It is interesting to note that neither the Soviet nor the Chinese satellites have orbital inclinations greater than about 80°. This is presumably because less power is needed from a rocket to put a satellite in an orbit with an inclination considerably smaller than 90°. The economy in power is realized because use is made of the earth's rotation.

On 24 April 1970, the People's Republic of China became the fifth nation to launch a satellite independently. A year later, on 3 March 1971, a second satellite was successfully orbited. However, there was a considerable gap until the third satellite was launched on 26 July 1975. This delay may have been caused partly by the technical difficulties which seem to have slowed down the whole of China's missile development programme and partly by the need to develop sophisticated techniques in passing from a simple scientific satellite to an advanced reconnaissance satellite system.

China's development of a satellite surveillance programme is not unmotivated since it has an advanced missile programme, and if its missiles are to be used as a credible deterrent, surveillance of the missile forces of other nations becomes necessary. While the development of an operational system of any type takes a considerable amount of time, the launching of China's third satellite and the recovery of the payload of China-4 will certainly usher China into the military satellite club which has so far been the preserve of only two powers.

VI. *Tables of Chinese, US and Soviet reconnaissance satellites*

Conventions

A-2	Vostok up-rated second stage
B-1	Modified Sandal intermediate-range missile with an added upper stage
BMEWS	Ballistic missile early-warning system
C-1	Skean intermediate-range missile plus upper stage
Cape Ken	Cape Kennedy
F-1-m	SS-9 Scarp missile with an upper stage
IMEWS	Integrated missile early-warning system
PL	Plesetsk
T-3C	Titan-3C
T-3D	Titan-3D
T-3B/A-D	Titan-3B Agena D
TT	Tyuratam
Van	Vandenberg

Table 5.1. Possible photographic reconnaissance satellites launched in 1975 by the People's Republic of China

Satellite name and designation[a]	Launch site and vehicle	Launch date and time *GMT*	Orbital inclination *deg*	Period *min*	Perigee height *km*	Apogee height *km*	Lifetime *days*	Whether recovered[b]
China 3[c] (1975-70A)	Shuang-Cheng-Tzu –	26 Jul 1326	69.02	90.98	184	461	50	?
China 4 (1975-111A)	Shuang-Cheng-Tzu –	26 Nov 0336	62.59	91.09	179	479	6	Yes
China 5[c] (1975-119A)	Shuang-Cheng-Tzu –	16 Dec 0920	69.0	90.1	188	385		?

[a] The designation of each satellite is recognized internationally and is given by the World Warning Agency on behalf of the Committee on Space Research.
[b] Uncertainty about the data, and recovery of satellites or capsules, is indicated by question marks.
[c] These satellites may be reconnaissance satellites but they did not eject a capsule.

Table 5.2. US photographic reconnaissance satellites launched in 1975

Satellite name and designation[a]	Launch site and vehicle	Launch date and time *GMT*	Orbital inclination *deg*	Period *min*	Perigee height *km*	Apogee height *km*	Lifetime *days*	Whether capsule recovered[b]
USAF[c] (1975-32A)	Van T-3B/A-D	18 Apr 1648	110.54	89.86	134	401	48	?
USAF[d] (1975-51A)	Van T-3D	8 Jun 1829	96.38	88.77	154	269	150	?
USAF[c] (1975-98A)	Van T-3B/A-D	9 Oct 1912	96.41	89.34	125	356	52	?
USAF[d] (1975-114A)	Van T-3D	4 Dec 2038	96.27	88.44	157	234	(152)[e]	?

[a] See footnote [a] to table 5.1.
[b] See footnote [b] to table 5.1.
[c] Area-surveillance and ocean-surveillance.
[d] "Big Bird" satellite.
[e] The expected lifetime is 152 days.

Table 5.3. US early-warning satellites launched in 1975

Satellite name and designation[a]	Launch site and vehicle	Launch date and time *GMT*	Orbital inclination *deg*	Period *min*	Perigee height *km*	Apogee height *km*	Lifetime *years*
BMEWS ? (1975-55A)	Cape Can T-3C	18 Jun 1005	9.0	1422	32 200	40 800	$>10^6$
IMEWS 5 (1975-118A)	Cape Can T-3C	14 Dec 0517	0.5	1433.2	35 620	35 860	$>10^6$

[a] See footnote [a] to table 5.1.

Table 5.4. Soviet photographic reconnaissance satellites launched in 1975

Satellite name and designation[a]	Launch site and vehicle	Launch date and time *GMT*	Orbital inclination *deg*	Period *min*	Perigee height *km*	Apogee height *km*	Lifetime *days*	Whether recovered[b]
Cosmos 702[f] (1975-02A)	TT A-2	17 Jan 0907	71.33	89.70	205	313	11.9	Yes
Cosmos 704[c] (1975-05A)	PL A-2	23 Jan 1102	72.86	89.62	205	305	13.74	Yes
Cosmos 709[c] (1975-13A)	PL A-2	12 Feb 1438	62.83	89.39	181	310	12.65	*
Cosmos 710[c] (1975-15A)	TT A-2	26 Feb 0907	64.99	89.61	176	335	13.83	Yes
Cosmos 719[c] (1975-18A)	TT A-2	12 Mar 0853	64.98	89.32	175	307	12.86	Yes
Cosmos 720[d] (1975-19A)	PL A-2	21 Mar 0658	62.81	89.33	212	273	11.6	*
Cosmos 721[e] (1975-20A)	PL A-2	26 Mar 0853	81.33	88.88	208	228	9.38	*
Cosmos 722[c] (1975-21A)	TT A-2	27 Mar 0810	71.35	89.94	204	337	12.88	*
Cosmos 727[c] (1975-30A)	TT A-2	16 Apr 0810	64.98	89.55	172	334	11.87	*
Cosmos 728[e] (1975-31A)	PL A-2	18 Apr 1005	72.83	89.80	205	323	10.79	Yes
Cosmos 730[c] (1975-35A)	PL A-2	24 Apr 0810	81.33	88.96	210	234	11.85	*
Cosmos 731[e] (1975-41A)	TT A-2	21 May 0658	64.97	89.49	203	296	11.9	?
Cosmos 740[c] (1975-46A)	TT A-2	28 May 0735	64.97	89.50	173	327	12.9	?
Cosmos 741[f] (1975-47A)	PL A-2	30 May 0643	81.34	88.93	210	231	11.86	*
Cosmos 742[c] (1975-48A)	PL A-2	3 Jun 1326	62.85	89.82	178	355	11.66	Yes
Cosmos 743[c] (1975-53A)	PL A-2	12 Jun 1229	62.80	89.61	181	331	12.66	*
Cosmos 746[c] (1975-59A)	PL A-2	25 Jun 1258	62.80	89.54	180	325	12.66	*
Cosmos 747[e] (1975-60A)	PL A-2	27 Jun 1258	62.83	89.32	193	291	11.66	*
Cosmos 748[c] (1975-61A)	PL A-2	3 Jul 1341	62.81	89.44	178	317	12.65	Yes
Cosmos 751[f] (1975-68A)	PL A-2	23 Jul 1258	62.82	89.58	197	313	11.64	Yes
Cosmos 753[c] (1975-71A)	PL A-2	31 Jul 1258	62.83	89.59	181	330	12.66	*
Cosmos 754[c] (1975-73A)	TT A-2	13 Aug 0726	71.37	89.83	204	326	12.88	Yes
Cosmos 757[c] (1975-78A)	PL A-2	27 Aug 1453	62.82	89.46	182	316	12.64	*

Satellite name and designation[a]	Launch site and vehicle	Launch date and time *GMT*	Orbital inclination *deg*	Period *min*	Perigee height *km*	Apogee height *km*	Lifetime *days*	Whether recovered[b]
Cosmos 758 (1975-80A)	PL A-2 ?	5 Sep 1453	67.14	89.50	174	326	1	Exploded
Cosmos 759[d] (1975-84A)	PL A-2	12 Sep 0531	62.80	89.55	231	276	11.63	*
Cosmos 760[c] (1975-85A)	TT A-2	16 Sep 0907	64.96	89.59	174	335	13.85	Yes
Cosmos 769[e] (1975-88A)	PL A-2	23 Sep 1005	72.83	89.62	203	307	11.76	*
Cosmos 771[c] (1975-90A)	PL A-2	25 Sep 0950	81.32	88.74	203	219	12.85	Yes
Cosmos 774[c] (1975-95A)	TT A-2	1 Oct 0838	71.35	89.72	204	315	12.8	Yes
Cosmos 776[e] (1975-101A)	PL A-2	17 Oct 1438	62.82	89.36	200	288	11.7	Yes
Cosmos 779[c] (1975-104A)	PL A-2	4 Nov 1522	62.80	89.71	182	341	13.6	Yes
Cosmos 780[e] (1975-108A)	TT A-2	21 Nov 0922	65.01	89.28	201	278	11.9	*
Cosmos 784[e] (1975-113A)	PL A-2	3 Dec 1000	81.33	88.99	215	232	11.85	*
Cosmos 786[c] (1975-120A)	TT A-2	16 Dec 1000	65.00	89.49	174	326	12.9	*

[a] See footnote [a] to table 5.1.
[b] See footnote [b] to table 5.1. Yes indicates that recovery beacon signals were monitored by the group at Kettering Grammar School, UK.
[c] Manoeuvrable satellites—two tone, no telemetry.
[d] Non-manoeuvrable satellites—two tone, no telemetry.
[e] Non-manoeuvrable satellites with scientific payloads and pulse duration modulation.
[f] Non-manoeuvrable satellites without scientific payloads and pulse duration modulation.
* During the last orbit, signals were received by the group at Kettering Grammar School, but these were not the recovery beacon signals.

Table 5.5. Possible Soviet electronic reconnaissance satellites launched in 1975

Satellite name and designation[a]	Launch site and vehicle	Launch date and time *GMT*	Orbital inclination *deg*	Period *min*	Perigee height *km*	Apogee height *km*	Lifetime
Cosmos 705 (1975-06A)	PL B-1	28 Jan 1200	70.97	92.29	271	502	8 months
Cosmos 707 (1975-08A)	PL C-1	5 Feb 1326	74.03	95.14	503	547	10 years
Cosmos 725 (1975-26A)	PL B-1	8 Apr 1829	70.99	92.08	270	481	7 months
Cosmos 745 (1975-58A)	PL B-1	24 Jun 1214	71.80	92.35	264	514	6 months
Cosmos 749 (1975-62A)	PL C-1	4 Jul 0058	74.04	95.25	509	556	10 years
Cosmos 750 (1975-67A)	PL B-1	17 Jul 0907	71.04	95.40	272	803	2 years
Cosmos 781 (1975-109A)	PL C-1	21 Nov 1717	74.03	95.21	505	551	10 years

[a] See footnote [a] to table 5.1.

Table 5.6. Possible Soviet ocean-surveillance satellites

Satellite name and designation[a]	Launch site and vehicle	Launch date and time *GMT*	Orbital inclination *deg*	Period *min*	Perigee height *km*	Apogee height *km*	Lifetime *years*
		1973					
Cosmos 626 (1973-108A)	TT F-1-m	27 Dec 2024	65.02 64.91[b]	89.65 104.04[b]	257 910[b]	259 990[b]	600
		1974					
Cosmos 651 (1974-29A)	TT F-1-m	15 May 0726	64.97 64.97[b]	89.64 103.45[b]	250 892[b]	264 954[b]	600
Cosmos 654 (1974-32A)	TT F-1-m	17 May 0658	64.99 64.99[b]	89.63 104.44[b]	248 913[b]	265 1 024[b]	600
		1975					
Cosmos 723 (1975-24A)	TT F-1-m	2 Apr 1102	65.02 65.02[b]	89.64 103.72[b]	249 916[b]	266 951[b]	600
Cosmos 724 (1975-25A)	TT F-1-m	7 Apr 1102	64.97 64.97[b]	89.63 103.02[b]	248 870[b]	266 934[b]	600
Cosmos 785 (1975-116A)	TT F-1-m	12 Dec 1300	64.96 65.07[b]	89.61 104.26[b]	251 898[b]	261 1 023[b]	600

[a] See footnote [a] to table 5.1.
[b] Final orbit.

Sources

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Part II. Developments in world armaments

Chapter 6. World armaments, 1975

Introduction / Military research and development / World military expenditure / The defence industry / The international trade in arms / Conclusions / World military expenditure, 1975 / Registers of indigenous and licensed production of major weapons in industrialized countries, 1975 / Register of arms trade to industrialized countries, 1975 / Chronology of indigenous combat aircraft, missiles and warships made operational in the USA, the USSR, the UK and France, 1946–1975 / Registers of indigenous and licensed production of major weapons in third world countries, 1975 / Register of arms trade to third world countries, 1975

Chapter 7. Sources and methods for world armaments data

Purpose of the data / Sources / Definitions and restrictions / Military expenditure tables (appendix 6 A) / Registers of indigenously designed and licence-produced weapons in development or production (appendices 6 B and 6 E) / Weapon chronology (appendix 6 D) / Arms trade registers (appendices 6 C and 6 F)

6. World armaments, 1975

Square-bracketed numbers, thus [1], *refer to the list of references on page 144.*

I. *Introduction*

At the level of generalities, there is nothing remarkable to report about world armaments in 1975. World military expenditure, at current prices and exchange rates, amounted to about $280 billion; weapon production was large and widespread, the international trade in arms was extremely brisk and advances in military technology continued to frustrate efforts at arms control.

The fact that none of these statements, let alone all of them collectively, can be claimed to be unusual is cause for the greatest concern. Thirty years after the end of the most destructive war in human history the majority of nations in the world remain dedicated supporters of the notion that military strength is the best available means of preserving national security and promoting national interests.

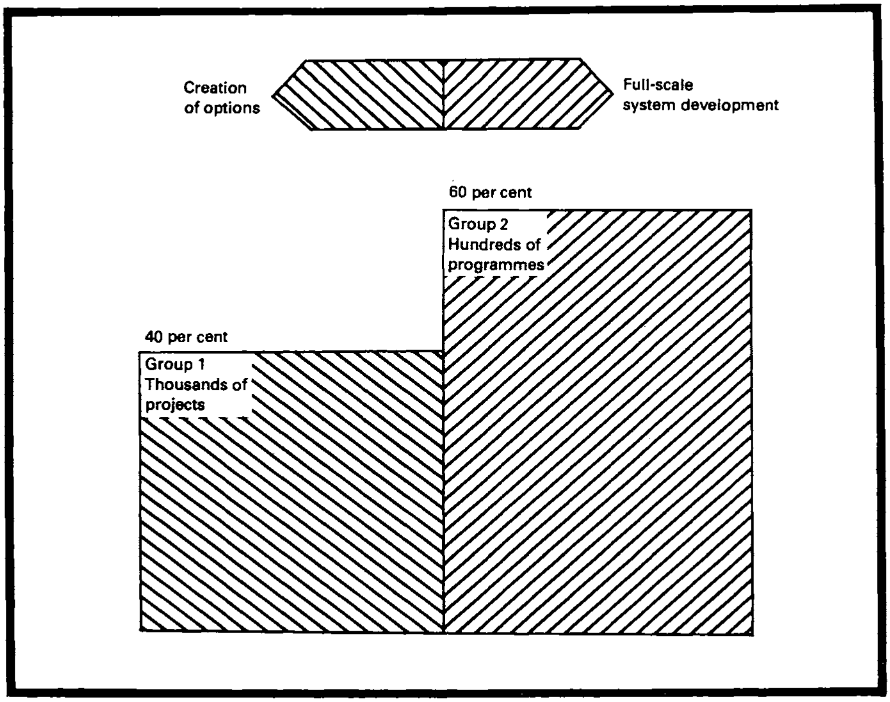
Military expenditure since World War II

The post-war period is remarkable for the consistency with which large quantities of resources have annually been set aside for military purposes. Including 1975, cumulative world military expenditure since the end of World War II amounts to something like $4 500 billion. This figure is computed at constant (1970) prices and is almost certainly a conservative estimate.

A large slice of this expenditure (of the order of one-third) has been for the development and production of major weapons. Appendix 6D gives an overview of some of the results of this activity in the four principal arms-producing countries—the USA, the USSR, France and the UK. Some remarkable figures can be derived. For example, in the space of 30 years these four countries have developed and put into operational service 76 distinct types and 144 variants of interceptor, fighter and attack aircraft. In addition some 36 types and variants were developed but cancelled prior to operational deployment.

Despite the obvious enthusiasm behind these efforts and despite the enormity of the overall investment there is no evidence that the majority of countries feel more secure; indeed, national insecurity seems to be by far the most widespread sentiment.

Chart 6.1. Relative distribution of US military RDT&E funds, FY 1976



[a] Activities under Group 1 are classified as basic research, exploratory development and advanced development. Group 2 consists of engineering development, management and support, and operational systems development.
Source: Adapted from reference [2], p. 23.

II. *Military research and development*

Apart from the huge increase in the volume of resources devoted to military uses the other distinguishing feature of the post-war period has been the extraordinary emphasis given to technological advances. The intensity of the drive—though not the drive itself—to develop and produce better machines is basically military in origin. A major conclusion drawn from events during World War II was that failure to have on hand the most technologically advanced weapons would have disastrous consequences. As a result, military research and development (R&D) was given the highest priority. In the major countries the quantity and quality of the scientific and engineering workforce were deliberately maximized (through changes in the educational system and by modifying relative wage and salary rates) to meet the enormously increased military demand.

Since these developments occurred in parallel in both East and West, the anticipated dangers of lagging technologically became a self-fulfilling prophecy. For the last 30 years new and improved weapons have emerged at an unmanageably rapid rate with no signs of any relaxation.

In the USA some $10.2 billion was requested for FY 1976 for research, development, test and evaluation activities conducted by the Department of Defense. This excluded several hundred million dollars for the design, development and testing of nuclear warheads and more than $1 billion for an activity called "Bids and Proposals" which covers the expenses incurred by defence contractors or would-be contractors in response to official "requests for proposals" concerning weapons and related technology.

Chart 6.1 gives some indication of how all-encompassing the military R&D effort is in the United States with the expenditure of about $4 billion proposed for the "creation of options" or, in other words, for the exploration (and creation) of scientific and technological developments for possible military application. The Soviet Union makes an effort comparable in size and scope while many other countries do what they can with, relatively speaking, very limited resources.

At the present time the most threatening new technologies—in the sense of being regarded by the military as too attractive to be given up at any price—include cruise missiles, terminal guidance for re-entry vehicles on ICBMs and so-called precision-guided munitions (PGMs). The conclusion of a second strategic arms limitation agreement between the United States and the Soviet Union in 1975 was prevented due to the uncertainties created by the cruise missile, a new weapon in the strategic equation. If terminally guided ICBM warheads are eventually deployed, it will essentially complete the trend of increasing vulnerability for fixed land-based strategic weapons. The ramifications of such a development probably cannot be underestimated. And finally, the application of various new technologies to achieve very high single-shot kill probabilities for tactical weapons (the PGMs) is arousing considerable enthusiasm: many observers foresee a decisive switch, on the grounds of both cost and effectiveness, in favour of defensive rather than offensive military postures. The widespread adoption of genuinely defensive military postures would be an extremely favourable development but a review of post-war developments in general does not permit a great deal of optimism.

Weapon development and production: just another industry?

The quantity of resources devoted annually to armaments has, on the average, been more than five times as large since World War II than over the period 1925–38, or 7.5 times as large if the rapid rearmament immediately preceding World War II is excluded. Since World War II, and particularly since the Korean War, the scientific and industrial resources supporting the military efforts of the major powers have constituted a significant fraction of the total resources available. Of greater significance, however, is the fact that the allocation of large quantities of resources to the maintenance of armed forces and the continuous modernization of their equipment has been rapidly accepted as a normal state of affairs, and thus a more or less permanent commitment.

One indicator of how alarmingly normal the continuous modernization of armed forces has become can be found in the increasingly elaborate forecasts of the worldwide demand for armaments. Forecasting is based on the assumption that the future can be inferred from the study of past and present conditions or, to put it another way, that past behaviour exhibits sufficient regularity to impart confidence to predictions based on a study of the past. It is also noteworthy that these forecasts of the probable size and structure of the future market for armaments are prepared and sold by commercial agencies.

An outstanding example of such agencies is Defense Marketing Services (DMS). Among other things, this US organization prepares a ten-year world aircraft forecast, the military component of which is based on a demand analysis of 128 military services, and a ten-year world warship forecast (including related missile, ordnance, propulsion and electronics requirements) covering 43 countries. In response to the rapid growth in the export market, a new information service has been prepared that identifies current and future requirements for all types of military equipment in 78 countries around the world. The new service purports to provide "all the information you need to plan your marketing program in the rapidly-expanding foreign military sales market" [2]. By changing a single word this quotation could easily refer to television sets or automobiles.

A question of values

As a glance at appendix 6A will indicate, any sustained exposure to the world of armaments involves the adoption of a scale of values quite different from that which prevails in the civilian world. In military circles $10 million is an insignificant sum; it will buy a solitary F-15 Eagle air-superiority fighter (without spares). The expenditure of tens or even hundreds of millions of dollars simply to explore new technological possibilities in a particular area is not uncommon.

If exploratory development shows promise, additional, and usually larger sums are invested to produce an operational prototype. A well-known recent example is the US F-16 fighter aircraft. The F-16 emerged from the light-weight fighter competition, a programme sponsored by the US Air Force to explore alternative ways of exploiting new technologies and concepts in the design of fighter aircraft. This programme resulted in four aircraft: two examples of the F-16 and two of the competing design, the F-17. Neither of these aircraft was developed to the point at which it could be mass-produced and used operationally; that was not the intention. Nevertheless, the development and construction of these four aircraft absorbed over $100 million. The air force selected the F-16 for further development up to operational standards at a currently estimated cost of $574 million.

Thus if all goes as expected, the development of the F-16 will cost some $675 million spread over six to seven years. In non-military circles, sums of this magnitude are almost fictitiously large, even though the F-16 is a low-cost programme; the performance parameters of the aircraft have been deliberately constrained so that it will be relatively inexpensive and can therefore be procured in relatively large numbers.

When one progresses from individual weapon systems to multinational aggregates of total military expenditure the sums become incomprehensibly large. Few people can translate $100 billion into anything tangible. In an attempt to give these huge sums some meaning, comparisons are often made with other aggregates considered to be more widely understood. Thus, it can be pointed out that total world military expenditure is (*a*) equivalent to the combined gross national products of the 65 countries in Latin America and Africa, (*b*) equivalent to total worldwide government expenditures on education, (*c*) about twice as large as government expenditures on health or (*d*) about 15 times as large as the value of all official assistance provided to the underdeveloped countries.

Comparisons such as these are undoubtedly helpful in conveying an impression of the sheer bulk of the resources devoted annually to military uses. On the other hand, if one wants to illustrate the gulf which exists between military and civilian fields regarding levels of expenditure considered acceptable for the achievement of a given objective, then a micro-approach is probably more illuminating. Consider, for example, the missile section of appendix 6B. This section describes over 100 different missile systems, one of them being the US AIM-7F Sparrow III air-to-air missile. The AIM-7F is the fourth model of the Sparrow III missile to become operational. Compared with its predecessor (the AIM-7E), the new model offers a longer range, a more powerful warhead, greater reliability and a more capable dual-mode (semi-active radar/infrared) homing system. The achievement of these improvements absorbed some $129 million over an eight-year period (1968–1975). Over the same period, the World Health Organization conducted a major programme to eradicate smallpox in the world. This programme, the imminent success of which was announced in November 1975, absorbed only $83 million [3].

III. *World military expenditure*

Total world military expenditure in 1975 was estimated to be $280 billion at current prices. In constant prices the total was some 0.3 per cent higher

Table 6.1. World military expenditure: growth rates and percentage distribution, 1955–1975

	Average annual per cent change	Percentage distribution				
		1955	1960	1965	1970	1975
World total[a]	**2.6**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
NATO	*1.0*	*61.7*	*62.3*	*55.2*	*49.9*	*44.8*
USA	*0.5*	*46.2*	*45.5*	*39.3*	*37.2*	*30.0*
WTO	*3.3*	*29.4*	*27.3*	*30.5*	*33.7*	*33.3*
USSR	*2.8*	*27.4*	*25.0*	*27.7*	*30.1*	*28.5*
Other Europe	*3.4*	*1.6*	*1.8*	*1.8*	*1.6*	*1.8*
Other developed	*4.1*	*1.2*	*1.1*	*1.3*	*1.4*	*1.5*
China	*6.5*	*2.9*	*3.1*	*4.9*	*5.7*	*6.1*
Third world	*10.3*	*3.2*	*4.6*	*6.3*	*7.7*	*12.3*
Middle East	*16.7*	*0.5*	*0.8*	*1.1*	*2.2*	*6.1*

[a] Totals may not equal 100 because of rounding.

Source: Appendix 6A.

than in 1974, the seventh consecutive year that fluctuations in the total have not exceeded ±2 per cent. On the average, world military expenditure (in real terms), increased at an annual rate of 4.5 per cent between 1948 and 1975. Annual percentage changes have exceeded this average figure on only seven occasions (1951, 1952, 1961, 1962, 1966, 1967 and 1968) but the increases in these years totalled $137.5 billion, or about 95 per cent of the difference between the totals in 1948 and 1975. But if years of comparative stability in world military expenditure outnumber the years of rapid increase by nearly 3 to 1, there is no evidence that this has restrained military developments to any significant extent. The absolute quantity of resources made available each year is simply too large for there to be any detectable sensitivity to a zero or slow rate of increase.

Although world military expenditure has moved upwards in spasms followed by periods of stability, the distribution of this expenditure has been changing in a more systematic way (table 6.1). The basic trend has been a declining concentration of expenditure on the European and North American continents with offsetting increases in the third world and China. And although military expenditure is a very imperfect index, the extent and persistence of this redistribution can be taken to indicate a diffusion of real military strength.

But despite the considerable and highly significant shift in the distribution of world military expenditure the NATO and WTO contributions remain predominant. Comparatively small percentage changes in the level of expenditure in either of these two alliances will still determine the overall trend in the world total. To put it another way, the stability of world military expenditure since 1970 is due largely to the stability of total expenditure in these two alliances.

Table 6.2. Forecasts of US military expenditure, FY1976–FY1980

US $ billion

	FY1976	FY1977	FY1978	FY1979	FY1980
Actual expenditure					
(1) Current prices	92.8	104.0	119.0	130.0	140.0
(2) Constant (FY1976) prices	92.8	95.3	102.4	105.8	108.5

Source: Reference [4], p. 1835.

Events during 1975 suggest that a continuation of this comparatively favourable trend is unlikely, at least within NATO. There appears to be a growing sentiment that while the West has maintained the *status quo* in order to explore—through avenues such as negotiations on European force reductions and the limitation of strategic arms—the possibilities of détente, the Soviet Union and its allies have significantly expanded their military forces. Indeed, 1975 was notable for the number of high-ranking officials, both political and military, who gave unusually hard-line assessments of the decline in NATO's military strength, relative to that of the Warsaw Treaty Organization.

Whatever the truth of this argument—and it is not without truth although the NATO countries have by no means been totally inactive—it is rapidly acquiring supporters. Unless something occurs very soon to revive optimism over the long-term prospects of détente it seems fairly certain that a major effort will be made to boost NATO's military effort. Indeed, in the largest country in this alliance, this effort has already begun. The present Administration in the USA appears determined to match what it considers to be the trend of Soviet resource input into military activities and it considers this trend to be upward at a minimum of 3 per cent annually. Because of the dominant influence of expenditure trends in these two countries they are discussed in more detail below.

Possible future trends in US military expenditure

In the course of Congressional hearings on the FY 1976 military budget, the Department of Defense presented some forecasts of military expenditure through FY 1980. The forecasts were presented by Assistant Secretary of Defense for Program Analysis and Evaluation, Leonard Sullivan [4]. The main purpose behind the preparation of the forecasts was to show that even the maintenance of constant force levels requires a steady increase in real military expenditure.

The forecast expenditure (outlays) figures shown in table 6.2 are not formal targets; in fact, the expenditure figure eventually determined for

Table 6.3. Cost growth in selected categories of US weapon systems

Type of system	Period	Systems included	Average annual increase in real cost *Per cent*
1. Main battle tank	1940–1980	Sherman, M-48, M-48A1, M-48A2, M-60, M-60A1, M-60A3, XM-1	*4.8*
2. Attack/utility helicopters	1950–1980	H-19, UH-1, AH-1G, AH-1S, UTTAS, AAH	*4.3*
3. Solid fuel ballistic missiles	1960–1979	A-1, MM-1, A-2, A-3, MM-2, MM-3, C-3, C-4	*4.8*
4. Tactical aircraft:			
High mix	1960–1975	F-4A/B, F-4D, F-4J, F-4E, F-111, F-14, F-15	*9.2*
High/low mix	1960–1985	F-4A/B, F-4D, F-4J, F-4E, F-111, F-14, F-5E, F-15, F-16, F-18	*5.3*
5. Major ships/submarines/ aircraft carriers	(1945–1975)	. .	(*4.5*)
6. Average all major weapon systems	(1940–1985)	–	(*5.5*)

Source: Reference [4], pp. 1826–29.

FY 1976 and that proposed for FY 1977 are both significantly lower although, as mentioned above, the present Administration is attempting to re-establish an upward trend in real military expenditure. Of primary interest is the analysis behind these forecasts, particularly the growth in the real cost of weapon systems due to their increasing complexity and sophistication.

An analysis of more than 15 different categories of weapon systems over the post-war period showed that technological advances have produced an average annual increase in real prices of about 5.5 per cent. In other words, on the average, the real cost of major weapon systems doubled every *13* years.

The rate of increase in cost varied considerably between types of major weapon systems as is shown in table 6.3. Where systems currently under development are included there is, of course, the risk that these systems will not, in the end, be developed and produced at currently estimated costs.

The manner in which these cost-growth figures were used can be briefly described. The cost growth in equipment other than major weapons being lower, the average annual rate of increase for all "investment" expenditure by the US Department of Defense was estimated at about 4 per cent. Then, since investment expenditures account for approximately one-half of total military expenditure and since all increases in personnel costs are treated as inflation, it follows that total military expenditure will have to rise, in real terms, at an average rate of at least 2 per cent annually if present force levels are to be maintained and equipment kept up to date. Finally, consideration was given to the probable evolution of Soviet military strength. Official US estimates show Soviet military expenditure, in real terms, rising at an average of 3 per cent per annum over the last decade with annual changes fluctuating between 1 and 5 per cent. The projections of US expenditure in table 6.2 show an average growth rate, in real terms, of 4 per cent. The current price figures are, of course, based on additional assumptions regarding inflation and military pay increases.

As mentioned above, these projections are not formal targets and have not, in fact, proved to be particularly accurate. They do, however, provide evidence of the persuasive influence on military costs of a commitment to technological superiority.

Soviet military expenditure[1]

During the debate in the USA on the FY 1976 and FY 1977 Transition Defense Budget, intelligence estimates of the dollar cost of the Soviet military effort assumed a fairly prominent role. The estimates, prepared by the Central Intelligence Agency (CIA), were compiled by applying US costs to all known aspects of the Soviet military apparatus, that is, personnel, operation and maintenance of existing forces, military construction and the rate of production of new equipment. The only component of expenditure estimated directly from an analysis of Soviet financial statistics was military R&D, because for the most part, this activity involves no observable hardware [5a].

The estimates, presented in constant 1973 prices and on a calendar year basis, show Soviet expenditures rising at an average annual rate of about 3 per cent over the period 1964–74 and surpassing US outlays for the first time in 1971. For 1974, Soviet outlays were estimated at approximately $93.5 billion, nearly 20 per cent higher than those of the USA [5b].

The manner in which the estimates were compiled permitted a number of direct comparisons to be made on various components of military expenditure. Thus, Soviet expenditure on military investment (R&D, procurement and construction) was some 25 per cent higher than that of the United States in 1974. Similarly, Soviet military R&D expenditure was shown to have exceeded US expenditure for the first time in 1971 with the margin widening to about 25 per cent in 1974. As a final example, Soviet expenditure on offensive strategic weapons (excluding R&D) was shown to have exceeded US expenditure every year since 1966 with the difference in 1974 amounting to 60 per cent [5c].

In presenting the estimates to Congress the CIA carefully qualified them both with regard to their accuracy and to their limitations for evaluating

[1] This section is largely based on reference [5].

relative military strength.[2] Inevitably, however, the estimates began to be used in an increasingly cavalier manner. Comparison of weapon systems and force levels is an extremely complicated exercise and it seems highly likely that bewildered legislators are heavily influenced by the comparative simplicity of a graph depicting the relative level and trend of total military expenditure. As Senator Proxmire remarked: "Much of our military spending is based on our estimates of what our potential adversary may be spending" [5d].

Comparisons of military expenditures can serve a useful, if limited, function in assessments of relative military strength. The disturbing fact is that the uncertainties surrounding any estimate of Soviet military expenditure—whether in dollars or in roubles—are very great and yet such estimates appear to play an important role in US decision-making on their own military budget. A related concern is that it is virtually impossible for anyone outside official defence and intelligence circles effectively to verify or challenge the official estimates, at least within the period during which a particular defence budget is being debated. Anyone who does not have access to intelligence data must start with the official defence budget (17.4 billion roubles in 1975) and the official rouble: dollar exchange rate (0.69 in mid-1975), or in other words, a dollar figure of $25.2 billion. The task of justifying additions to the official defence budget and of computing a rouble: dollar conversion ratio for military activities is difficult, time-consuming and can only yield a very low-confidence estimate.

It is not being suggested that any estimate of Soviet military expenditure emanating from the defence and intelligence community in the United States is necessarily inflated. The scale and momentum of Soviet military activities can hardly be described as modest. The point is that comparative expenditure figures play an important role and the figures being used lack credibility.

Considerable efforts are now being made in the United States to improving estimates of Soviet military expenditure.[3] However, no major improvement in the credibility of data on Soviet military expenditure

[2] CIA Director Colby stated that the margin of error for the estimates was not likely to exceed 15 per cent and that, if anything, the estimates were conservative. The CIA refused to provide estimates of Soviet expenditure in roubles stating that work on dollar: rouble conversion ratios was still incomplete at the time. Similarly the CIA could not provide estimates of the rouble-equivalent of US military spending. However, it was stated that preliminary calculations of each country's expenditure in roubles show a Soviet advantage in 1974 of about 10 per cent (against 20 per cent in dollar terms) and that Soviet expenditure first exceeded that of the United States in 1974 (against 1971 when the comparison is made in dollars). Interestingly, one of the main problems in converting US spending into roubles is that "the Soviets simply do not have the technology required to produce many of the US weapons nor could they produce close substitutes." [5e] This, of course, makes the estimation of rouble prices for US weapons extremely difficult.

[3] For example, the Office of Net Assessment in the Department of Defense was recently created for this express purpose.

Table 6.4. Alternative SIPRI estimates of the dollar-equivalent of Soviet military expenditure

US $ billion

1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
49.1–54.8	52.9–59.1	61.2–68.3	64.8–72.4	65.7–73.4	65.7–73.4	65.7–73.4	65.7–73.4	64.5–71.9	63.7–71.1

can be expected unless that country officially provides more information than is currently available.[4]

The SIPRI estimates of Soviet military expenditure are based on an analysis of the Soviet State budget. Owing to the uncertainties involved, a deliberately conservative approach was adopted in estimating total expenditure in roubles. For conversion into dollars, different rouble : dollar ratios were selected for each of the major categories of expenditure: uniformed military personnel, operation and maintenance, procurement and R&D. A single ratio was then devised by weighting the individual ratios according to the estimated distribution of military expenditure in 1970.[5]

If, instead of applying a single weighted average rouble : dollar ratio, the individual ratios are applied directly, the estimates of the dollar-equivalent of Soviet military expenditure are somewhat higher than those given in appendix 6D. These alternative estimates are presented in table 6.4, below. Because it is necessary to assume that the estimated distribution of expenditure in 1970 is applicable over a longer period, calculations were only made for the years 1966–75.

IV. *The defence industry*

As was the case in 1974, the weapon development and production programmes in the industrialized countries showed remarkable resilience to

[4] New estimates of relative (dollar) military expenditure in the USA and the USSR were released in January 1976 in conjunction with the FY 1977 defence budget. The figures were stated to be relative expenditures on baseline military forces (excluding, for example, retirement pay and military assistance). Compared with the CIA estimates discussed in this section, the new estimates show an even wider differential in favour of the Soviet Union. For FY 1975, for example, Soviet expenditure is put in the $126–136 billion range. The mid-point of this range is over 40 per cent higher than the US baseline expenditures of $92.3 billion. Both figures are computed at FY 1977 US prices.

[5] The percentage distribution of Soviet military expenditure and the rouble : dollar ratios adopted were as follows:

	Per cent of total expenditure	Rouble : dollar ratio
Personnel	21	0.2
Operation & maintenance	25	0.5
Procurement	35	0.38–0.44
R&D	19	0.28–0.40

The weighted average rouble : dollar ratio which results is 0.37. For a more complete discussion the reader is referred to *World Armaments and Disarmament, SIPRI Yearbook 1974* [10].

the economic difficulties which continued to plague most of these countries during 1975. Although economic recession and high rates of inflation produced an unfavourable climate, military budgets were maintained in most countries; some even increased their expenditures in real terms. And for those with competitive weapons to offer, the export markets, particularly in the third world, provided a volume of business more than sufficient to offset any stagnation in national demand. The register in appendix 6F fully bears out this assessment.

In the United States, Congress reduced the requested level of military expenditure for FY 1976 by a little over $3 billion but this did not involve the cancellation of any major weapon programmes. On the other hand, no new major weapon programmes were initiated. A partial exception was the F-18 Navy air combat fighter. The F-18 is a much refined derivative of the YF-17, which lost the US Air Force light-weight fighter competition to the YF-16. Although Congress requested the Navy to use the F-16 as the basis for its own "low-cost" fighter, the latter insisted on a derivative of the twin-engined YF-17. Despite severe opposition, the F-18 programme, involving $1.4 billion in R&D, was accepted and initial funding provided in the FY 1976 budget.

One of the more ironical developments in the USA during 1975 was the Congressional decision to mothball the one existing Safeguard anti-ballistic missile site despite the fact that this facility only became fully operational earlier that year. Only the Perimeter Acquisition Radar, which can detect incoming missiles at long range, will remain operational. The short-range Missile Site Radar and the missiles themselves (Spartan and Sprint) will be deactivated.

In Europe, France cancelled the multi-role Super Mirage in favour of the less costly single-engine Delta 2000 which will be limited to the interceptor role. The UK cancelled three missile programmes: Hawkswing and Beeswing, helicopter-launched and infantry versions, respectively, of the Swingfire antitank missile, and the Sub-Martel, a submarine-launched anti-shipping missile. The French–West German Milan and US Harpoon missiles will be purchased to replace Beeswing and Sub-Martel, respectively.

The reactions of the manufacturers to the cancellation of these weapons are indicative of the current strength of the export market for armaments. Dassault, prime contractor for the Super Mirage, indicated its intention of developing privately a twin-engined, multi-role version of the Delta 2000 for export. Similarly the British Aircraft Corporation intends to complete the development of Beeswing and Hawkswing in the hope of securing export orders.

The export demand for armaments has not been confined entirely to production orders for existing weapons. A number of development contracts have also been negotiated. France is developing the Chahinn

Table 6.5. Licensed production of major weapons in the third world, 1975

Licenser / Licensee	USA	USSR	France	UK	Italy	FR Germany	Czecho-slovakia	Switzer-land	Spain	Israel	China
Argentina	6, 7			11		12, 13, 14		10			
Brazil	6			11	1, 2, 7	8					
Colombia	6										
Egypt				1[b], 7[b]							
India		1, 8	7, 8, 11	1, 4, 9, 11			10	15			
Indonesia						7			5		
Korea, North		(1), 14									
Korea, South	1[b], 13										
Pakistan	3, 7		1[b], 7			8[a]					8[b]
Peru					11						
Philippines				5	3	7					
Singapore						13					
South Africa			1, 10		1, 2, 4	9[b]				13	
Taiwan	1, 7										
Venezuela					11						

Code:
1. Combat aircraft
2. Jet trainers
3. Other trainers
4. Medium transports
5. Light transports
6. Light utility aircraft
7. Helicopters
8. Missiles
9. Tanks
10. Armoured cars/APCs
11. Major warships
12. Submarines
13. Missile-armed patrol boats
14. Patrol boats
15. Electronic systems

[a] Production continues despite the West German embargo.
[b] Advanced negotiations but no firm contract as of late 1975.

Source: Appendix 6E.

mobile surface-to-air missile system (employing the Crotale missile) for Saudi Arabia. The UK is developing a similar system (using the Rapier missile) for Iran. Similarly, British negotiations with Iran concerning an additional 1 200 Chieftain main battle tanks apparently involved the development and incorporation of a number of improvements which, in the opinion of some observers, would significantly increase the capabilities of this weapon.

Defence industries in third world countries continue to mature. Argentina, India and Israel have indigenous combat aircraft programmes under way; Brazil, India, Israel, South Africa and Taiwan are developing and/or producing their own missiles of various types—antitank, ship-to-ship, surface-to-surface, air-to-surface, and air-to-air. During 1975 Israel introduced its Kfir fighter, the first country other than the USA, the USSR, France, the UK, Sweden and China to develop successfully and produce indigenously—at least to a significant extent—an advanced, supersonic combat aircraft. Development and production activity is more widespread in less sophisticated fields such as trainer and transport aircraft, small ships and boats and small arms.

Although a considerable number of third world countries appear determined to build up an indigenous weapon design and development capability, this is very much a long-term objective. Apart from direct imports the predominant method of weapon acquisition remains the production of foreign systems under licence. The extent of this activity is summarized in table 6.5.

The horizontal proliferation of defence and defence-related industrial facilities also continued in 1975 with the establishment of aircraft-manufacturing plants in Peru, the Philippines and the Democratic People's Republic of Korea. However, the most important new development along these lines is likely to occur in Egypt which has a $2-billion fund—provided mainly by Saudi Arabia and Kuwait—for the establishment of an Arab defence industry, specifically the Arab States Military Industrial Organization. Both France and the UK are competing for large licence-production contracts for light attack aircraft and helicopters planned as the initial projects for this new industry.

V. *The international trade in arms*

The arms trade with the third world

Of all the aspects of world armaments the arms trade with the third world is probably the most dangerous at the present time. The volume of this trade has grown consistently throughout the post-war period. Similarly, there has been a steady progression in the modernity of the weapons traded. However, the October 1973 Arab–Israeli War and its various ramifications (particularly, of course, the oil crisis) led to an abrupt and alarming change in pace. Developments which may otherwise have taken a decade or more have been compressed into the space of two or three years. Indeed, so hectic has been the international market for arms over the past two years that all appearances of control, whether supposed or real, have vanished.

The fact that the arms trade was so manifestly out of control did at least serve to attract attention to this long-neglected subject. Statements that the export of arms constituted a carefully controlled instrument of foreign policy fell on increasingly sceptical ears in many countries. Particularly notable have been the recent changes made in the USA to permit Congress to review all transactions valued at more than $25 million—whether commercial or official—and to prevent a transaction if both the House and the Senate voted disapproving resolutions. Furthermore, proposals were being made early in 1976 to prohibit the sale of US armaments to countries judged to have violated the human rights of their citizens. Since the adoption of this criterion would, at least potentially, severely restrict the scope and size of US arms sales, it was being strongly opposed by the Administration and the arms manufacturers.

On the other hand, the enormous increase in the export demand for armaments, coupled with the circumstances in which it took place, produced equally strong pressures in the other direction. Conditions of economic recession, high rates of inflation and balance-of-payments difficulties were almost universal in the industrialized countries, a state of affairs produced in no small part by the policies of the Organization of Petroleum Exporting Countries (OPEC) whose members in turn constituted the primary source of demand for armaments in the third world. The fact that none of the member countries of OPEC currently has any significant capacity to develop or even manufacture modern weapons makes the area an open market with a value measured in billions of dollars annually: in just three years, 1973–75, the USA secured firm orders for military equipment and services valued at $13.7 billion from the OPEC countries. As this figure suggests, the United States as well as the Soviet Union, France, the United Kingdom and many of the smaller arms-producing countries found the temptation of meeting this lavish new demand for armaments utterly irresistible. And in countries that to date have pursued restrictive policies with regard to the export of armaments—FR Germany and Japan, for example—there were powerful internal pressures to liberalize these policies.

The actual value, in current price terms, of the global traffic in weapons, equipment and related services can only be guessed at. The USA is still the only country to provide detailed information—or indeed any information at all—on its activities in this field. And although that country is currently the largest arms exporter, the combined activities of the Soviet Union, France,

Table 6.6 Export of weapons, equipment and related services by the USA, 1966–1975

Fiscal years, US $ million

											Cumulative totals 1966–1975		
	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	Orders	Deliveries	Balance
1. Total export orders[a]	1 627	979	799	1 551	953	1 657	3 261	4 368	10 809	9 511	35 515[b]	15 722[b]	19 793
Industrialized	1 280	636	489	875	579	554	1 662	978	1 292	3 297	11 642	8 028	3 614
Third world	330	324	294	667	334	1 085	1 560	3 302	9 498	6 182	23 576	7 482	15 994
OPEC[c]	228	204	77	245	159	496	907	2 765	6 516	4 413	16 010	3 433	12 577
2. Commercial sales[d]	196	238	257	251	438	397	424	362	502	..	..	3 065	..
3. Grant assistance[e]	1 071	1 012	790	645	544	559	555	523	716	765	..	7 180	..

[a] Cash and credit sales under the Foreign Military Sales Program.
[b] Includes "international organizations" not included in the subcategories below.
[c] Organization of Petroleum Exporting Countries.
[d] Deliveries.
[e] Expenditures under the Military Assistance Program. Surplus equipment provided under MAP is included only to the extent of packaging and transportation costs. The acquisition value of surplus equipment delivered over the period 1966–75 was $3.9 billion.

Source: Reference [8].

the United Kingdom and a host of lesser arms suppliers are certainly of the same order of magnitude.[6] Nevertheless, the US data, summarized in table 6.6, illustrates a number of trends that have a wider relevance, namely, the dominance of sales over grants, the comparatively rapid growth of demand in the third world and the expansion of commercial sales.

Perhaps of greater significance than the rapid escalation in the total value of the trade is the marked change that has occurred in the nature of the equipment demanded and, more generally, in the comprehensiveness of the military capability which a number of third world countries are seeking to acquire. Some third world countries are now insisting on and receiving the very latest technologies across almost the entire spectrum of conventional weapon systems and related equipment. Supplying countries have, to a significant extent, dropped their inhibitions regarding the export of highly sophisticated and/or newly developed conventional weapons and weapon subsystems.

Similarly, many of the arms contracts signed in recent years go far beyond

[6] The US Department of Defense estimates the combined military export sales of France, the UK, FR Germany and Italy at $4.5 billion in 1974 [6b]. If the Soviet Union and other suppliers—Czechoslovakia, Canada and Belgium to cite only three—were included, it is unlikely that the total would fall far short of $10 billion.

the mere transfer of weapons to include training, technical support, the establishment of maintenance and repair facilities in the purchasing country, and construction projects. The escalation in the complexity of the systems being purchased has led to a large derived demand for technical support services to permit the fastest possible assimilation of the new equipment. This has involved the stationing in the purchasing countries of large numbers of foreign technical experts. As another indication, by June 1975, the USA had $4.3 billion in outstanding construction contracts under the Foreign Military Sales programme, mainly from Iran and Saudi Arabia. The work contracted for includes communications networks, command centres and naval facilities.

It is true that these developments are at present heavily concentrated in the major oil-producing countries, particularly Iran and Saudi Arabia. In view of the costs involved, this is hardly surprising. The more sophisticated the weapon system, the larger and more complex become the infrastructure and logistical facilities required to support it. Nevertheless the fact that weapons and equipment incorporating the newest technologies will be exported if a cash demand exists will almost certainly mean the proliferation of these items as rapidly as financial considerations permit. One indication of this trend is the expanding international market for retrofitting advanced systems—such as laser designators and computerized weapon delivery systems—into existing combat aircraft [7].

Value of the trade with the third world

In two years—1974 and 1975—the value of resources transferred to the third world in the form of major weapons has increased by more than 60 per cent. In 1974 there was a 41 per cent increase and in 1975 a further 23 per cent increase. Indeed the cumulative value of major weapon transfers in the six years 1970–75 ($19.2 billion) is already larger than that for the decade 1960–69 ($14.2 billion) and nearly three times that for the decade 1950–59 ($6.8 billion).

The Middle East is, of course, primarily responsible for the acceleration in the value of imports of major weapons by the third world but significant increases have also occurred in Africa, in the Far East (excluding Viet-Nam) and in Latin America (see tables 6.7 and 6.8). As one would expect, five of the ten leading arms importers in the third world, ranked by the cumulative value of arms imports over the period 1965–75, are Middle Eastern countries (table 6.9). If Viet-Nam is excluded, North Korea ($644 million) and Saudi Arabia ($619 million) would be included in the list.

Table 6.7. Increase in the value of imports of major weapons by the third world

US $ mn, at constant (1973) prices

	Average annual imports		
	1964–68	1969–73	1974–75
Total third world	1 521	2 527	4 387
Middle East	549	1 181	2 451
Far East, total	469	640	408
excl Viet-Nam	259	266	332
South Asia	191	277	210
North Africa	70	98	378
Sub-Saharan Africa	130	126	401
Latin America	114	206	497

Source: Appendix 6F.

Table 6.8. Distribution of the value of imports of major weapons by the third world, 1970–75

Per cent

Region	1970	1971	1972	1973	1974	1975
Middle East	*49.7*	*47.4*	*31.0*	*61.0*	*56.4*	*56.1*
Far East	*23.9*	*23.0*	*39.2*	*10.6*	*8.5*	*10.5*
Viet-Nam	*14.7*	*11.7*	*34.5*	*2.3*	*3.6*	*0.3*
South Asia	*10.2*	*13.4*	*11.8*	*8.0*	*7.3*	*2.8*
Latin America	*5.2*	*7.3*	*9.9*	*4.3*	*10.4*	*12.2*
North Africa	*4.1*	*3.3*	*4.8*	*4.0*	*4.4*	*12.1*
Sub-Saharan Africa	*6.7*	*5.5*	*3.3*	*5.2*	*12.9*	*6.2*
OPEC[a]	*15.2*	*21.2*	*16.0*	*19.2*	*29.4*	*48.0*

[a] Organization of Petroleum Exporting Countries. Totals will add to more than 100 because OPEC countries are situated in the Middle East, the Far East, Africa and South America.

Source: Appendix 6F.

Table 6.9. Ten leading importers of major weapons in the third world

US $ mn, at constant (1973) prices

Country	Cumulative imports 1965–75
1. Iran	3 220
2. Egypt	3 047
3. Syria	2 185
4. Israel	2 118
5. India	1 901
6. Viet-Nam, N.	1 513
7. Viet-Nam, S.	1 495
8. South Africa	1 061
9. Iraq	1 060
10. Libya	1 050

Source: SIPRI worksheets.

Table 6.10. Arms imports by industrialized countries, 1963–73[a]

US $ mn, at constant (1972) prices

1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
3 674	3 569	3 121	2 992	3 431	3 363	3 871	3 200	3 494	3 931	2 567

[a] NATO, WTO, Other Europe, Australia, Japan, New Zealand.

The trade among industrialized countries

Among the industrialized countries the volume of the trade in armaments has been comparatively stable. The only estimates currently available of the value of this trade are those prepared by the US Arms Control and Disarmament Agency (ACDA). The estimates, shown in table 6.10, are only available for the period 1963–73 but they do purport to measure the total trade, that is, major and minor weapons, spare parts, ammunition, support equipment and other commodities considered primarily military in nature. Although the volume of the trade is considerable, it has not exhibited any marked growth; the contrary may be true if the decline in 1973 has persisted in 1974 and 1975.

The widespread economic difficulties in recent years have reinforced more permanent phenomena such as the rapidly escalating cost of weapons and the political difficulties of maintaining large military budgets. As a result, decision-making on weapon acquisition, particularly imports of weapons, has become an arduous and drawn-out process characterized by hard bargaining.

The outstanding example of 1975 was, of course, the selection of the US F-16 fighter by four European NATO countries in preference to the French Mirage F1E and the Swedish Viggen. To secure this contract the United States agreed to a ceiling on the unit cost of the aircraft ($6.09 million in 1975 prices) despite the fact that more than two years of development work remained to be done. In addition it was agreed that the four purchasing countries would receive contracts to manufacture components amounting to 40 per cent of the value of the aircraft they bought themselves, 10 per cent for aircraft purchased by the USA and 15 per cent for the first 500 aircraft purchased by third parties. Thus in Belgium, for example, it has been calculated that if a total of 1 700 F-16s are built, the value of the associated contracts placed with Belgian industry will equal the total cost of the 102 aircraft being purchased.

Although unique in size, the complexities of the F-16 deal are fairly typical of current arms transactions in general. Purchasing countries with an advanced industrial infrastructure are insisting on subcontracts to offset as much of the cost of a transaction as possible. And countries without appropriate industrial facilities are seeking to create them in conjunction

Table 6.11. The pattern of trade in major weapons and components in industrialized countries, 1975

Imports from / Exports to	Belgium	Canada	Denmark	France	FR Germany	Greece	Italy	Luxembourg	Netherlands	Norway	Portugal	Turkey	UK	USA	Bulgaria	Czechoslovakia	German DR	Hungary	Poland	Romania	USSR	Albania	Austria	Finland	Ireland	Spain	Sweden	Switzerland	Yugoslavia	Australia	China	Japan	New Zealand
Belgium																																	
Canada					3								3	3														3			3		
Denmark																																	
France			3		1 2 3	1	3				1		1 3							2			3		1	1 2 3	3		2 3		1	3	
FR Germany	2			3		1	2		1		1	1 2	3													1 2 3	1 3						
Greece																																	
Italy				3	3	1						1	3	3												1			3				
Luxembourg																																	
Netherlands	3				3		1						3	3																			
Norway																																	
Portugal																																	
Turkey																																	
UK	1 2 3	1	3	3	1 3		3		3					1 3						2						3	3	1	2 3	1		3	1
USA	3	1 3	1 3	1 3	1 2 3	1	1 2 3	1	3	1 2		1	1 2 3											1 3		1 3	1 3	1		2 3		1 2 3	1 3
Bulgaria																																	
Czechoslovakia															1		1	1 2		1	1												
German DR																																	
Hungary																																	
Poland																					(1)												
Romania																																	
USSR															1	1 2 3	1	1	1 2 3	1				1					1 2		(1)		
Albania																																	
Austria																																	
Finland																																	
Ireland																																	
Spain											1																						
Sweden			1	3																				2				1					
Switzerland	3				3		3							2								1					3						
Yugoslavia																																	
Australia													1																				
China																				1		1											
Japan																														1			
New Zealand																																	

Code: *1* =trade in complete weapons. 2=trade in licences. 3=trade in major components or subsystems (or in the technology for those items).

Source: Appendices 6B and 6C.

with major arms purchases. The economics of weapon development and production and the fierce international competition in this field have forced manufacturers to be increasingly accommodating to these demands. Table 6.11 summarizes the complexities of the trade in armaments among the industrialized countries.

VI. *Conclusions*

The fact that the international trade in arms has increasingly involved, and is now dominated by, cash and credit transactions has immeasurably increased the difficulties of establishing any form of control. For even the most sophisticated conventional weapon systems and equipment there are at least three alternative suppliers to any one supplier wishing to exercise restraint. At lower levels of sophistication the number of alternative sources is significantly larger.

The US ban, recently lifted, on the sale of "sophisticated" weapons to South American countries proved to be something of a bonanza for France (aircraft), the UK (surface ships and submarines) and FR Germany (submarines). Similarly the US embargo on arms shipments to Turkey, imposed in February 1975, led that country to approach France and the UK both for direct arms purchases and for participation in a plan to expand the Turkish defence industry. Turkey also secured the prompt delivery of Italian-built F-104 Starfighters while the US embargo was in force.

The view that unilateral restraints on arms exports are politically useless and economically costly has gained increasing support in recent years. Moreover, the fact that the transactions are predominantly on a cash or credit basis has made it easier for the supplying countries to absolve themselves of responsibility for whatever impact—military, economic or political—the arms supplied may have. Purchasing countries, it is argued, are sovereign states that are free to dispose of their resources as they see fit. This rationalization has been severely damaged by the recent disclosures of the demand-creating activities of many of the major arms manufacturers, including the payment of large commissions and in some cases outright bribes to secure contracts. Although these activities primarily affect the distribution of the demand, the major powers, because of the example they have set, must still accept a large part of the responsibility for the demand itself.

The international transfer of weapons, weapon technology and industrial know-how for weapon production has passed well beyond the point at which it could be regarded as essentially a sideline of the main arms race between East and West. In size, geographic scope and particularly in comprehensiveness, the arms trade has become a phenomenon of major importance, the control and limitation of which can only come about through a general commitment to diminish the role of relative military strength in international relations and through the pursuit of effective arms control and disarmament measures.

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World armaments data

Conventions and abbreviations

The following conventions and abbreviations are used in the tables and registers of world armaments data. For the sources and methods used in preparing this data, see chapter 7.

Conventions

. .	Information not available
( )	Uncertain data or SIPRI estimate. For military expenditure: estimates based on budget figures or using an estimated consumer price index, or both. For GDP, NMP data: where sources other than *National Account Statistics* are used
[ ]	For military expenditure: rough estimate
<	Less than the number given
>	More than the number given
~	Approximate number
–	Nil
1969–	1969 and subsequent years
n.a.	Not applicable
†	For military expenditure: year of independence
▮	For military expenditure: GDP figures used for years after this symbol are not *strictly* comparable with those for preceding years

Abbreviations

A	Attack
A/A	Anti-aircraft
AAM	Air-to-air missile
ABM	Anti-ballistic missile
AC	Armoured car
AD	Air defence
AEW	Airborne early warning

AF	Air Force
aircr	Fixed-wing aircraft
ALBM	Air-launched ballistic missile
ALCM	Air-launched cruise missile
APC	Armoured personnel carrier
approx	Approximately
Ar	Armament
ARM	Anti-radar missile
A/S	Antisubmarine
A/SM	Antisubmarine missile
ASM	Air-to-surface missile
A/S TT	Antisubmarine torpedo tubes
ASW	Antisubmarine warfare
A/T	Antitank
ATM	Antitank missile
AWACS	Airborne warning and control system
B	Bomber
batt	Battery
carr-b	Aircraft-carrier based
carr-b or land-b	Aircraft-carrier based or land-based
COIN	Counterinsurgency
com.&con.	Command and control
Co-prod	Co-production
CVR(T)	Combat vehicle reconnaissance (tracked)
D	Diesel
Displ	Displacement of naval vessels, in tons
E	Electronic equipment
ECM	Electronic countermeasures
E-d	Computer/data processing equipment
E-f	Fire-control system (for armaments)
E-g	Guidance system (for missiles)
E-n	Navigation equipment
E-r	Radar
E-s	Sonar
Ex-Im	Export-Import Bank

F	Fighter
FAC	Fast attack craft
FB	Fighter-bomber
fixed	Fixed land-based
FROG	Free rocket over ground
GT	Gas turbine
HE	High explosive
hel	Helicopter
I	Interceptor
ICBM	Intercontinental ballistic missile (range >5 500 km)
Imp	Imported
Indig	Indigenization
IR	Infrared
IRBM	Intermediate-range ballistic missile (range 2 750–5 500 km)
J	Jet
kt	Kiloton (1 000 tons of TNT equivalent)
L	Licence
LOH	Light observation helicopter
LP	Liquid propellant
LRCM	Long-range cruise missile
MAP	(US) Military Assistance Program
MBT	Main battle tank (heavy, medium)
MG	Machine gun
MIRV	Multiple independently targetable re-entry vehicle
miss	Missile
Mk	Mark
mobile	Mobile ground-based
Mod	Model
MRBM	Medium-range ballistic missile (range 1 100–2 750 km)
MRV	Multiple re-entry vehicle
mt	Megaton (1 000 000 tons of TNT equivalent)

N	Nuclear
P	Piston
portable	Portable (man-carried)
pp	Power plant
recce	Reconnaissance
Req	Requirement
RL	Rocket launcher
S	Solid propellant
SAM	Surface-or Ship-to-air missile
SAR	Search and rescue/sea-air rescue
ShShM	Ship-to-ship missile
ShSuM	Ship-to-submarine missile
SL	Storable liquid
SLAM	Submarine-launched air missile
SLBM	Submarine-launched ballistic missile
SLCM	Ship/Submarine-launched cruise missile
SP	Self-propelled ground-based
Sqds	Squadrons
Srs	Series
SSM	Surface-to-surface missile
ST	Steam turbine
STOL	Short take-off and landing
sub	Submarine
SuShM	Submarine-to-ship missile
SuSuM	Submarine-to-submarine missile
t	Ton
T	Turboprop (fixed-wing), turboshaft (helicopter)
TOW	Tube-launched, Optically-tracked, Wire-guided
towed	Towed ground-based
transp	Transport
TT	Torpedo tube
U.c.	Unit cost
USAF	United States Air Force
USN	United States Navy

vers	Version
VG	Variable geometry
VIP	Very important person
V/STOL	Vertical or short take-off and landing
VTOL	Vertical take-off and landing

Appendix 6A

World military expenditure, 1975

For sources and methods, see chapter 7. For conventions, see page 145.

Table 6A.1. World summary: constant price figures

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
USA	62 370	58 850	59 645	60 825	60 858	61 192	59 554	62 008	67 241	66 280	64 096
Other NATO	20 023	19 755	20 795	21 071	19 401	20 924	21 760	22 537	24 576	25 419	25 858
Total NATO	**82 393**	**78 605**	**80 440**	**81 896**	**80 259**	**82 116**	**81 314**	**84 545**	**91 817**	**91 699**	**89 954**
USSR	31 100	34 900	31 600	31 300	30 500	33 000	32 700	40 800	44 600	48 900	46 700
Other WTO[a]	2 150	2 600	2 600	2 700	2 900	3 000	2 958	3 250	4 147	4 469	4 471
Total WTO	**33 250**	**37 500**	**34 200**	**34 000**	**33 400**	**36 000**	**35 658**	**44 050**	**48 747**	**53 369**	**51 171**
Other Europe	2 055	2 040	2 050	2 190	2 235	2 300	2 295	2 465	2 679	2 764	2 916
Middle East	475	595	755	790	940	1 020	1 035	1 080	1 195	1 335	1 550
South Asia	870	935	930	1 010	1 015	1 010	1 030	1 075	1 339	2 011	2 003
Far East (excl China)	1 765	1 770	1 910	2 240	2 525	2 650	2 800	2 940	3 189	3 331	3 586
China	[3 700]	[3 700]	[3 700]	[4 000]	[3 700]	[4 100]	[4 100]	[4 800]	[5 600]	[6 300]	[7 500]
Oceania	672	687	672	620	610	625	624	626	646	680	814
Africa (excl Egypt)	130	150	215	250	250	260	305	450	645	715	850
Central America	185	210	235	275	280	290	340	371	414	446	471
South America	1 165	1 200	1 425	1 530	1 585	1 315	1 320	1 272	1 313	1 387	1 383
World total	**126 660**	**127 392**	**126 532**	**128 801**	**126 799**	**131 686**	**130 821**	**143 674**	**157 584**	**164 037**	**162 198**

[a] At current prices and Benoit-Lubell exchange rates.

Table 6A.2. NATO: constant price figures

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
North America:												
Canada	2 508	2 576	2 643	2 477	2 306	2 153	2 143	2 202	2 294	2 134	2 221	1 983
USA	62 370	58 850	59 645	60 825	60 858	61 192	59 554	62 008	67 241	66 280	64 096	63 748
Europe:												
Belgium	605	503	489	511	505	510	519	525	558	611	652	636
Denmark	249	244	235	248	242	236	264	269	328	332	342	363
France	4 217	3 922	5 118	5 312	4 905	5 004	5 158	5 316	5 513	5 418	5 568	5 658
FR Germany	2 603	2 968	2 816	3 407	2 535	4 047	4 375	4 612	5 854	6 580	6 306	6 232
Greece	166	170	221	194	190	197	209	202	206	211	219	237
Italy	1 438	1 428	1 464	1 515	1 547	1 614	1 678	1 734	1 903	2 121	2 172	2 254
Luxembourg	16	17	11	12	11	11	7	7	9	9	11	11
Netherlands	789	827	893	834	734	654	720	839	892	905	984	959
Norway	285	238	231	245	228	241	230	250	276	288	292	338
Portugal	125	132	132	136	140	157	163	261	296	290	316	316
Turkey	328	351	331	321	332	381	401	434	450	463	501	532
UK	6 694	6 379	6 215	5 859	5 726	5 719	5 893	5 886	5 997	6 057	6 274	6 256
Total NATO	**82 393**	**78 605**	**80 440**	**81 896**	**80 259**	**82 116**	**81 314**	**84 545**	**91 817**	**91 699**	**89 954**	**89 523**
Total NATO (excl USA)	**20 023**	**19 755**	**20 795**	**21 071**	**19 401**	**20 924**	**21 760**	**22 537**	**24 576**	**25 419**	**25 858**	**25 775**
Total NATO Europe	**17 515**	**17 179**	**18 152**	**18 594**	**17 095**	**18 771**	**19 617**	**20 335**	**22 282**	**23 285**	**23 637**	**23 792**

US $ mn, at prices and 1970 exchange rates (Final column, X, at current prices and exchange rates)

1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1974X
63 748	76 043	87 730	90 103	86 274	77 854	71 776	72 088	68 594	67 643	64 178	*85 906*
25 775	25 930	27 063	26 317	26 082	26 615	28 028	29 180	30 043	31 014	31 635	*49 424*
89 523	**101 973**	**114 793**	**116 420**	**112 356**	**104 469**	**99 804**	**101 268**	**98 637**	**98 657**	**95 813**	*135 330*
44 900	47 000	50 800	58 600	62 200	63 000	63 000	63 000	63 000	61 900	61 100	*61 900*
4 598	4 833	5 267	6 380	7 012	7 498	7 974	8 240	8 713	9 273	10 213	*9 273*
49 498	**51 833**	**56 052**	**64 995**	**69 212**	**70 498**	**70 974**	**71 240**	**71 713**	**71 173**	**71 313**	*71 173*
2 938	3 035	3 030	3 131	3 270	3 362	3 429	3 658	3 693	3 722	3 985	*6 147*
1 785	2 125	2 820	3 290	3 640	4 570	4 925	5 407	8 588	10 680	13 140	*15 902*
2 166	2 169	1 941	2 007	2 138	2 236	2 659	2 878	2 619	2 500	2 545	*3 397*
4 231	4 184	4 580	5 082	5 435	5 870	6 474	7 195	7 080	7 055	7 000	*10 010*
[7 900]	[8 900]	[8 600]	[8 900]	[11 100]	[12 000]	[13 400]	[13 400]	[13 100]	[13 100]	[13 100]	*[15 000]*
993	1 131	1 232	1 337	1 353	1 332	1 311	1 315	1 269	1 248	1 280	*2 255*
970	1 023	1 288	1 507	1 816	1 918	2 001	2 050	2 025	2 135	2 750	*3 146*
466	500	535	599	584	618	634	701	700	690	700	*904*
1 699	1 673	2 013	1 976	2 061	2 110	2 555	2 620	2 897	2 225	2 220	*3 641*
162 169	**178 546**	**196 884**	**209 244**	**212 965**	**208 983**	**208 166**	**211 732**	**212 321**	**213 185**	**213 846**	*266 905*

US $ mn, at 1970 prices and 1970 exchange rates (Final column, X, at current prices and exchange rates)

1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1974X
2 035	2 185	2 060	1 942	2 040	2 050	2 055	2 052	2 203	(2 161)	*2 925*
76 043	87 730	90 103	86 274	77 854	71 776	72 088	68 594	67 643	(64 178)	*85 906*
646	678	709	709	755	766	808	837	871	(940)	*1 485*
358	358	381	375	368	403	401	381	417	(441)	*736*
5 821	6 133	6 140	5 854	5 919	5 994	6 145	6 373	6 381	(6 720)	*10 080*
6 041	6 283	5 578	6 117	6 188	6 625	7 086	7 363	7 688	(7 753)	*13 853*
257	331	387	438	474	501	534	533	510	(817)	*804*
2 439	2 381	2 426	2 378	2 506	2 836	3 131	3 126	3 128	(2 777)	*4 387*
11	9	8	8	8	8	9	10	11	(11)	*18*
935	1 034	1 023	1 069	1 103	1 154	1 192	1 246	1 301	(1 335)	*2 405*
336	347	367	388	389	399	398	401	412	(430)	*715*
333	409	430	399	436	456	450	416	499	(461)	*989*
517	521	551	541	579	677	703	438	808	(1 212)	*1 135*
6 201	6 394	6 257	5 864	5 850	6 159	6 654	6 567	6 785	(6 577)	*9 892*
101 973	**114 793**	**116 420**	**112 356**	**104 469**	**99 804**	**101 268**	**98 637**	**98 657**	**95 813**	*135 330*
25 930	**27 063**	**26 317**	**26 082**	**26 615**	**28 028**	**29 180**	**30 043**	**31 014**	**31 635**	*49 424*
23 895	**24 878**	**24 257**	**24 140**	**24 595**	**25 978**	**27 125**	**27 991**	**28 811**	**29 474**	*46 499*

Table 6A.3. NATO: current price figures

	Currency	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
North America:											
Canada	*mn dollars*	1 771	1 819	1 888	1 829	1 740	1 642	1 654	1 715	1 810	1 712
USA	*mn dollars*	42 786	40 371	41 513	44 159	45 096	45 833	45 380	47 808	52 381	52 295
Europe:											
Belgium	*mn francs*	20 707	17 067	17 065	18 356	18 312	18 686	19 161	19 561	21 111	23 596
Denmark	*mn kroner*	885	920	936	1 012	988	986	1 113	1 180	1 551	1 651
France	*mn francs*	11 710	11 020	14 690	15 600	16 569	17 926	19 162	20 395	22 184	22 849
FR Germany	*mn marks*	6 287	7 383	7 211	8 962	6 853	11 087	12 115	13 175	17 233	19 924
Greece	*mn drachmas*	3 428	3 688	4 939	4 477	4 469	4 735	5 110	5 034	5 102	5 385
Italy	*bn lire*	543	551	584	611	647	667	710	749	861	1 031
Luxembourg	*mn francs*	565	614	395	439	429	402	263	290	355	348
Netherlands	*mn guilders*	1 583	1 699	1 854	1 845	1 656	1 505	1 728	2 013	2 186	2 307
Norway	*mn kroner*	1 141	953	967	1 049	1 024	1 107	1 058	1 179	1 371	1 465
Portugal	*mn escudos*	2 100	2 224	2 297	2 391	2 485	2 820	3 023	4 922	5 744	5 724
Turkey	*mn lire*	934	1 077	1 159	1 266	1 470	2 153	2 405	2 718	2 940	3 157
UK	*mn pounds*	1 569	1 567	1 615	1 574	1 591	1 589	1 657	1 709	1 814	1 870

Table 6A.4. NATO: military expenditure as a percentage of gross domestic product

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
North America:										
Canada	*7.0*	*6.6*	*6.1*	*5.6*	*5.2*	*4.6*	*4.3*	*4.3*	*4.2*	*3.7*
USA	*11.6*	*10.0*	*9.8*	*9.9*	*10.0*	*9.4*	*8.9*	*9.1*	*9.3*	*8.8*
Europe:										
Belgium	*4.8*	*3.8*	*3.5*	*3.6*	*3.6*	*3.5*	*3.4*	*3.3*	*3.3*	*3.4*
Denmark	*3.2*	*3.2*	*3.0*	*3.1*	*2.9*	*2.6*	*2.7*	*2.6*	*3.0*	*3.0*
France	*7.3*	*6.4*	*7.7*	*7.3*	*6.8*	*6.6*	*6.4*	*6.2*	*6.0*	*5.6*
FR Germany	*4.0*	*4.1*	*3.6*	*4.1*	*3.0*	*4.4*	*4.0*	*4.0*	*4.8*	*5.2*
Greece	*5.5*	*5.2*	*6.0*	*5.1*	*4.8*	*4.9*	*4.9*	*4.3*	*4.0*	*3.9*
Italy	*4.0*	*3.7*	*3.6*	*3.5*	*3.4*	*3.3*	*3.3*	*3.1*	*3.2*	*3.3*
Luxembourg	*3.3*	*3.2*	*1.9*	*1.9*	*1.9*	*1.8*	*1.1*	*1.1*	*1.4*	*1.3*
Netherlands	*6.0*	*5.7*	*5.7*	*5.2*	*4.7*	*4.0*	*4.1*	*4.5*	*4.5*	*4.4*
Norway	*5.0*	*3.9*	*3.5*	*3.6*	*3.5*	*3.6*	*3.2*	*3.3*	*3.6*	*3.5*
Portugal	*4.2*	*4.2*	*4.0*	*4.0*	*4.0*	*4.3*	*4.2*	*6.4*	*7.0*	*6.5*
Turkey	*5.4*	*5.1*	*4.7*	*4.1*	*3.8*	*4.5*	*4.7*	*5.0*	*4.9*	*4.6*
UK	*8.8*	*8.2*	*7.8*	*7.2*	*7.0*	*6.6*	*6.5*	*6.3*	*6.4*	*6.2*

Table 6A.5. WTO: current price figures

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
Bulgaria	. .	. .	. .	133	149	141	154	187	222	256	224
Czechoslovakia	918	1 227	1 071	1 094	1 047	1 035	1 033	1 119	1 276	1 274	1 202
German DR	. .	. .	. .	. .	487	. .	295	295	796	826	855
Hungary	. .	. .	. .	110	. .	144	179	194	283	374	355
Poland	666	791	754	634	704	898	937	1 069	1 154	1 300	1 374
Romania	. .	. .	. .	405	381	365	360	386	416	439	461
USSR[a]	31 100	34 900	31 600	31 300	30 500	33 000	32 700	40 800	44 600	48 900	46 700
Total WTO	**[33 250]**	**[37 500]**	**[34 200]**	**[34 000]**	**[33 400]**	**36 000**	**35 658**	**44 050**	**48 747**	**53 369**	**51 171**

[a] At SIPRI-estimated exchange rates (see *SIPRI Yearbook 1974*, pp. 191 ff.).

Local currency, current prices

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1 813	1 659	1 766	1 965	1 927	1 899	2 061	2 131	2 238	2 405	2 862	3 113
51 213	51 827	63 572	75 448	80 732	81 443	77 854	74 862	77 639	78 472	85 906	88 983
26 241	26 606	28 169	30 396	32 676	33 892	37 502	39 670	44 140	48 941	57 395	69 791
1 764	1 974	2 080	2 249	2 591	2 640	2 757	3 195	3 386	3 520	4 439	5 130
24 280	25 300	26 732	28 912	30 264	30 696	32 672	34 907	37 992	42 284	48 153	56 495
19 553	19 915	20 254	21 408	19 310	21 577	22 573	25 450	28 720	31 908	35 644	38 095
5 647	6 290	7 168	9 390	11 003	12 762	14 208	15 480	17 211	19 866	24 126	43 917
1 118	1 212	1 342	1 359	1 403	1 412	1 562	1 852	2 162	2 392	2 852	2 961
462	477	497	413	374	391	416	442	517	601	710	786
2 661	2 714	2 790	3 200	3 280	3 682	3 968	4 466	4 974	5 612	6 423	7 266
1 570	1 897	1 947	2 097	2 300	2 502	2 774	3 022	3 239	3 505	3 938	4 589
6 451	6 680	7 393	9 575	10 692	10 779	12 538	14 699	16 046	16 736	25 108	26 552
3 443	3 821	3 996	4 596	5 159	5 395	6 237	8 487	9 961	12 192	15 831	28 570
2 000	2 091	2 153	2 276	2 332	2 303	2 444	2 815	3 258	3 512	4 207	5 070

Per cent

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
3.6	*3.0*	*2.8*	*2.9*	*2.6*	*2.4*	*2.4*	*2.3*	*2.1*	*2.0*	*2.0*
8.0	*7.5*	*8.4*	*9.4*	*9.4*	*8.8*	*7.9*	*7.1*	*6.7*	*6.0*	*6.1*
3.4	*3.2*	*3.1*	*3.1*	*3.2*	*2.9*	*2.9*	*2.8*	*2.8*	*2.7*	*2.8*
2.8	*2.8*	*2.7*	*2.7*	*2.8*	*2.5*	*2.4*	*2.5*	*2.3*	*2.1*	*2.4*
5.3	*5.2*	*5.0*	*5.0*	*4.8*	*4.2*	*4.2*	*4.0*	*3.9*	*3.8*	*(3.8)*
4.6	*4.3*	*4.1*	*4.3*	*3.6*	*3.6*	*3.3*	*3.3*	*3.4*	*3.4*	*3.6*
3.6	*3.6*	*3.7*	*4.3*	*4.7*	*4.8*	*4.8*	*4.7*	*4.6*	*4.2*	*4.2*
3.3	*3.3*	*3.4*	*3.1*	*3.0*	*2.7*	*2.7*	*2.9*	*3.1*	*3.0*	*2.9*
1.5	*1.4*	*1.4*	*1.2*	*1.0*	*0.9*	*0.8*	*0.8*	*0.9*	*0.8*	..
4.3	*3.9*	*3.7*	*4.0*	*3.7*	*3.6*	*3.5*	*3.4*	*3.4*	*3.4*	*3.5*
3.4	*3.7*	*3.5*	*3.5*	*3.6*	*3.6*	*3.5*	*3.4*	*3.3*	*3.1*	*3.1*
6.7	*6.2*	*6.3*	*7.3*	*7.3*	*6.7*	*7.0*	*7.4*	*6.9*	*5.9*	..
4.6	*4.8*	*4.3*	*4.4*	*4.6*	*4.4*	*4.3*	*4.5*	*4.3*	*4.2*	*3.9*
6.1	*5.9*	*5.7*	*5.7*	*5.4*	*5.0*	*4.9*	*5.0*	*5.2*	*5.0*	..

US $ mn, at Benoit–Lubell exchange rates

1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
198	207	213	228	260	279	305	337	364	416	472
1 191	1 275	1 457	1 560	1 679	1 755	1 876	1 976	1 976	2 035	2 271
914	944	1 062	1 711	1 858	2 006	2 124	2 242	2 457	2 625	2 821
332	301	313	381	440	567	570	543	547	611	649
1 461	1 584	1 661	1 905	2 105	2 142	2 312	2 324	2 538	2 676	2 971
502	522	546	610	670	749	787	818	831	910	1 029
44 900	47 000	50 800	58 600	62 200	63 000	63 000	63 000	63 000	61 900	61 100
49 498	**51 833**	**56 052**	**64 995**	**69 212**	**70 498**	**70 974**	**71 240**	**71 713**	**71 173**	**71 313**

Table 6A.6. WTO: current price figures

	Currency	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Bulgaria	*mn leva*	. .	. .	. .	154	173	163	179	217	258	297
Czechoslovakia	*mn korunas*	7 800	10 430	9 100	9 300	8 900	8 800	8 783	9 512	10 845	10 829
German DR	*mn marks*	. .	. .	. .	. .	1 650	. .	1 000	1 000	2 700	2 800
Hungary	*mn forints*	. .	. .	. .	1 912	. .	2 500	3 100	3 376	4 913	6 500
Poland	*mn zlotys*	10 600	12 600	12 000	10 100	11 200	14 300	14 920	17 019	18 378	20 695
Romania	*mn lei*	. .	. .	. .	3 817	3 597	3 446	3 392	3 639	3 924	4 143
USSR	*mn roubles*	10 030	11 210	9 730	9 672	9 400	9 370	9 300	11 600	12 700	13 900

Table 6A.7. WTO: military expenditure as a percentage of net material product

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Bulgaria	. .	. .	. .	*4.8*	*5.0*	*3.9*	*4.0*	*4.6*	*5.0*	*5.2*
Czechoslovakia	*6.3*	*7.8*	*6.8*	*6.6*	*6.0*	*5.8*	*5.4*	*5.6*	*6.2*	*6.3*
German DR	. .	. .	. .	. .	*2.7*	. .	*1.4*	*1.4*	*3.6*	*3.7*
Hungary	. .	. .	. .	*1.8*	. .	*2.0*	*2.2*	*2.3*	*3.1*	*3.9*
Poland	*4.2*	*5.6*	*4.8*	*3.4*	*3.5*	*4.1*	*4.0*	*4.1*	*4.3*	*4.5*
USSR[a]	*10.9*	*11.4*	*9.1*	*8.6*	*7.4*	*6.9*	*6.4*	*7.6*	*7.7*	*8.2*

[a] An alternative series for the Soviet Union shows the SIPRI estimates of the dollar-equivalent of Soviet military expei ture as a percentage of official Soviet estimates of the dollar-equivalent of Soviet National Income for 1962–1973:

	1962	1963
	22.5	*23.4*

Table 6A.8. Other Europe: constant price figures

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
Albania[a]	. .	. .	. .	. .	. .	. .	. .	[60]	[68]	[69]	71	73
Austria	3	12	60	99	113	112	104	101	106	129	163	135
Finland	64	86	82	80	83	98	103	119	167	133	131	134
Ireland	38	35	33	32	31	33	35	37	37	38	42	43
Spain	324	310	332	352	315	296	349	356	415	427	435	431
Sweden	758	781	786	804	813	847	833	875	940	1 002	1 054	1 118
Switzerland	237	255	229	306	328	316	297	346	382	398	432	435
Yugoslavia	584	512	475	464	499	540	514	571	564	568	588	569
Total Other Europe	**[2 055]**	**[2 040]**	**[2 050]**	**[2 190]**	**[2 235]**	**[2 300]**	**[2 295]**	**2 465**	**2 679**	**2 764**	**2 916**	**2 938**

[a] Figures for Albania are at current prices and Benoit–Lubell exchange rates.

Table 6A.9. Other Europe: current price figures

	Currency	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Albania	*mn leks*	. .	. .	. .	. .	. .	. .	. .	[240]	[270]	[275]
Austria	*mn schillings*	47	188	1 001	1 714	1 986	1 989	1 893	1 890	2 076	2 608
Finland	*mn marks*	124	163	170	184	206	246	267	314	460	383
Ireland	*mn pounds*	8.6	8.1	7.9	8.1	8.3	8.6	9.2	9.9	10.5	10.
Spain	*mn pesetas*	8 210	8 167	9 330	10 881	11 067	11 115	13 375	13 935	17 173	19 218
Sweden	*mn kronor*	2 147	2 264	2 389	2 557	2 706	2 820	2 898	3 107	3 500	3 839
Switzerland	*mn francs*	688	750	682	930	1 009	972	924	1 096	1 264	1 362
Yugoslavia	*mn new dinars*	1 627	1 593	1 580	1 590	1 785	1 956	2 077	2 477	2 701	2 862

Local currency, current prices

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
260	230	240	247	264	302	324	354	391	422	483	548
10 217	10 125	10 841	12 385	13 189	14 268	14 919	15 943	16 800	16 800	17 300	19 300
2 900	3 100	3 200	3 600	5 800	6 300	6 800	7 200	7 600	8 328	8 900	9 564
6 163	5 757	5 219	5 433	6 611	7 644	9 848	9 891	9 430	9 489	10 610	11 258
21 881	23 255	25 213	26 438	30 332	33 519	34 100	36 800	37 000	40 400	42 600	47 300
4 346	4 735	4 927	5 146	5 751	6 319	7 067	7 424	7 710	7 835	8 583	9 700
13 300	12 800	13 400	14 500	16 700	17 700	17 900	17 900	17 900	17 900	17 600	17 400

Per cent

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
3.1	*3.5*	*3.3*	*3.1*	*3.1*	*3.2*	*3.1*	*3.4*	*3.5*	3.5	3.7
6.1	*5.9*	*5.5*	*5.3*	*5.1*	*4.9*	*4.8*	*5.0*	*4.9*	4.7	4.5
3.6	*3.7*	*3.7*	*3.9*	*(6.2)*	*(6.1)*	*(6.2)*	*(6.3)*	*(6.3)*	[6.5]	. .
3.6	*3.4*	*2.8*	*2.6*	*2.9*	*3.0*	*3.6*	*3.4*	*3.0*	*2.7*	*2.9*
4.4	*4.4*	*4.4*	*4.4*	*4.5*	*4.8*	*4.6*	*4.3*	*3.9*	*3.8*	*3.5*
7.3	*6.6*	*6.5*	*6.4*	*6.8*	*6.8*	*6.2*	*5.9*	*5.7*	*5.3*	*5.0*
20.2	*18.1*	. .	*17.3*	*18.0*	*17.4*	*16.5*	*15.4*	*14.8*	*13.1*	. .

US $ mn, at 1970 prices and 1970 exchange rates (Final column, X, at current prices and exchange rates)

1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1974X
69	69	77	106	120	128	141	148	154	160	*154*
155	157	157	162	160	154	164	166	170	(193)	*309*
131	128	147	134	142	155	177	179	162	(190)	*271*
41	42	43	45	51	56	67	70	72	. .	*110*
509	550	570	592	603	623	678	741	746	. .	*1 362*
1 128	1 098	1 100	1 159	1 190	1 209	1 242	1 210	1 162	(1 201)	*1 818*
458	446	425	454	467	485	494	479	455	(463)	*903*
544	540	612	618	629	619	695	700	801	(955)	*1 220*
3 035	**3 030**	**3 131**	**3 270**	**3 362**	**3 429**	**3 658**	**3 693**	**3 722**	**[3 985]**	*6 147*

Local currency, current prices

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
282	288	272	272	304	420	475	508	558	589	610	635
3 408	2 957	3 474	3 661	3 775	4 006	4 135	4 166	4 712	5 130	5 750	6 800
417	446	456	471	589	549	597	692	847	956	1 017	1 405
12.9	14.0	13.7	14.4	15.5	17.3	21.3	25.5	33.1	38.8	46.7	. .
20 920	23 471	29 407	33 850	36 780	39 016	42 067	47 019	55 368	67 467	78 600	. .
4 173	4 646	4 990	5 072	5 176	5 596	6 150	6 714	7 306	7 600	8 019	9 096
1 521	1 586	1 746	1 770	1 726	1 889	2 014	2 232	2 425	2 556	2 662	2 891
3 321	4 305	5 070	5 382	6 406	6 980	7 864	8 948	11 716	14 108	19 559	29 495

Table 6A.10. Other Europe: military expenditure as a percentage of gross domestic product

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Austria	*0.1*	*0.2*	*0.8*	*1.3*	*1.5*	*1.4*	*1.2*	*1.0*	*1.1*	*1.3*
Finland	*1.4*	*1.6*	*1.5*	*1.5*	*1.6*	*1.7*	*1.7*	*1.8*	*2.4*	*1.9*
Ireland	*1.7*	*1.6*	*1.5*	*1.5*	*1.5*	*1.4*	*1.4*	*1.4*	*1.4*	*1.3*
Spain	*2.4*	*2.2*	*2.2*	*2.2*	*1.9*	*1.8*	*2.2*	*2.0*	*2.1*	*2.0*
Sweden	*4.9*	*4.8*	*4.7*	*4.6*	*4.7*	*4.6*	*4.0*	*4.0*	*4.1*	*4.2*
Switzerland	*2.7*	*2.8*	*2.4*	*3.0*	*3.2*	*2.9*	*2.5*	*2.7*	*2.8*	*2.7*
Yugoslavia[a]	*12.6*	*10.3*	*9.9*	*7.9*	*9.0*	*8.0*	*7.2*	*7.4*	*7.2*	*6.2*

[a] Percentage of gross material product.

Table 6A.11. Middle East: constant price figures

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
Cyprus	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	7	9
Egypt	166	251	287	259	[242]	[246]	[264]	[292]	[330]	369	463	501
Iran	78	107	126	151	243	271	216	216	214	218	241	323
Iraq	75	67	94	102	110	129	147	153	164	191	219	268
Israel	32	34	68	97	109	121	144	144	162	201	262	288
Jordan	(40)	(41)	(48)	(50)	(59)	(73)	(68)	(67)	(71)	(72)	(71)	(71)
Kuwait[b]	. .	. .	. .	. .	. .	. .	. .	17	19	22	20	31
Lebanon	10	12	16	16	18	16	17	20	29	24	26	31
Oman[b]	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Saudi Arabia	. .	. .	. .	. .	. .	. .	. .	[88]	[111]	136	(129)	(138)
Syria	28	30	53	44	[79]	77	78	79	90	94	103	113
United Arab Emirates[b]	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Yemen[b]	. .	. .	. .	. .	. .	. .	. .	. .	[1]	[2]	[2]	[2]
Yemen, Democratic[b]	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Total Middle East	**[475]**	**[595]**	**[755]**	**[790]**	**[940]**	**[1 020]**	**[1 035]**	**[1 080]**	**[1 195]**	**[1 335]**	**[1 550]**	**[1 785]**

[a] 1973.

[b] At current prices and 1970 exchange rates.

Table 6A.12. Middle East: current price figures

	Currency	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Cyprus	*mn pounds*	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Egypt	*mn pounds*	47	71	83	78	[73]	[74]	[80]	[89]	[95]	110
Iran	*mn rials*	3 468	4 956	6 205	7 960	12 771	15 699	13 756	14 183	14 156	14 487
Iraq	*mn dinars*	18.8	17.1	25.8	29.7	31.0	35.8	42.4	44.8	48.2	58.
Israel	*mn pounds*	50	57	122	153	212	243	294	313	386	511
Jordan	*mn dinars*	10.2	10.5	12.8	13.4	15.9	20.1	19.1	18.9	20.6	21.
Kuwait	*mn dinars*	. .	. .	. .	. .	. .	. .	. .	6.1	6.8	7.
Lebanon	*mn pounds*	21.7	26.7	38.0	39.1	45.6	43.0	47.8	56.4	80.6	68.
Oman	*mn rials*	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Saudi Arabia	*mn rials*	. .	. .	. .	. .	. .	. .	. .	331	428	541
Syria	*mn pounds*	76	82	161	140	[234]	237	251	261	279	297
United Arab Emirates	*mn dirhams*	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Yemen	*mn rials*	. .	. .	. .	. .	. .	. .	. .	. .	[5.3]	[10
Yemen, Democratic	*mn dinars*	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .

Per cent

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
1.5	*1.2*	*1.3*	*1.3*	*1.2*	*1.2*	*1.1*	*1.0*	*1.0*	*1.0*	*0.9*
1.8	*1.7*	*1.6*	*1.6*	*1.7*	*1.4*	*1.4*	*1.5*	*1.5*	*1.4*	*1.2*
1.4	*1.4*	*1.3*	*1.3*	*1.2*	*1.2*	*1.3*	*1.4*	*1.5*	*1.5*	*1.6*
1.9	*1.8*	*2.0*	*2.1*	*2.0*	*1.9*	*1.9*	*1.8*	*1.8*	*1.9*	..
4.1	*4.1*	*4.1*	*3.8*	*3.7*	*3.6*	*3.6*	*3.7*	*3.7*	*3.4*	*3.2*
2.8	*2.7*	*2.7*	*2.6*	*2.4*	*2.4*	*2.3*	*2.3*	*2.1*	*2.0*	*2.0*
5.4	*5.4*	*5.1*	*5.2*	*5.7*	*5.3*	*5.0*	*4.4*	*4.8*	*4.6*	..

US $ mn, at 1970 prices and 1970 exchange rates (Final column, X, at current prices and exchange rates)

1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1974X
7	8	7	7	8	8	(7)	(7)	..	..	*(10)*[a]
516	718	740	836	1 263	1 450	1 420	2 327	2 315	(2 114)	*3 136*
446	560	636	566	714	704	990	1 360	3 050	4 012	*4 748*
274	265	321	393	401	408	394	547	540	..	*806*
365	562	730	955	1 278	1 370	1 375	2 415	1 972	(1 950)	*3 250*
(85)	115	136	135	105	109	109	95	83	(77)	*138*
35	54	63	67	67	78	88	314	[518]	[588]	[632]
35	39	44	43	43	43	61	67	85	(74)	*149*
..	..	..	..	..	[48]	[48]	91	243	300	*292*
(252)	(372)	389	400	446	503	(680)	(1 010)	(1 420)	(2 943)	*2 103*
93	102	159	164	162	156	180	289	358	385	*538*
..	..	..	..	..	..	..	13	19	60	*23*
[2]	5	7	10	13	17	22	29	40	..	*48*
..	..	[20]	19	19	21	23	24	..	..	*29*[a]
[2 125]	**[2 820]**	**[3 290]**	**[3 640]**	**[4 570]**	**4 925**	**5 407**	**8 588**	**[10 680]**	**[13 140]**	*15 902*

Local currency, current prices

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
2.7	3.3	2.8	3.1	2.7	2.7	3.0	3.5	3.4	(3.5)	..	..
143	178	200	280	300	350	549	650	650	1 111	1 225	1 225
16 606	22 826	31 365	40 030	45 734	42 160	54 120	55 575	83 200	125 400	321 060	492 300
66.1	80.6	83.9	83.8	104.1	134.3	143.2	150.8	153.3	223.1	238.6	..
700	825	1 131	1 772	2 351	3 151	4 472	5 370	6 084	12 815	14 625	20 125
21.1	21.5	26.0	35.7	42.2	45.2	37.4	40.7	44.0	42.4	44.2	48.0
7.1	10.9	12.5	19.4	22.6	23.8	24.0	27.8	31.3	112.0	[185.0]	[210.0]
76.6	90.1	105.9	121.9	135.9	139.1	138.4	142.3	212.9	247.7	[345.0]	315.0
..	..	..	..	..	..	..	[20.0]	[20.0]	38.0	101.4	125.0
531	561	1 050	1 579	1 688	1 798	2 005	2 285	3 230	5 055	7 465	16 255
346	365	316	366	587	600	617	625	725	1 400	2 000	2 500
..	..	..	..	..	..	..	..	..	64	90	285
[10.6]	[11.7]	[12.7]	25.1	39.2	56.7	74.3	92.0	121	160	219	..
..	..	..	..	[8.2]	8.1	8.1	8.9	9.6	10.1	..	..

Table 6A.13. Middle East: military expenditure as a percentage of gross domestic product

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Cyprus	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Egypt	. .	. .	. .	. .	. .	. .	5.6	6.0	6.1	6.2
Iran	. .	. .	. .	. .	. .	. .	4.2	4.1	3.8	3.7
Iraq	4.7	4.1	5.7	6.5	6.0	6.7	7.1	6.9	6.9	8.3
Israel	2.8	2.5	4.6	5.9	5.9	5.9	6.6	5.9	6.1	6.7
Jordan	. .	. .	. .	. .	. .	21.5	19.4	15.7	17.3	16.3
Kuwait	. .	. .	. .	. .	. .	. .	. .	. .	. .	1.2
Lebanon	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Saudi Arabia	. .	. .	. .	. .	. .	. .	. .	. .	. .	[6.6]
Syria	. .	. .	. .	. .	. .	. .	. .	. .	. .	7.5
Yemen	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Yemen, Democratic	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .

[a] GDP at factor cost.

Table 6A.14. South Asia: constant price figures

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
Afghanistan	. .	. .	. .	. .	. .	. .	. .	. .	[44.0]	[56.0]	46.5
Bangla Desh	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
India	585.6	610.2	607.1	730.4	723.2	674.2	677.6	728.0	1 003.7	1 642.5	1 607.6
Nepal	. .	. .	. .	. .	. .	. .	[3.1]	[4.0]	[3.7]	[4.0]	[3.7]
Pakistan	240.9	281.3	274.0	226.8	235.7	277.3	290.1	287.4	273.2	295.6	333.3
Sri Lanka	7.2	6.6	7.9	10.4	14.5	15.8	16.0	16.2	14.8	12.7	12.3
Total South Asia	**[870.0]**	**[935.0]**	**[930.0]**	**[1 010.0]**	**[1 015.0]**	**[1 010.0]**	**[1 030.0]**	**[1 075.0]**	**[1 339.4]**	**[2 010.8]**	**2 003.4**

[a] 1973.

Table 6A.15. South Asia: current price figures

	Currency	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Afghanistan	*mn afghanis*	. .	. .	. .	. .	. .	. .	[628]	[650]	[650]	[810]
Bangla Desh	*mn taka*	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
India	*mn rupees*	1 969	1 932	2 110	2 665	2 797	2 699	2 774	3 046	4 336	7 306
Nepal	*mn rupees*	. .	. .	. .	. .	. .	. .	[16.2]	[19.4]	[22.4]	23.7
Pakistan	*mn rupees*	705	787	793	718	771	878	978	984	938	1 029
Sri Lanka	*mn rupees*	30.2	27.5	32.8	46.0	66.2	71.9	71.3	73.2	67.9	59.6

Table 6A.16. South Asia: military expenditure as a percentage of gross domestic product

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
India	[1.8]	[1.7]	[1.7]	[2.1]	[2.0]	[1.9]	[1.9]	1.9	2.6	3.8
Nepal	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Pakistan	[3.1]	[3.4]	[3.1]	[2.5]	[2.6]	[2.8]	2.8	2.6	2.4	2.4
Sri Lanka	0.6	0.5	0.6	0.8	1.1	1.1	1.1	1.1	1.0	0.8

Per cent

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
2.4	*2.4*	*1.8*	*1.8*	*1.5*	*1.3*	*1.3*	*1.4*	*1.2*	..	..
7.0	*7.7*	*8.2*	*11.2*	*11.5*	*12.4*	*18.0*	*20.1*	*19.2*	*31.4*	..
3.9	*4.7*	*5.9*	*6.8*	*6.8*	*5.6*	*6.3*	*5.4*	*6.6*	*6.7*	..
8.2	*9.2*	*8.5*	*8.4*	*9.2*	*11.3*	*11.1*	*10.2*	..	..	..
8.0	*7.9*	*9.8*	*14.9*	*17.0*	*19.7*	*23.6*	*22.8*	*20.5*	*33.3*	..
14.2	*12.8*	*15.2*	*18.3*	*22.6*	*20.6*	*17.8*	*18.2*	*17.7*	*16.1*	*14.7*
1.0	*1.5*	*1.5*	*2.2*	*2.4*	*2.4*	*2.5*	*2.2*	*2.1*	*5.7*	[*6.3*]
2.4	*2.6*	*2.7*	*3.2*	*3.2*	*3.0*	*2.8*	*2.6*	*3.3*	..	..
5.9	*5.7*	*9.4*	*11.4*	*11.0*	*10.8*	*10.0*	*8.9*	*9.4*	*7.1*	..
7.5	*7.9*	*6.7*	*5.8*	*10.6*	*10.0*	*9.6*	*8.4*	*8.2*	*14.9*	*13.8*
..	..	..	..	..	*2.6*	*3.1*	*3.2*	*3.6*	*4.3*	..
..	..	..	..	..	14.3	13.7	..	..	..	..

US $ mn, at 1970 prices and 1970 exchange rates (Final column, X, at current prices and exchange rates)

1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1974X
44.4	43.3	37.3	33.0	35.0	30.2	24.1	27.6	42.3	..	..	*42*[a]
..	..	..	..	..	..	..	34.5	40.2	40.9	(35.6)	*81*
1 567.6	1 480.1	1 373.2	1 429.0	1 511.9	1 558.2	1 854.0	1 958.0	1 786.0	1 757.0	(1 793.0)	*2 726*
[3.8]	4.1	5.0	5.3	5.3	5.8	6.4	6.3	6.9	6.9	(7.8)	*9*
537.7	627.8	511.0	525.2	571.1	623.0	746.0	827.0	723.0	629.0	(635.0)	*520*
12.8	13.5	14.0	14.9	15.1	19.0	28.1	24.9	20.3	16.1	(19.9)	*19*
2 166.3	**2 168.8**	**1 940.5**	**2 007.4**	**2 138.4**	**2 236.2**	**2 658.6**	**2 878.3**	**2 618.7**	**[2 500.0]**	**[2 545.0]**	*3 397*

Local currency, current prices

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1974
909	1 023	1 088	1 177	1 273	1 322	1 361	1 360	1 367	1 879	..	..
..	..	..	..	..	..	..	..	238	401	655	730
8 084	8 651	9 027	9 535	10 170	10 840	11 747	14 438	16 206	17 279	21 878	24 198
25.5	28.3	35.2	41.9	45.9	51.3	58.5	65.9	71.9	82.8	99.6	126.6
1 208	2 059	2 575	2 240	2 307	2 588	2 975	3 730	4 350	4 590	5 160	6 300
59.7	62.0	65.4	69.1	78.0	85.0	113.0	172.0	162.0	145.0	129.0	170.0

Per cent

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
3.6	*3.6*	*3.4*	*3.1*	*3.1*	*3.0*	*3.0*	*3.4*	*3.5*	*3.4*	..
..	[*0.4*]	[*0.5*]	*0.6*	*0.6*	*0.6*	*0.7*	*0.7*	*0.7*	*0.7*	..
2.6	*4.0*	*4.5*	*3.5*	*3.4*	*3.5*	[*3.7*]	[*4.4*]	*7.2*	*6.0*	..
0.8	*0.8*	*0.8*	*0.8*	*0.7*	*0.7*	*0.9*	*1.3*	*1.1*	*0.8*	*0.6*

Table 6A.17. Far East: constant price figures

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
Brunei[a]	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .†	2.8
Burma[a]	77.4	70.8	74.8	79.2	85.1	86.0	89.3	85.4	90.5	100.0	97.7
Cambodia	. .	. .	. .	. .	. .	49.2	41.5	41.7	43.8	41.9	45.7
Indonesia	224.0	182.0	179.0	222.0	281.0	285.0	336.0	373.0	263.0	181.0	142.0
Japan	843.6	795.3	785.8	778.6	786.3	804.1	798.3	826.9	905.4	960.4	1 056.4
Korea, North	. .	. .	. .	. .	. .	. .	. .	[225.0]	[250.0]	[280.0]	[300.0]
Korea, South	141.3	113.6	110.1	141.6	167.6	175.4	172.5	179.6	207.3	171.9	162.0
Laos	. .	. .	. .	. .	. .	. .	. .	. .	64.9	41.1	31.0
Malaysia	64.4	57.8	52.7	54.9	57.3	50.6	46.6	39.4	39.8	53.4†	75.1
Mongolia[a]	. .	. .	. .	. .	. .	. .	. .	[15.0]	[15.0]	[15.0]	[15.0]
Philippines	47.4	46.4	46.7	47.8	50.0	51.8	51.5	66.3	51.3	51.4	49.0
Singapore	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Taiwan	. .	153.2	157.8	172.0	215.0	244.0	226.0	210.0	224.0	271.0	330.0
Thailand	65.5	56.3	50.4	91.2	76.3	81.9	80.2	84.6	88.6	91.3	96.9
Viet-Nam, North	. .†	. .	. .	. .	. .	. .	. .	[340.0]	[390.0]	[485.0]	[585.0]
Viet-Nam, South	. .†	. .	. .	. .	308.8	305.3	386.0	396.0	555.0	588.0	597.0
Total Far East	[1 765.0]	[1 770.0]	[1 910.0]	[2 240.0]	[2 525.0]	[2 650.0]	[2 800.0]	[2 940.0]	3 188.6	3 331.4	3 585.6

[a] At current prices and 1970 exchange rates. [b] 1972. [c] 1973.

Table 6A.18. Far East: current price figures

	Currency	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Brunei	*mn dollars*	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Burma	*mn kyats*	369.6	338.0	357.3	378.3	406.5	410.8	426.3	407.7	431.9	477.7
Cambodia	*mn riels*	. .	. .	. .	. .	. .	1 656	1 495	1 610	1 736	1 764
Indonesia	*mn new rupiah*	3.6	3.9	4.4	6.1	11.1	14.1	21.7	31.7	57.4	92.4
Japan	*bn yen*	162.0	151.3	149.5	152.3	153.8	159.3	163.3	178.3	208.5	238.0
Korea, North	*mn won*	. .	. .	. .	. .	. .	. .	. .	[270]	[300]	[336]
Korea, South	*bn won*	4.4	5.9	7.1	11.3	12.8	14.0	14.8	16.7	20.5	20.5
Laos	*mn kips*	. .	. .	. .	. .	. .	. .	. .	. .	2 712	3 312
Malaysia	*mn dollars*	184.4	160.5	148.1	160.6	166.2	142.3	131.3	110.9	112.0	154.9
Mongolia	*mn tugriks*	. .	. .	. .	. .	. .	. .	. .	[60]	[60]	[60]
Philippines	*mn pesos*	162.3	157.2	161.6	169.1	182.4	186.9	193.4	201.5	207.6	219.2
Singapore	*mn dollars*	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Taiwan	*bn dollars*	. .	2.8	3.2	3.8	4.8	6.0	6.6	6.6	7.2	8.9
Thailand	*mn baht*	943.6	855.2	816.7	1 566.7	1 389.7	1 420.5	1 378.4	1 473.0	1 580.0	1 643.0
Viet-Nam, South	*bn piastres*	. .	. .	. .	. .	6.0	6.1	[7.6]	[8.3]	12.0	13.6

Table 6A.19. Far East: military expenditure as a percentage of gross domestic product

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Burma	*6.7*	*5.9*	*6.0*	*6.0*	*6.4*	*6.1*	*6.0*	*5.7*	(6.4)	(6.6)
Cambodia	. .	. .	. .	. .	. .	. .	. .	. .	*7.5*	*6.9*
Indonesia	. .	. .	. .	. .	. .	. .	*5.4*	*6.3*	*4.4*	*2.8*
Japan	*2.1*	*1.8*	*1.5*	*1.4*	*1.3*	*1.2*	*1.1*	*0.9*	*1.0*	*1.0*
Korea, South	*6.6*	*5.1*	*4.7*	*5.8*	*6.2*	*6.4*	*6.0*	*5.7*	*5.9*	*4.2*
Malaysia	. .	*3.2*	*2.9*	*3.1*	*3.4*	*2.6*	*2.2*	*1.9*	*1.8*	*2.4*
Philippines	*1.8*	*1.7*	*1.6*	*1.6*	*1.6*	*1.5*	*1.4*	*1.4*	*1.3*	*1.2*
Singapore	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Taiwan	. .	*9.3*	*9.3*	*9.4*	*14.1*	*14.3*	*12.9*	*13.2*	*14.0*	*12.8*
Thailand	*2.8*	*2.4*	*2.1*	*3.4*	*2.9*	*2.8*	*2.6*	*2.5*	*2.5*	*2.4*
Viet-Nam, South	. .	. .	. .	. .	. .	. .	*6.6*	*7.0*	*10.1*	*9.4*

US $ mn, at 1970 prices and 1970 exchange rates (Final column, X, at current prices and exchange rates

1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1974X
9.5	10.5	9.0	8.9	6.3	16.5	12.3	[12.1]	12.0	19.4	43.4	*25*
107.0	105.2	101.8	104.3	114.1	121.9	125.5	121.7	117.1	(128.8)	(156.0)	*127*
41.4	42.9	45.1	47.2	49.9	124.8	107.0	142.0	145.5	. .	. .	*110*[b]
127.0	87.0	189.0	245.0	284.0	301.0	340.0	382.0	361.0	[415.0]	(512.0)	*775*
1 095.6	1 169.2	1 253.1	1 338.0	1 453.9	1 594.8	1 763.0	1 974.0	2 128.0	1 946.0	(2 056.0)	*3 670*
[350.0]	[350.0]	[465]	630	700	(745)	(892.0)	1 045.0	1 068.0	1 307.0	. .	*1 574*
170.6	208.1	231.2	272.8	314.7	324.6	383.0	430.1	443.1	420.5	(551.8)	*518*
41.2	41.4	38.7	36.7	36.2	38.0	39.0	34.0	32.0	25.3	. .	*25*
105.0	129.6	120.2	124.6	121.0	165.0	185.0	183.0	190.0	178.0	(231.0)	*311*
[15.0]	[15.0]	[20.0]	[25.0]	[33.0]	[38.0]	42.0	48.0	53.0	90.0	93.0	*108*
49.0	53.0	59.0	67.0	75.0	85.0	79.0	87.0	123.0	114.0	(165.0)	*211*
. .†	. .	25.7	40.0	79.4	100.6	127.7	135.2	127.3	126.1	(151.0)	*251*
370.0	438.0	[447.0]	485.0	[482.0]	482.0	585.0	631.0	(638.0)	[560.0]	. .	*(903)*
103.7	112.1	128.9	154.4	180.9	210.0	248.0	258.0	248.0	234.0	[262.0]	*351*
[620.0]	[640.0]	[630.0]	[630.0]	[585.0]	[585.0]	[585.0]	[585.0]	[520.0]	. .	. .	[520][c]
1 026.0	781.9	815.9	873.0	920.0	938.0	960.0	1 127.0	874.0	740.0	. .	*531*
4 231.0	**4 183.9**	**4 579.6**	**5 081.9**	**5 435.4**	**5 870.2**	**6 473.5**	**7 195.1**	**[7 080.0]**	**[7 055.0]**	**[7 000.0]**	*10 010*

Local currency, current prices

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
8.7	29.3	32.3	27.9	27.5	19.4	51.0	38.0	[37.5]	37.0	60.0	134.0
466.3	510.7	502.2	485.9	498.1	544.9	582.2	599.0	581.2	559.1	(615.0)	(745.0)
1 899	1 846	1 851	2 025	2 154	2 478	5 966	10 206	16 956	. .	. .	. .
145.0	522.0	3 760	21 600	63 100	86 000	102 200	120 475	144 450	178 525	[290 000]	(425 000)
272.0	300.5	337.0	375.5	422.5	483.0	570.3	669.0	783.0	943.0	1 073.0	1 271.0
[360]	[420]	[420]	[560]	[755]	[840]	(865)	(1 070)	1 254	1 282	1 568	. .
24.9	29.9	40.7	50.0	65.4	84.9	101.6	136.1	170.7	181.4	214.0	353.0
4 935	7 391	8 463	8 531	8 511	8 672	9 131	9 375	10 330	12 732	15 071	. .
217.0	303.0	379.5	366.6	379.3	367.3	510.0	581.0	591	681.0	747.0	1 019.0
[60]	[60]	[60]	[80]	[100]	[130]	[150]	169	191	213	362	373.0
227.0	237.0	270.0	318.0	365.0	421.0	500.0	572.0	731.0	1 111.0	1 444.0	2 254.0
. .	. .	. .	78.9	123.5	244.3	311.0	402.0	434.4	503.0	609.5	748.7
10.8	12.1	14.6	15.4	17.8	[18.5]	19.3	24.0	27.1	(30.0)	(34.3)	. .
1 778.0	1 921.0	2 150.8	2 575.2	3 151.7	3 768.7	4 420.0	5 319.0	5 738.0	6 165.0	7 182.0	[8 345.0]
14.3	28.5	35.2	52.8	72.0	92.0	128.3	155.2	228.3	255.8	336.0	. .

Per cent

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
(6.5)	*(6.6)*	*6.5*	*5.7*	*5.3*	*5.4*	*5.7*	*5.7*	*5.3*	*4.5*	. .
7.1	*6.1*	*5.9*	. .	. .	*5.6*	. .	. .	. .	. .	. .
0.8	*1.3*	*1.2*	*2.5*	*3.0*	*3.2*	*3.1*	*3.2*	*3.2*	*2.7*	. .
0.9	*0.9*	*0.9*	*0.9*	*0.8*	*0.8*	*0.8*	*0.8*	*0.9*	*0.8*	. .
3.6	*3.7*	*4.0*	*4.1*	*4.2*	*4.1*	*3.9*	*4.3*	*4.4*	*3.7*	*3.1*
3.1	*4.0*	*4.8*	*4.5*	*4.5*	*3.8*	*5.1*	*5.5*	*5.2*	*4.7*	*4.4*
1.1	*1.1*	*1.3*	*1.2*	*1.2*	*1.2*	*1.2*	*1.1*	*1.3*	*1.6*	*2.3*
. .	. .	. .	*2.1*	*2.9*	*4.9*	*5.4*	*5.9*	*5.3*	*4.8*	*4.7*
11.7	*[11.3]*	*[11.5]*	*[11.2]*	*[11.1]*	*[9.7]*	*8.8*	*9.6*	*9.3*	*8.4*	. .
2.4	*2.3*	*2.1*	*2.4*	*2.7*	*2.9*	*3.3*	*3.7*	*3.5*	*2.9*	*2.7*
16.8	*21.2*	*16.0*	*15.8*	*20.1*	*17.2*	*16.5*	*16.2*	*20.9*	*16.4*	. .

Table 6A.20. Oceania: constant price figures

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
Australia	577.0	598.0	583.0	534.0	525.0	537.0	534.0	542.0	564.0	596.0	714.0
New Zealand	94.7	89.2	89.3	86.2	85.0	88.0	89.8	84.4	82.4	84.3	100.0
Total Oceania	**671.7**	**687.2**	**672.3**	**620.2**	**610.0**	**625.0**	**623.8**	**626.4**	**646.4**	**680.3**	**814.0**

Table 6A.21. Oceania: current price figures

	Currency	1954	1955	1956	1957	1958	1959	1960	1961	1962	1964
Australia	*mn dollars*	342.0	362.0	372.0	351.0	349.0	365.0	376.0	391.0	406.0	529.0
New Zealand	*mn dollars*	49.5	48.1	49.6	48.8	50.4	53.7	55.5	53.1	53.2	68.0

Table 6A.22. Oceania: military expenditure as a percentage of gross domestic product

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1964
Australia	*3.6*	*3.6*	*3.4*	*3.0*	*2.9*	*2.8*	*2.6*	*2.7*	*2.6*	*2.7*
New Zealand	*2.7*	*2.5*	*2.4*	*2.2*	*2.2*	*2.2*	*2.1*	*1.9*	*1.8*	*2.0*

US $ mn, at 1970 prices and 1970 exchange rates (Final column, X, at current prices and exchange rates)

1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1974X
882.0	1 014.0	1 123.0	1 221.0	1 233.0	1 200.0	1 188.0	1 190.0	1 147.0	1 127.0	1 160.0	*2 041*
111.0	117.0	109.0	116.0	120.0	132.0	123.0	125.0	122.0	121.0	120.0	*214*
993.0	**1 131.0**	**1 232.0**	**1 337.0**	**1 353.0**	**1 332.0**	**1 311.0**	**1 315.0**	**1 269.0**	**1 248.0**	**1 280.0**	**2 255**

Local currency, current prices

1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
678.0	804.0	918.0	1 025.0	1 065.0	1 077.0	1 131.0	1 199.0	1 265.0	1 432.0	1 684.0
78.0	85.0	84.0	93.0	101.0	118.0	122.0	132.0	139.0	154.0	174.0

Per cent

1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
3.4	*3.7*	*3.9*	*4.0*	*3.7*	*3.4*	*3.3*	*3.1*	*2.7*	*2.6*
2.1	*2.1*	*2.0*	*2.2*	*2.1*	*2.2*	*2.0*	*1.8*	*1.7*	..

Table 6A.23. Africa: constant price figures

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
Algeria[a]	..	..	..	..	..	..	..	..	65†	79	86
Benin (Dahomey)[a]	..	..	..	..	..	..	..†	(1.7)	(2.4)	(2.8)	(3.3)
Burundi	..	..	..	..	..	..	..	..	(1.2)†	(1.4)	(1.6)
Cameroon	..	..	..	..	..	..	11.3†	14.4	17.6	14.9	14.5
Central African Republic	..	..	..	..	..	..	..†	1.4	1.3	1.3	2.7
Chad	..	..	..	..	..	..	..†	..	1.7	1.9	2.1
Congo	..	..	..	..	..	..	..†	2.5	4.4	(4.5)	5.3
Ethiopia	..	..	..	..	..	(20.0)	24.9	(27.3)	29.3	38.9	50.6
Gabon	..	..	..	..	..	..	..†	1.2	1.8	2.7	2.1
Ghana	..	8.9	14.3	17.5	17.9	18.7	30.6	41.9	41.1	36.9	33.4
Guinea[a]	..	..	..	..	..†	..	..	4.1	6.1	6.1	6.4
Ivory Coast	..	..	..	..	..	..	..†	4.7	10.2	9.4	12.9
Kenya	..	..	6.5	6.9	6.0	5.5	3.1	1.1	0.8	2.1†	6.7
Liberia	..	..	..	..	..	..	..	..	..	(3.4)	3.3
Libya	..	..	..	..	..	(6.1)	(5.9)	(7.3)	(16.6)	(18.1)	20.3
Malagasy Rep.	..	..	..	..	..	..	1.9†	9.7	10.3	9.8	9.8
Malawi	..	..	..	..	..	..	..	..	..	..	(1.0)
Mali[a]	..	..	..	..	..	..	..†	..	3.6	3.8	4.2
Mauritania	..	..	..	..	..	..	..†	[2.7]	[3.9]	4.7	2.2
Mauritius	..	..	..	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3
Morocco	..	..	32.7	44.5	52.2	51.6	52.1	59.4	63.1	82.9	74.5
Niger	..	..	..	..	..	..	..†	1.3	1.5	2.0	2.1
Nigeria	[7.6]	7.3	7.3	8.6	20.1	23.8	26.3†	25.6	31.2	39.3	44.5
Rhodesia, S.	..	..	..	..	..	..	..	..	..	..	16.0
Rwanda	..	..	..	..	..	..	..	..	..†	[1.9]	[2.1]
Senegal	..	..	..	..	..	..	..†	5.0	7.4	11.8	15.3
Sierra Leone	..	..	..	..	..	..	..	2.3†	2.4	2.6	2.6
Somalia	..	..	..	..	..	..	..†	4.4	5.1	6.1	6.6
South Africa	85	86	96	101	75	71	81	128	206	209	293
Sudan	10.3	11.7	13.0	17.5	19.9	21.8	24.6	25.1	28.5	31.9	40.7
Tanzania	..	..	..	..	..	..	..	..†	1.7	3.0	5.7
Togo	..	..	..	..	..	..	..†	(0.3)	(0.6)	0.9	(2.7)
Tunisia	..	..	3.6†	6.1	10.4	16.1	18.6	20.7	16.5	17.3	20.1
Uganda	..	3.0	3.2	3.1	2.9	2.9	1.6	0.2	1.1†	4.2	7.6
Upper Volta	..	..	..	..	..	..	1.5†	1.8	5.0	5.1	5.1
Zaire	..	..	..	..	..	..	..†	..	..	25.2	33.9
Zambia	..	..	..	..	7.6	..	10.4	15.2	16.2	17.0	8.5†
Total Africa	**[130.0]**	**[150.0]**	**[215.0]**	**[250.0]**	**[250.0]**	**[260.0]**	**[305.0]**	**[450.0]**	**[645.0]**	**[705.0]**	**849.7**

[a] At current prices and 1970 exchange rates.
[b] 1972.
[c] 1973.
[d] 1971.

US $ mn, at 1970 prices and 1970 exchange rates (Final column, X, at current prices and exchange rates)

1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1974X
99	99	99	99	99	99	99	101	110	177	(211)	*210*
(3.6)	3.2	3.6	3.6	4.0	4.3	4.7	[5.0]	5.1	. .	. .	*6*[c]
2.4	2.5	2.7	2.8	2.7	3.1	3.0	3.3	. .	. .	. .	*4*[b]
15.3	16.3	17.6	18.5	19.6	19.8	20.0	21.9	(23.8)	. .	. .	*38*[c]
2.3	2.4	3.3	4.2	5.5	4.9	4.9	4.1	4.8	4.5	. .	*7*
3.7	6.0	(8.0)	(8.1)	8.6	12.6	13.3	[13.0]	. .	. .	. .	[*15*][b]
5.3	7.4	8.3	7.7	8.5	[10.1]	[9.7]	[8.8]	[11.3]	13.3	. .	*19*
53.8	49.2	41.5	38.9	37.9	34.4	35.8	39.8	37.4	35.5	(46.6)	*48*
3.1	3.0	2.9	2.9	4.2	4.6	5.3	5.6	6.7	7.2	. .	*11*
29.7	28.0	45.7	50.3	47.6	42.0	40.0	37.6	37.5	44.5	. .	*64*
11.1	13.2	14.0	14.2	14.6	[18.0]	[16.8]	[17.2]	. .	. .	. .	*19*[b]
14.5	14.3	15.5	16.3	16.4	17.6	19.4	19.6	19.7	. .	. .	*27*[c]
10.8	13.6	16.4	16.7	16.1	17.1	21.7	26.9	31.9	(30.7)	(27.0)	*42*
3.5	3.4	3.8	3.1	3.3	3.8	4.3	3.6	3.0	. .	. .	*4*[c]
25.9	48.4	136.5	216.1	330.4	[365.0]	[390.0]	[405.0]	[400.0]	[290.0]	. .	*400*
10.7	11.0	11.6	12.4	12.5	12.1	13.1	11.7	[13.1]	12.5	. .	*21*
(1.1)	(1.4)	(1.5)	1.5	1.3	1.4	1.6	1.7	2.8	. .	. .	*3*[c]
4.3	4.1	4.3	4.2	5.3	6.1	5.7	7.6	8.4	. .	. .	*11*[c]
2.3	2.1	2.2	2.3	2.4	2.4	2.4	. .	. .	. .	. .	*3*[d]
0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.5	. .	. .	*1*[c]
65.1	68.2	73.7	86.3	92.9	87.7	94.0	103.8	116.8	110.4	. .	*187*
2.3	2.8	3.3	3.7	3.5	3.8	4.2	[4.6]	[3.6]	(3.2)	. .	*5*
51.9	44.0	152.9	262.4	428.0	434.0	358.0	384.0	289.0	307.0	(723.0)	*492*
19.3	18.8	20.7	21.9	22.0	25.5	27.5	26.7	36.5	51.4	(56.6)	*72*
2.6	4.7	4.6	4.5	4.0	4.5	4.9	4.9	[4.4]	. .	. .	*6*[c]
14.6	14.8	15.6	16.5	14.6	16.1	16.4	16.9	14.1	13.9	(14.2)	*22*
2.7	2.4	2.3	2.8	3.3	3.7	4.0	3.0	3.9	. .	. .	*4*[c]
5.5	7.1	8.4	9.0	9.0	11.2	11.4	13.3	[13.1]	11.5	. .	*16*
300	325	367	366	377	360	400	406	497	654	(792)	*950*
49.9	54.2	54.2	66.1	72.1	93.3	107.7	97.3	84.7	64.9	(50.5)	*109*
8.3	10.4	12.5	12.1	14.9	24.5	31.0	28.2	32.7	28.4	. .	*46*
(2.9)	2.3	2.5	2.7	2.8	3.0	3.1	3.4	3.8	4.3	. .	*7*
16.3	18.6	17.3	21.1	20.2	22.5	22.6	25.9	25.3	28.3	(36.4)	*40*
13.1	17.5	20.0	24.4	25.0	26.6	45.5	57.6	36.1	21.0	. .	*49*
3.4	3.7	3.7	3.7	3.8	4.2	4.2	(3.9)	[4.0]	. .	. .	*6*[c]
86.9	78.3	65.8	53.6	63.0	96.0	90.9	70.6	[62.0]	48.9	. .	*104*
23.0	22.0	24.3	26.9	19.5	22.5	66.0	83.0	52.0	54.0	. .	*78*
970.2	**1 023.0**	**1 287.5**	**1 506.8**	**1 815.8**	**1 917.8**	**2 000.7**	**[2 050]**	**[2 025]**	**[2 135]**	**[2 750]**	*3 146*

Table 6A.24. Africa: current price figures

	Currency	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Algeria	*mn dinars*	. .	. .	. .	. .	. .	. .	. .	. .	320	390
Benin (Dahomey)	*mn francs*	. .	. .	. .	. .	. .	. .	. .	(480)	(655)	(765)
Burundi	*mn francs*	. .	. .	. .	. .	. .	. .	. .	. .	85.9	99.9
Cameroon	*mn francs*	. .	. .	. .	. .	. .	. .	2 186	2 841	3 550	3 350
Central African Republic	*mn francs*	. .	. .	. .	. .	. .	. .	. .	250	250	250
Chad	*mn francs*	. .	. .	. .	. .	. .	. .	. .	. .	319	367
Congo	*mn francs*	. .	. .	. .	. .	. .	. .	. .	500	915	990
Ethiopia	*mn dollars*	. .	. .	. .	. .	. .	33	41	46	50	68
Gabon	*mn francs*	. .	. .	. .	. .	. .	. .	. .	245	370	620
Ghana	*mn cedis*	. .	4.0	6.7	8.3	8.5	9.1	14.9	21.9	23.4	21.9
Guinea	*mn sily*	. .	. .	. .	. .	. .	. .	. .	100	150	150
Ivory Coast	*mn francs*	. .	. .	. .	. .	. .	. .	. .	990	2 148	1 976
Kenya	*mn pounds*	. .	. .	1.8	2.0	1.8	1.6	0.9	0.3	0.2	0.7
Liberia	*mn dollars*	. .	. .	. .	. .	. .	. .	. .	. .	. .	2.6
Libya	*mn dinars*	. .	. .	. .	. .	. .	1.4	1.4	1.8	4.2	4.7
Malagasy Rep.	*mn francs*	. .	. .	. .	. .	. .	. .	396	2 094	2 266	2 211
Malawi	*mn kwachas*	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Mali	*mn francs*	. .	. .	. .	. .	. .	. .	. .	. .	2 020	2 130
Mauritania	*mn ouguiyas*	. .	. .	. .	. .	. .	. .	. .	[100]	[150]	197
Mauritius	*mn rupees*	. .	. .	. .	2.0	2.0	2.0	1.6	1.3	1.4	1.5
Morocco	*mn dirhams*	. .	. .	116	165	198	198	210	244	272	379
Niger	*mn francs*	. .	. .	. .	. .	. .	. .	. .	260	300	430
Nigeria	*mn nairas*	[2.8]	2.8	3.0	3.6	8.4	10.4	12.2	12.6	16.0	19.6
Rhodesia, S.	*mn dollars*	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Rwanda	*mn francs*	. .	. .	. .	. .	. .	. .	. .	. .	. .	130
Senegal	*mn francs*	. .	. .	. .	. .	. .	. .	. .	1 110	1 725	2 840
Sierra Leone	*mn leones*	. .	. .	. .	. .	. .	. .	. .	1.3	1.4	1.5
Somalia	*mn shillings*	. .	. .	. .	. .	. .	. .	. .	22.6	26.4	32.0
South Africa	*mn rands*	39.5	42.4	48.4	51.7	40.2	38.0	44.0	71.1	116.4	118.7
Sudan	*mn pounds*	2.4	2.8†	3.0	4.1	5.0	5.4	6.1	6.8	7.9	9.2
Tanzania	*mn shillings*	. .	. .	. .	. .	. .	. .	. .	. .	10.0	17.1
Togo	*mn francs*	. .	. .	. .	. .	. .	. .	. .	66.3	144.3	228.6
Tunisia	*mn dinars*	. .	. .	1.4	2.5	4.4	6.6	7.4	8.6	6.6	7.1
Uganda	*mn shillings*	. .	12.9	15.0	14.7	14.2	14.0	7.5	1.0	5.2	19.5
Upper Volta	*mn francs*	. .	. .	. .	. .	. .	. .	311	403	1 201	1 294
Zaire	*mn zaires*	. .	. .	. .	. .	. .	. .	. .	. .	. .	3.3
Zambia	*mn kwachas*	. .	. .	. .	. .	3.4	. .	4.8	7.2	7.8	8.0

[a] GDP figure used excludes Eastern states.

[b] GDP at factor cost.

Local currency, current prices

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
425	490	490	490	490	490	488	491	500	545	874	1 040
(905)	995	900	1 000	[1 000]	[1 100]	[1 200]	1 300	[1 350]	1 412	. .	. .
118.9	181.9	199.8	212.0	237.0	235.0	273.0	276.0	315.0	. .	. .	. .
3 450	3 700	4 050	4 500	4 800	5 150	5 500	5 808	6 850	8 255	. .	. .
580	547	588	827	1 109	1 451	1 351	1 468	1 312	1 616	1 667	. .
441	820	1 426	(1 950)	(2 000)	2 190	3 500	3 925	[3 950]	. .	. .	. .
1 235	1 235	1 910	2 218	2 130	2 336	[2 800]	[2 800]	[2 800]	[3 700]	4 610	. .
90	107	109	93	87	86	86	90	94	96	99	(138)
500	740	740	740	740	1 130	1 285	1 514	1 682	2 107	2 556	. .
22.2	25.4	25.5	39.0	47.2	46.8	43.1	42.7	44.0	48.9	74.1	. .
157	275	325	345	350	360	[445]	[415]	[425]	. .	. .	. .
2 742	3 162	3 260	3 600	4 000	4 185	4 900	5 335	5 425	6 025	. .	. .
2.1	3.5	4.7	5.7	5.8	5.6	6.1	7.9	10.6	13.6	(15.0)	(15.8)
2.6	2.8	2.8	3.3	2.8	3.3	3.8	4.3	3.8	3.7	. .	. .
5.4	7.3	15.0	43.0	71.0	[118.0]	[130.0]	[135.0]	[140.0]	[150.0]	119.0	. .
2 334	2 644	2 800	2 990	3 220	3 380	3 370	3 840	3 625	[4 300]	5 000	. .
0.7	0.8	1.0	1.1	1.1	1.0	1.2	1.4	1.6	2.7	. .	. .
2 330	2 400	[2 260]	[2 365]	[2 340]	[2 950]	[3 400]	3 175	4 200	4 685	. .	. .
99	104	100	108	117	125	135	142	. .	. .	. .	. .
1.5	1.5	1.5	1.5	1.5	[1.8]	[2.0]	2.0	3.0	3.0	. .	. .
354	320	332	356	419	464	444	493	568	(665)	815	. .
465	540	710	855	915	960	[1 050]	1 215	[1 450]	[1 275]	(1 160)	. .
23.4	28.2	26.0	87	150	270	310	290	320	250	310	955
10.2	12.6	12.6	14.1	15.3	15.4	18.2	20.2	20.2	28.5	42.8	51.6
[180]	220	480	391	360	450	480	525	520	. .	. .	. .
3 800	3 750	3 800	4 050	4 300	3 960	4 461	4 678	4 970	4 461	5 225	6 907
1.7	1.8	1.7	1.7	2.1	2.6	[3.1]	[3.3]	[2.6]	3.6	. .	. .
38.7	36.9	46.4	53.8	59.6	64.3	80.0	81.0	92.0	[96.0]	100.0	. .
170.7	181.6	203.8	238.0	241.0	256.0	257.0	303.0	327.0	439.0	645.0	886.0
12.2	14.6	16.1	17.9	19.6	24.1	32.5	38.0	38.4	39.1	37.8	36.3
33.2	51.2	67.6	83.0	83.0	103	175	233	250	(305)	330	. .
682.2	678.4	584	629	670	735	830	948	1 063	1 261	1 604	. .
8.6	7.4	8.8	8.4	10.5	10.5	11.8	12.6	14.7	15.0	17.5	24.7
39.2	76.7	101.9	120.3	142	163	190	376	462	360	350	. .
1 313	860	960	910	930	1 045	1 160	1 205	1 230	1 400	. .	. .
6.1	15.3	15.9	18.3	22.9	30.1	48.0	47.7	50.1	[51.0]	52.0	. .
4.2	12.0	12.6	14.6	17.9	13.3	16.1	50.0	66.3	44.5	50.0	. .

Table 6A.25. Africa: military expenditure as a percentage of gross domestic product

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Algeria	. .	. .	. .	. .	. .	. .	. .	. .	[2.7]	(3.1)
Benin (Dahomey)	. .	. .	. .	. .	. .	. .	. .	(1.3)	(1.7)	(1.9)
Burundi	. .	. .	. .	. .	. .	. .	. .	. .	. .	(1.4)
Cameroon	. .	. .	. .	. .	. .	. .	. .	. .	[2.5]	2.2
Central African Republic	. .	. .	. .	. .	. .	. .	. .	0.7	0.7	0.7
Chad	. .	. .	. .	. .	. .	. .	. .	. .	0.1	0.6
Congo	. .	. .	. .	. .	. .	. .	. .	[1.5]	[2.6]	(2.7)
Ethiopia	. .	. .	. .	. .	. .	. .	1.7	1.9	1.9	2.4
Gabon	. .	. .	. .	. .	. .	. .	. .	0.7	0.9	1.4
Ghana	. .	0.6	0.9	1.1	1.1	1.0	1.6	2.1	2.1	1.8
Guinea	. .	. .	. .	. .	. .	. .	. .	[2.0]	[2.7]	(2.7)
Ivory Coast	. .	. .	. .	. .	. .	. .	. .	0.6	1.3	1.0
Kenya	. .	. .	0.9	1.0	0.8	0.7	0.4	0.1	0.1	[0.2]
Liberia	. .	. .	. .	. .	. .	. .	. .	. .	. .	0.9
Libya	. .	. .	. .	. .	. .	. .	. .	. .	2.4	1.9
Malagasy Rep.	. .	. .	. .	. .	. .	. .	0.3	[1.5]	1.5	(1.5)
Malawi	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Mauritania	. .	. .	. .	. .	. .	. .	. .	[2.3]	[3.1]	3.6
Mauritius	. .	. .	. .	0.3	0.3	0.3	0.2	0.2	0.2	0.1
Morocco	. .	. .	1.7	2.3	2.4	2.4	2.3	2.7	2.6	3.2
Niger	. .	. .	. .	. .	. .	. .	. .	0.5	0.5	0.7
Nigeria	[0.2]	0.2	0.2	0.2 ▌	0.4	0.5	0.5	0.5	0.6	0.7
Rhodesia, S.	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Rwanda	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Senegal	. .	. .	. .	. .	. .	. .	. .	0.7	1.1	1.6
Sierra Leone	. .	. .	. .	. .	. .	. .	. .	. .	[0.7]	[0.7]
Somalia	. .	. .	. .	. .	. .	. .	. .	. .	. .	(2.7)
South Africa	1.0	1.0	1.1	1.1	0.8	0.8 ▌	0.8	1.3	2.0	1.8
Sudan	. .	. .	1.0	1.2	1.5	1.5	1.6	1.7	1.8	2.0
Tanzania	. .	. .	. .	. .	. .	. .	. .	. .	0.2	0.3 ▌
Togo	. .	. .	. .	. .	. .	. .	. .	[0.2]	[0.5]	0.7
Tunisia	. .	. .	. .	. .	. .	. .	2.2	2.3	1.8	1.6
Uganda	. .	0.5	0.5	0.5	0.5	0.5	0.3	0.03	0.2	0.4
Upper Volta	. .	. .	. .	. .	. .	. .	(0.7)	[0.8]	[2.3]	(2.4)
Zaire	. .	. .	. .	. .	. .	. .	. .	. .	. .	1.7
Zambia	. .	. .	. .	. .	1.2	. .	1.1	1.8	1.9	1.9 ▌

[a] GDP figure used excludes Eastern states.
[b] GDP at factor cost.

Local currency, current prices

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
3.2	3.5	3.2	3.0	2.6	2.4	2.1	2.1	1.8	1.8	. .
(2.1)	2.2	1.9	2.1	2.0	[2.1]	[2.1]	2.1	[2.0]	2.0	. .
. .	. .	. .	. .	(1.5)	(1.4)	(1.5)	. .	. .	. .	
2.1	2.1	2.2	2.2	2.0	2.0	1.9	. .	. .	. .	. .
1.5	(1.3)	(1.3)	1.8	2.2	[2.7]	2.4	2.6	. .	. .	. .
0.7	. .	. .	. .	. .	. .	(4.7)	. .	. .	. .	. .
[3.2]	[2.9]	[4.2]	[4.6]	(4.0)	(4.0)	[4.4]	[4.0]	. .	. .	. .
2.9	3.2	3.1	2.5	2.2	2.0	1.9	1.9	1.9	1.8	. .
1.0	1.5	1.3	1.3	1.0	1.3	1.4	[1.4]	1.6	. .	. .
1.6	1.6	1.7	2.6	2.8	2.3	1.9	1.7	1.6	. .	. .
. .	. .	. .	. .	(4.9)	(4.6)	. .	. .	. .	. .	. .
1.1	1.3	1.3	1.3	1.2	1.1	1.2	1.2	1.1	1.1	. .
0.6	1.0	1.1	1.3	1.2	1.1	1.1	1.2	1.5	1.7	(1.6)
0.9	0.9	0.9	0.9	0.7	0.8	0.9	1.0	0.8	. .	. .
1.4	1.4	2.3	5.5	6.4	[9.3]	[9.8]	[8.3]	[7.8]	[6.8]	. .
1.5	1.6	1.5	1.6	1.5	1.5	1.4	1.4	1.3	. .	. .
0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.6	. .
1.4	(1.4)	[1.2]	[1.2]	1.2	(1.3)	[1.3]	[1.3]	. .	. .	. .
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	. .
2.8	2.4	2.6	2.6	2.7	2.9	2.6	2.7	2.8	3.1	3.1
0.7	0.7	0.7	0.9	1.0	1.0	0.9	. .	. .	. .	. .
0.7	0.8	0.7	2.8	5.2	7.6	5.9	4.3	4.2	2.9	. .
1.5	1.7	1.7	1.7	1.8	1.5	1.7	1.6	1.5	1.9	2.4
. .	. .	. .	2.6	2.4	2.0	2.2	2.3	2.5	2.3	. .
2.0	2.0	1.8	2.0	2.0	1.8	1.9	2.1	1.9	. .	. .
0.7	0.7	0.6	0.6	0.7	0.8	0.9	0.9	. .	. .	. .
. .	. .	. .	. .	. .	(3.9)	. .	. .	. .	. .	. .
2.4	2.3	2.4	2.5	2.4	2.2	2.1	2.4	2.1	2.3	2.9
2.6	3.0	3.2	3.3	3.4	4.1	5.2	5.5	. .	. .	. .
0.6	0.8	1.0	1.1	1.1	1.2	1.9	2.4	2.2	2.4	. .
1.8	1.6	1.1	1.1	1.1	1.1	1.1	1.2	1.2	. .	. .
1.9	1.4	1.6	1.4	1.7	1.5	1.6	1.4	1.4	1.3	1.1
0.8	1.3	1.7	1.9	1.9	2.0	2.0	3.6	.	. .	. .
[2.4]	1.5	1.6	[1.9]	1.6	. .	. .	. .	. .	. .	. .
. .	. .	. .	5.9	3.2	3.4	5.0	4.6	4.4	. .	. .
0.8	1.8	1.6	1.6	1.7	1.0	1.3	4.2	5.4	. .	. .

Table 6A.26. Central America: constant price figures

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
Cuba[a]	. .	. .	. .	. .	. .	. .	. .	175	200	215	220
Dominican Rep.	. .	. .	. .	. .	39.9	49.2	39.9	39.1	37.8	35.8	38.7
El Salvador	6.5	7.2	7.6	8.6	8.0	6.7	6.5	6.8	9.5	9.9	9.8
Guatemala	7.4	8.6	9.4	10.0	10.5	10.5	10.2	10.0	9.9	10.9	13.6
Haiti	6.5	6.4	6.5	7.0	8.2	8.5	8.7	9.1	9.9	8.7	8.6
Honduras	4.2	3.9	5.8	5.7	[5.7]	5.8	5.2	8.9	8.9	9.2	6.8
Jamaica	. .	. .	. .	. .	. .	. .	. .	. .	1.2†	4.9	5.1
Mexico	64.2	73.4	83.2	98.6	96.5	96.7	106.6	113.9	127.5	140.0	156.7
Nicaragua	. .	. .	. .	. .	. .	. .	. .	8.5	9.2	9.3	8.7
Trinidad & Tobago	. .	. .	. .	. .	. .	. .	. .	. .	. .	2.0	3.0
Total Central America	**[185.0]**	**[210.0]**	**[235.0]**	**[275.0]**	**[280.0]**	**[290.0]**	**[340.0]**	**371.3**	**413.9**	**445.7**	**471.0**

[a] At current prices and 1970 exchange rates.
[b] 1972.
[c] 1973.

Table 6A.27. Central America: current price figures

	Currency	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Cuba	*mn pesos*	. .	. .	. .	. .	. .	. .	. .	175.0	200.0	215.0
Dominican Republic	*mn pesos*	. .	. .	. .	. .	34.5	42.6	33.4	31.6	33.1	34.0
El Salvador	*mn colones*	14.5	16.4	17.4	19.2	19.0	15.6	15.3	15.5	21.7	23.0
Guatemala	*mn quetzales*	6.7	8.0	8.8	9.3	9.8	9.8	9.4	9.2	9.3	10.2
Haiti	*mn gourdes*	25.7	25.9	27.2	29.7	35.0	34.4	33.3	35.5	38.8	35.7
Honduras	*mn lempiras*	6.4	6.4	9.3	8.9	[9.1]	9.3	8.2	14.4	14.5	15.4
Jamaica	*mn dollars*	. .	. .	. .	. .	. .	. .	. .	. .	0.7	3.0
Mexico	*mn pesos*	405.0	533.0	632.0	792.0	862.0	883.0	1 021.0	1 111.0	1 258.0	1 388.0
Nicaragua	*mn cordobas*	. .	. .	. .	. .	. .	. .	. .	49.2	53.2	54.3
Trinidad & Tobago	*mn dollars*	. .	. .	. .	. .	. .	. .	. .	. .	. .	3.3

Table 6A.28. Central America: military expenditure as a percentage of gross domestic product

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Cuba[a]	. .	. .	. .	. .	. .	. .	. .	. .	. .	*6.2*
Dominican Republic	. .	. .	. .	. .	*4.8*	*6.1*	*4.6*	*4.5*	*3.7*	*3.4*
El Salvador	. .	. .	. .	. .	*1.4*	*1.2*	*1.1*	*1.1*	*1.4*	*1.4*
Guatemala	*0.9*	*1.0*	*1.0*	*1.0*	*0.9*	*0.9*	*0.9*	*0.9*	*0.8*	*0.8*
Haiti	. .	. .	. .	. .	. .	. .	[2.2]	. .	. .	*2.2*
Honduras	*1.1*	*1.0*	*1.4*	*1.3*	[*1.3*]	*1.2*	*1.1*	*1.8*	*1.7*	*1.8*
Jamaica	. .	. .	. .	. .	. .	. .	. .	. .	*0.1*	*0.5*
Mexico	*0.6*	*0.6*	*0.6*	*0.7*	*0.7*	*0.6*	*0.7*	*0.7*	*0.7*	*0.7*
Nicaragua	. .	. .	. .	. .	. .	. .	. .	*1.7*	*1.7*	*1.7*
Trinidad & Tobago	. .	. .	. .	. .	. .	. .	. .	. .	. .	*0.3*

[a] Percentage of gross material product.

US $ mn, at 1970 prices and 1970 exchange rates (Final column, X, at current prices and exchange rates)

1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1974X
215	215	250	300	250	290	290	[320]	. .	. .	*[347]*[b]
36.9	34.7	32.8	33.6	32.6	31.3	31.0	31.0	28.6	24.9	*36*
10.0	10.2	10.2	12.1	29.5	10.6	11.8	14.1	13.6	. .	*15*[c]
15.4	15.7	17.4	16.4	16.0	28.7	18.6	19.5	18.3	18.1	*24*
8.0	7.1	7.4	7.3	7.2	7.2	6.6	6.9	5.7	5.3	*8*
6.6	7.7	8.3	7.1	14.9	8.6	11.1	14.3	14.0	13.1	*17*
5.3	5.3	5.6	5.7	5.0	5.5	6.4	6.7	. .	. .	*8*[b]
157.2	191.7	190.2	203.8	215.5	220.2	242.4	270.0	269.2	252.5	*424*
9.1	9.6	10.4	10.4	10.9	12.1	(11.8)	(14.8)	(15.0)	[16.4]	*21*
2.6	2.5	2.6	2.4	2.5	3.8	3.8	3.5	3.2	. .	*4*
466.1	**499.5**	**534.9**	**598.8**	**584.1**	**618.0**	**633.5**	**700.8**	**[700.0]**	**[690.0]**	*904*

Local currency, current prices

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
220.0	215.0	215.0	250.0	300.0	250.0	290.0	290.0	[320.0]	. .	. .
37.0	35.0	32.4	31.2	32.5	31.0	31.3	31.9	34.4	36.6	36.0
23.0	23.6	23.9	24.3	29.5	71.8	26.4	29.5	36.0	37.0	. .
12.7	14.3	14.7	16.3	15.7	15.6	28.7	18.5	19.5	21.0	24.0
38.8	36.8	35.4	35.8	35.8	35.8	35.8	36.6	39.1	39.9	42.3
12.0	12.0	14.1	15.4	13.6	28.9	17.2	22.8	31.1	31.7	33.3
3.2	3.4	3.5	3.8	4.1	3.8	4.6	5.7	6.3	. .	. .
1 589.0	1 651.0	2 100.0	2 148.0	2 355.0	2 560.0	2 750.0	3 125.0	3 700.0	4 300.0	5 292.0
53.2	37.2	62.4	70.5	70.9	75.0	86.4	90.0	116.0	130.0	. .
4.9	4.3	4.3	4.5	4.6	4.9	7.5	7.8	8.0	8.2	145.6

Per cent

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
. .	. .	. .	6.1	6.9	6.0	. .	. .	. .	. .	. .
3.4	3.7	3.1	2.8	2.8	2.3	2.1	1.9	1.7	1.6	. .
1.2	1.2	1.1	1.1	1.3	3.0	1.0	1.1	1.2	1.1	. .
1.0	1.1	1.1	1.1	1.0	0.9	1.5	0.9	0.9	0.8	0.8
. .	. .	. .	[1.9]	1.7	1.5	1.4	1.4	1.4	. .	. .
1.3	1.2	1.3	1.3	1.0	2.2	1.2	1.5	1.9	1.8	1.7
0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.5	. .	. .
0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
1.4	1.3	1.5	1.5	1.5	1.4	1.5	1.4	1.7	1.7	. .
0.4	0.3	0.3	0.3	0.3	0.3	0.4	. .	. .	. .	. .

Table 6A.29. South America: constant price figures

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
Argentina	428.9	341.3	428.8	450.3	467.3	368.5	406.3	396.7	380.3	382.0	351.7	391.
Bolivia	. .	5.6	4.1	4.7	[5.1]	[5.6]	[7.1]	7.7	7.7	17.4	17.0	20.
Brazil	394	450	545	603	619	500	462	417	447	439	472	697
Chile	79.7	119.2	114.0	122.3	114.2	91.9	98.4	100.6	101.3	91.9	86.4	98.
Colombia	67.0	66.3	64.6	57.9	53.2	43.7	49.5	58.8	92.7	102.3	96.4	106.
Ecuador	19.0	22.0	23.4	22.4	21.6	18.9	25.4	24.4	23.2	20.5	23.7	26.
Guyana	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Paraguay	. .	. .	. .	. .	. .	. .	. .	[6.9]	[6.8]	[7.6]	[7.4]	[8.2
Peru	55.8	59.6	97.7	88.0	99.4	88.2	86.3	[102.0]	[101.0]	139.3	136.1	135.4
Uruguay	. .	. .	. .	. .	. .	. .	. .	23.3	24.8	34.0	33.4	37.
Venezuela	73.9	92.5	103.4	138.8	159.2	154.3	139.7	134.1	128.5	153.1	158.9	178.
Total South America	**[1 165.0]**	**[1 200.0]**	**[1 425.0]**	**[1 530.0]**	**[1 585.0]**	**[1 315.0]**	**[1 320.0]**	**1 271.5**	**1 313.3**	**1 387.1**	**1 383.0**	**1 698.**

[a] 1973.

Table 6A.30. South America: current price figures

	Currency	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Argentina	*mn new pesos*	42.5	38.1	54.2	71.2	98.3	171	236	263	325	402
Bolivia	*mn pesos*	. .	4.7	9.7	23.9	[26.4]	[35.1]	[48.9]	57.9	61	137
Brazil	*mn cruzeiros*	13.0	17.8	26.2	34.6	40.8	43.9	69.6	43.9	114	194
Chile	*mn escudos*	13.2	34.3	51.7	73.1	82.2	91.1	109	119	135	179
Colombia	*mn pesos*	275	272	283	289	306	272	317	410	664	965
Ecuador	*mn sucres*	250	295	298	289	282	247	336	336	329	307
Guyana	*mn dollars*	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Paraguay	*mn guaranis*	. .	. .	. .	. .	. .	. .	. .	[750]	[750]	[860
Peru	*mn soles*	551	618	1 066	1 039	1 265	1 259	1 340	[1 687]	[1 785]	2 614
Uruguay	*mn pesos*	. .	. .	. .	. .	. .	. .	. .	187	221	365
Venezuela	*mn bolivares*	270	338	381	496	601	607	540	533	509	613

Table 6A.31. South America: military expenditure as a percentage of gross domestic product

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Argentina	*2.9*	*2.2*	*2.5*	*2.6*	*2.5*	*2.3*	*2.3*	*2.2*	*2.2*	*2.1*
Bolivia	. .	*0.3*	*0.4*	*0.8*	[*0.8*]	[*0.9*]	[*1.1*]	*1.2*	*1.1*	*2.4*
Brazil	*2.2*	*2.3*	*2.6*	*2.9*	*2.8*	*2.2*	*2.0*	*1.7*	*1.7*	*1.6*
Chile	*2.2*	*3.3*	*3.1*	*3.2*	*2.7*	*2.2*	*2.6*	*2.5*	*2.4*	*2.1*
Colombia	*2.2*	*2.1*	*1.9*	*1.6*	*1.5*	*1.2*	*1.2*	*1.3*	*1.9*	*2.2*
Ecuador	*2.4*	*2.7*	*2.6*	*2.4*	*2.3*	*1.9*	*2.4*	*2.2*	*2.0*	*1.8*
Guyana	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Paraguay	. .	. .	. .	. .	. .	. .	. .	[*1.9*]	[*1.7*]	[*1.8*]
Peru	*2.1*	*2.1*	*3.2*	*2.9*	*3.1*	*2.7*	*2.4*	[*2.6*]	[*2.4*]	*3.2*
Uruguay	. .	. .	. .	. .	. .	. .	. .	*1.1*	*1.2*	*1.6*
Venezuela	*1.6*	*1.9*	*1.9*	*2.1*	*2.4*	*2.4*	*2.1*	*2.0*	*1.7*	*1.9*

US $ mn, at 1970 prices and 1970 exchange rates (Final column, X, at current prices and exchange rates)

1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1974X
441.4	480.2	406.2	431.2	449.8	403.0	417.0	349.0	376.0	(226.0)	*1 278*
18.4	16.9	15.0	16.5	19.2	20.0	27.0	33.6	24.6	. .	*35*
595	818	822	904	853	1 166	1 223	1 428	865	(977)	*1 199*
120.7	127.3	136.2	151.0	207.0	211.0	255.0	402.3	235.0	. .	*182*
106.5	109.2	143.4	82.7	101.6	187.3	97.5	87.4	67.8	(72.4)	*91*
24.7	26.2	29.1	37.0	38.0	34.0	39.4	47.8	(27.0)	. .	*35*
1.1 †	2.3	2.1	2.4	3.8	3.3	3.3	4.1	. .	. .	*5*[a]
9.3	9.9	10.4	11.1	12.0	8.1	14.7	14.3	13.0	(15.9)	*21*
134.7	171.4	171.8	183.8	179.8	219.1	220.4	210.1	175.0	. .	*257*
35.9	41.9	31.5	43.3	47.7	62.8	53.0	56.9	. .	. .	*70*[a]
184.9	209.2	208.5	197.6	198.0	240.0	270.0	263.0	372.0	352.0	*468*
1 672.6	**2 012.5**	**1 976.2**	**2 060.6**	**2 109.9**	**2 554.6**	**2 620.3**	**2 896.5**	**[2 225.0]**	**[2 220.0]**	*3 641*

Local currency, current prices

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
452	647	962	1 354	1 329	1 521	1 800	2 170	3 565	4 780	6 390	10 309
147	178	175	179	168	188	228	242	350	580	691	. .
388	924	1 157	2 066	2 574	3 492	3 926	6 498	8 033	10 831	8 202	12 070
245	358	542	681	917	1 319	2 405	2 951	6 314	45 230	159 700	. .
1 072	1 218	1 467	1 627	2 263	1 437	1 885	3 789	2 254	2 479	2 393	3 229
370	428	413	456	527	714	767	742	933	1 280	888	. .
. .	. .	1.9	4.3	4.0	4.7	7.6	6.7	7.0	9.6	. .	. .
[840]	[975]	1 132	1 227	1 292	1 414	1 514	1 075	2 131	2 336	2 662	3 477
2 824	3 286	3 575	4 994	5 957	6 769	6 960	9 055	9 765	10 195	9 932	. .
509	900	1 500	3 300	5 600	9 300	11 900	19 400	28 900	61 200	. .	. .
650	742	782	885	894	867	891	1 113	1 290	1 309	2 012	2 100

Per cent

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
1.8	*1.8*	*2.1*	*2.3*	*1.9*	*1.9*	*1.9*	*1.6*	*1.6*	*1.3*	. .
2.3	*2.5*	*2.2*	*2.0*	*1.6*	*1.7*	*1.9*	*1.8*	*2.3*	*2.7*	*1.9*
1.7	*2.5*	*2.2*	*2.9*	*2.6*	*2.6*	*1.9*	*2.4*	*2.2*	*2.3*	. .
1.9	*2.0*	*2.2*	*2.0*	*2.0*	*2.0*	*2.5*	*2.3*	*2.6*	*3.6*	. .
2.0	*2.0*	*2.0*	*2.0*	*2.3*	*1.3*	*1.4*	*2.5*	*1.2*	*1.0*	. .
1.9	*2.1*	*1.7*	*1.7*	*1.8*	*2.2*	*2.2*	*1.9*	*2.0*	*2.0*	*1.0*
. .	. .	*0.5*	*1.0*	*0.9*	*0.9*	*1.4*	*1.2*	*1.2*	*1.5*	. .
[*1.6*]	[*1.7*]	*1.9*	*2.0*	*2.0*	*2.0*	*2.0*	*1.3*	*2.2*	*1.9*	*1.6*
2.9	*2.9*	*2.6*	*3.2*	*3.2*	*3.2*	*2.9*	*3.4*	*3.3*	*2.9*	. .
1.6	*1.7*	*1.5*	*1.9*	*1.5*	*1.8*	*1.9*	*2.6*	*2.3*	*2.4*	. .
1.8	*2.0*	*2.0*	*2.1*	*2.0*	*1.8*	*1.7*	*2.0*	*2.0*	*1.7*	*1.6*

Appendix 6B

Registers of indigenous and licensed production of major weapons in industrialized countries, 1975

I. Register of indigenously designed major weapons in development or production in industrialized countries, 1975

For sources and methods, see chapter 7. For conventions, see page 145.

Part 1. *Aircraft*

Country	Designation, description	Power plant	Weight, *kg*	Speed, *km/hr* or *Mach no.*	Design begun	Prototype flight	In production	No.: domestic/export or total	R&D cost, *$ mn*	Unit price, *$ mn*	Foreign-designed Power plant, Electronics or Armaments
NATO											
Canada	*DHC-5D Buffalo* STOL transp	T	22 500	815	. .	. .	1974[a]	–/19	. .	. .	P (USA)
	Twin Otter STOL utility	T	5 670	340	1964	1965	(1965)	>450	. .	(0.7)	–
France	*Super Mirage* fighter/strike	J	28 158	M 2.5	1973	1977	. .[b]	(200)/–	(1 000)	(13.6)	. .
	Delta 2000 fighter[b]	J	(10 500)	M 2.7	1975	(1977)	. .	(200)/. .	. .	. .	. .
	F1 fighter/strike	J	14 900	M 2.2	1964	1966	1972	105/(200)	. .	. .	. .
	F1-E with advanced engine[c]		15 590	M 2.2	1973	1974	. .	. ./. .		(5.8)	
	Mirage III fighter/strike	J	13 500	M 2.2	. .	1956	1958	(400)/(600)	. .	. .	E-r (UK)
	Mirage 50 latest vers		. .	. .		(1975)		–/. .[d]			
	Mirage 5 ground attack vers		. .	. .	. .	1967	1969	50/(350)			. .
	Super Etendard strike/fighter carr-b	J	11 500	M 1	. .	1974	1976	100/–	. .	. .	E-n (USA)
	Atlantic Mk II maritime patrol[e]	T/J	52 500	(897)	1970	1976	1979	(40)/–	. .	. .	. .
	Alouette III utility hel	T	2 250	220	. .	1959	(1960)	(1 250)	. .	(0.1)	–
	SA 360 Dauphin utility hel	T	2 730	310	. .	1972	1975	(26)/. .	. .	. .	–
	SA 365 twin-engine vers		3 200			1975	1977	. .			
	SA 315B Lama light utility hel	T	1 750	210	1968	1969	(1970)	–/(161)	. .	. .	–

FR Germany	*VAK 191B* V/STOL light strike	J	9 000		1964	1971	. .[f]	. .	(180)	. .	P (UK)
	Do 24/72 rescue flying boat	T	18 600	(400)	1973	. .	. .	. ./(30)	. .	. .	P (USA)
	AM-C 111 STOL light transport	T	6 800	400	. .	(1976)	. .[g]	. .	. .	. .	P (Can.)
	Do 28 D-2 STOL utility	P	3 850	320	. .	1966	1968	145/(30)	. .	(0.25)	P (USA)
	AWI 2 Fantrainer trainer	. .[h]	1 350	370	. .	1977	. .	. .	(3)	. .	–
	Bo 115 attack hel[i]	T	. .	. .	1972	. .	(1978)	(250)/. .	(75)	. .	. .
	Bo 105 utility hel[j]	T	2 100	250	1962	1967	1971	304/(30)	(25)	(0.3)	P (USA)
International:											
FRG (42.5%) UK (42.5%) It. (15%)	*Panavia 200 MRCA* strike/recce	J	24 500	M 2.2	1969	1974	(1977)	(642)	(1 100)	10.1[l]	E-r (USA)
	air defence vers[k]				(1974)	. .	(1980)	(165)	(225)	. .	. .
Fr. (50%)	*Jaguar* strike	J	13 500	M 1.7	1964	1969	1972	400	(380)	. .	. .
UK (50%)	Jaguar International export vers						1975	–/24	. .	(4)	. .
Fr. (50%) FRG (50%)	*Alpha-Jet* trainer/light strike	J	7 000	1 000	1969	1973	1976	390/33	. .	1.1	. .
Fr. UK[m]	*SA 330 Puma* medium transp hel[o]	T	7 000	274	. .	1965	1968	164/140	. .	1.1	. .
	Lynx multi-purpose hel	T	4 130	295	(1968)	1971	1974	111/17[n]	(78)	1.2	. .
	SA 341 Gazelle light utility hel	T	1 700	310	. .	1967	1971	(500)	. .	0.24	. .
Italy	*G 91Y* light fighter/strike	J	8 700	1 050	1965	1966	1971	75/–[p]	. .	1.1	P, E-d, E-r (USA)
	MB 339 trainer/light strike	J	5 670	817	(1975)	1976	(1977)	(100)/. .	. .	1.6	P (UK)
	MB 326 trainer/light strike	J									
	326 GB, K, L current production vers[q]		5 443	890	. .	. .	yes	–/. .	. .	(0.5)	P (UK)
	G222 transport	J	26 000	530	. .	1970	1974	44/2	. .	(5)	P (USA)
	PD-808 light transport/ECM	J	8 165	852	. .	. .	(1970)	(25)/–	. .	. .	P (UK)
	S.210M light utility	P	1 850	340	. .	1970	(yes)	(20)/–	. .	. .	P (USA)
	SF. 260 M/W trainer/light strike	P	1 360	340	. .	1969	. .	(20)/200	. .	. .	P (USA)
	SM.1019 light utility	P	1 270	250	1969	1969	1973	100/–	. .	. .	P (USA)
	A.129 attack hel	J	2 600	290	(1972)	. .	. .	. .	. .	. .	P (USA)
	A.109 utility hel	J	2 450	275	. .	1971	(1974)	(80)/. .	. .	(0.4)	P (USA)
Netherlands	*F.27 Mk 400M* transp	T	20 140	485	. .	1955	1958	(45)	. .	. .	P (UK)
	maritime patrol vers	T	. .	. .		1976					P (UK) E (USA, Can.)
UK	*Buccaneer S.Mk 2* strike/recce	J	28 120	1 040	. .	1963	1964	126/16	. .	(8)	–
	Harrier V/STOL strike/fighter	J	11 340	(M 1.1)	(1959)	1966	1968	115/118	. .	. .	–
	carr-b vers				(1973)	1977	1978	25/. .	(55)		
	Strikemaster light strike	J	5 215	760	. .	1967	yes	–/138	. .	0.6	–
	Nimrod maritime patrol[r]	J	87 100	925	1964	1967	1968	49/–	. .	10.2[s]	–
	AEW vers				1973	. .	no	. .	. .	. .	. .

Country	Designation, description	Power plant	Weight, *kg*	Speed, *km/hr* or *Mach no.*	Design begun	Proto-type flight	In pro-duction	No.: do-mestic/ export or total	R&D cost, *$ mn*	Unit price, *$ mn*	Foreign-designed Power plant, Electronics or Armaments
	HS 748 Andover transp	T	20 180	450	1959	1960	1961	31/(45)	. .	(1.3)	–
	Coastguarder maritime patrol				(1973)	. .[t]		–/. .	. .	. .	. .
	SD3-M STOL transp	T	10 660	367	. .	1974	. .	. .	. .	. .	P (Can.)
	Skyvan STOL light transp	T	6 575	326	. .	1970	1970	–/(50)	. .	(0.8)	P (USA)
	Hawk trainer/light strike	J	7 080	M 0.9	(1971)	(1974)	1976	175/. .	. .	(2)	P (UK + Fr.)
	BN-2 Islander light transp	P	2 993	290	1964	1965	1967	–/(50)[u]	. .	. .	–
	Defender armed vers		3 150	290	. .	1971	1972	–/(10)	. .	(0.3)	. .
	Jetstream 200 trainer	T	5 670	460	. .	(1970)	1972	26/–	. .	. .	P (Fr.)
	Bulldog 120 primary trainer	P	1 065	240	1968	1969	(1971)	132/149	. .	. .	P (USA)
	200 light strike vers		1 182	278	1974	1976	(1976)	. .	. .	(0.06)	. .
USA	*B-1* strategic bomber	J	176 815	M 1.6[a]	1970	1974	1976	241/–	3 800	49.6	–
	F-111 fighter bomber	J	40 816	M 2.5							
	F-111F latest production vers				. .	. .	yes	118/–	. .	14.9[b]	–
	F-15A Eagle fighter	J	24 490	M 2.3	1965	1972	1974	749/25	1 900	7.5[c]	–
	F-14A Tomcat fighter/strike carr-b	J	28 750	>M 2	. .	1970	1971	334/80	. .	12.8	–
	F-14B with advanced engine	J				1973					
	F-18 light fighter/strike carr-b[d]	J	19 976	M 1.6	1974	1978	. .	(600)/–	1 430	5.8	–
	F-16 light fighter/strike[e]	J	12 286	>M 2	1974	1977	1978	650/306	574	4.7	E-f (UK)
	XVF-12A VTOL light fighter carr-b	J	8 845	(M 2)	1973	1976	no	. .	. .	. .	–
	AV-8B V/STOL strike carr-b[f]	J	. .	. .	1975	1978	1981	(336)/–	(300)	(6.0)	P (UK)
	F-4 Phantom fighter/strike	J									
	F-4E AF/export vers		26 304	M 2.2	. .	. .	1967	835/295	. .	4.2	–
	F-4F version for FRG				. .	. .	yes	–/185	. .	. .	–
	RF-4E recce vers		26 304	M 2.2	. .	. .	yes	. ./102	. .	. .	–
	F-5E/F Tiger II light fighter	J		M 1.6				710[g]			
	F-5E first production vers		10 922		1970	1972	1973		(140)	(2.7)	–
	F-5F 2 seat vers		. .		. .	1974	1975		(50)	(3)	–
	F-5 Freedom Fighter light fighter	J						–/(815)	. .	. .	–
	F-5B current production vers		9 298	M 1.3	. .	1964	yes	–/134			
	A-10A strike	J	20 206	740	1970	1972	1975	729/–	381	3.0	–
	A-7 Corsair II strike	J	19 050	M 1							
	A-7E carr-b vers				. .	1968	1968	666/–	. .	4.1	P (UK)
	A-7D AF vers				. .	1968	1968	669/–	. .	(2.9)	P (UK)
	A-7H export vers				. .	. .	(1974)	–/60	. .	. .	P (UK)
	A-6 Intruder strike carr/land-b	J		M 1.1							
	A-6E current production vers		27 397		. .	1970	1970	96/–[h]	. .	8.4	–
	EA-6B ECM vers		26 576		1966	1968	1969	77/–	. .	15.7	–

A-4 Skyhawk strike carr/land-b	J									
A-4M latest production vers		11 100	1 086	. .	1970	1970	141/–	. .	2.6	–
A-4N improved export vers		. .	. .	. .	1972	1972	–/. .	. .	. .	–
A-37B Dragonfly light strike	J	6 350	843	1967	1967	(1968)	(487)	. .	0.4	–
OV-10 E/F Bronco light strike	T	6 563	452	. .	1973	(1974)	–/48[i]	. .	. .	–
P-3 Orion ASW patrol	T	64 410	761				461			
P-3C current production vers				. .	1968	1968	241/26	. .	11.5	–
P-3F export 3C, simpler electronics				. .	. .	1973	–/16	. .	. .	–
S-3A Viking ASW carr-b	J	23 827	880	1969	1972	1972	187/–	. .	10.4	–
. . carr-b transport vers	J	. .	. .	(1975)	(1977)	. .	24/–	. .	. .	–
E-4 AABNCP-Advanced Airborne National Command Post com. & con.	J									
E-4A initial vers		. .	. .	. .	1973	(1974)	3/–[j]	(141)	44.7	–
E-4B with advanced equipment		. .	. .	. .	1974	no	4/–	292	. .	–
E-3A AWACS-Airborne Warning and Control System AEW/com. & con.	J	147 392	926	. .	1972	1975	34/–	(1 200)	73.8	–
E-2 Hawkeye AEW carr-b	T	23 391	602							
E-2C current production vers				. .	1971	1973	49/–	207.8	17.5	–
AMST-Advanced Medium STOL Transp				1972		(1979)	. .	(230)[k]	(7.8)	–
YC-15 competitive prototype	J	90 000	805		1975					
YC-14 competitive prototype	J	90 000	805		1976					
C-130 Hercules medium transp	T	79 380	618				908/339			
C-130H current standard vers				. .	1964	1965	131/189	. .	(5)	–
EC-130Q airborne comm. relay				. .	. .	yes	24/–	. .	18.3	–
KC-130R/H tanker				. .	. .	1973	16/4	. .	8.9	–
CT-39 Sabreliner light transp	J	8 498	906	. .	. .	1971	103/–	. .	(1.7)	–
T-37C basic jet trainer	J	3 632	578	. .	. .	yes	–/(250)	. .	. .	–
T-2D/E Buckeye jet trainer carr/land-b	J	5 977	840	. .	1968	1968	243/92	. .	. .	–
T-34C Mentor basic trainer	T	1 940	400	. .	. .	1975	(400)/(40)	. .	0.4	P (Can.)
T-41D primary trainer	P	907	221	. .	. .	yes	(250)	. .	<0.5	–
F33A/C trainer	P	1 542	322	. .	1959	(1960)	–/. .	. .	. .	–
C-12/Huron light transp	T	5 443	488	1970	1972	1974	50/–	. .	. .	–
HSX ASW hel	T	. .	. .	(1974)	. .	. .	. ./–	(440)[l]	. .	–
HXM assault hel[m]	T	. .	. .	1975	. .	. .	. ./–	. .	. .	–
AAH–Advanced Attack Hel	T	7 890	. .	1971	1975	1978	472/–	(410)	(5.5)	–
YAH-63 competitive prototype										
YAH-64 competitive prototype										
AH-1 attack hel	T									
AH-1S Cobra/TOW		(4 313)	350	. .	1973	1974	305/–[n]	. .	(1.3)	–
AH-1J SeaCobra		4 535	333	. .	. .	1969	124/202	. .	(2)	–

Country	Designation, description	Power plant	Weight, *kg*	Speed, *km/hr* or *Mach no.*	Design begun	Proto-type flight	In pro-duction	No.: do-mestic/ export or total	R&D cost, *$ mn*	Unit price, *$ mn*	Foreign-designed Power plant, Electronics or Armaments
	XCH-62 HLH-Heavy Lift Hel	T	67 135	130	1971	(1976)	no[o]	. .	(205)	(7.8)	–
	UTTAS-Utility Tactical Transp Aircraft System medium transp hel	T		175	1965	1974	1978	1 107/–	426	(1.9)	–
	YUH-60A competitive prototype		9 525								
	YUH-61A competitive prototype		8 481								
	H-53 multi-purpose hel	T									
	CH-53E shipborne heavy lift		10 000	254	1971	1974	1976	70/–[p]	100	(6.5)	–
	RH-53D mine countermeasures		10 286	315	1970	1972	1972	30/6	. .	. .	–
	CH-47C Chinook transp hel	T	20 865	306	. .	1967	1968	63/34[q]	. .	(3)	–
	Bell Model 214 Huey Plus utility hel	T	5 896	305	1970	1974	1974	–/287[r]	. .	. .	–
	UH-1 Iroquois utility hel	T									
	UH-1N current production vers		4 762	203	1968	. .	1969	294/50	. .	1.1	–
	UH-1H current production vers		4 309	204	. .	. .	1967	1 408/9	. .	1.2	–
	LAMPS MkIII Light Airborne Multi-Purpose System hel[s]	T	8 640	. .	1972	1978	1979	204/–	374	4.4	–
	XV-15 Bell Model 301 tilt rotor research vehicle	T	6 804	574	1973	1976	. .	. .	29	. .	–
Warsaw Treaty Organization											
Czechoslovakia	*L-39 Albatross* jet trainer	J	4 535	750	. .	1968	1972	. ./. .	. .	. .	P (USSR)
	L-39Z light strike vers										
Poland	*TS-11 Iskra* jet trainer/light strike	J	3 800	722	. .	1960	1962	(800)	. .	. .	. .
	Mi-2M utility hel[m]	T	3 700	210	(1968)	1974		. .	. .	. .	P (USSR)
USSR	*(Tu-26) "Backfire B"* bomber[a]	J	(130 000)	M 2	(1969)	(1971)	(1973)	(50)/–	. .	. .	–
	MiG-25A "Foxbat A" fighter	J	(37 000)	M 3.2	. .	1965	(1970)	. ./–	. .	. .	–
	"Foxbat B" recce vers						(1969)	. ./–			
	MiG-23 "Flogger" VG fighter	J	(17 000)	M 2.3	. .	1967	(1970)	(1 000)	. .	. .	–
	"Flogger A" initial vers										
	"Flogger B" fighter/strike vers										
	"Flogger C" two-seat vers										
	Tu-22 "Blinder" interceptor[b]	J	>84 000	M 1.3	. .	. .	(1973)	. ./–	. .	. .	–
	Su-19 "Fencer" fighter/strike	J	(34 000)	. .	. .	(1970)	(1973)	. ./–	. .	. .	–
	Su-15 "Flagon" fighter	J	17 900	M 2.5	. .	1967	(1968)	>1 000	. .	. .	–
	"Flagon E" latest vers				. .	. .	(1973)	. .			
	"Flagon D" recent vers				. .	. .	(1971)	. .			

	Su-17 "Fitter C" STOL strike	J	(17 000)	. .	. .	1967	(1970)	. ./. .	. .	. .	–
	Su-20 export vers										
	MiG-21 "Fishbed" light fighter	J	10 400	M 2.1	. .	(1955)	(1958)	. ./. .	. .	. .	–
	"Fishbed K, L" current vers				. .	. .	(1972)	. ./. .			
	Yak-36 "Freehand" VTOL strike	J	. .	<M 1	. .	1967	(1976)	. .	. .	. .	–
	Il-38 "May" ASW	T	(60 000)	645	. .	1967	(1970)	. ./–	. .	. .	–
	Il-76 "Candid" medium transp	J	157 000	850	. .	1971	1973	. ./–	. .	. .	–
	Mi-24 "Hind A, B" attack hel	T	8 400	310	. .	(1971)	(1973)	(100)/. .	. .	. .	–
	Mi-12 "Homer" heavy lift hel	T	105 000	260	. .	1969	(1972)	. ./–	. .	. .	–
	Mi-6 "Hook" heavy lift hel	T	42 500	300	. .	1957	(1962)	(650)	. .	. .	–
	Mi-8 "Hip" transp hel	T	12 000	260	. .	(1960)	yes	>1 000	. .	. .	–
	Ka-25 "Hormone" ASW/transp hel	T	7 300	220	. .	1961	(1964)	(300)/(9)	. .	. .	–
Other Europe											
Finland	*Leko-70* primary trainer	P	1 150	240	1973	1975	. .	(30)/. .	1.5	. .	P (USA)
International:											
Yugoslavia, Romania	*Orao (Eagle)* light strike/trainer	J	. .	(1 000)	1971	1974	(1977)	(400)	. .	. .	P (UK)[h]
Spain	*C-101* trainer/light strike	J	(4 945)	M 0.7	(1975)	(1977)	. .	60/. .	(27)	(1.24)	P (USA)
	Casa-401 STOL transport[i]	T	24 500	470	(1972)	. .	. .	. ./. .	. .	. .	P (USA)
	T12 Aviocar STOL light transport	T	6 300	400	1964	1970	1973	32/31	. .	0.65	P (USA)
Sweden[i]	*System 37 Viggen* fighter/strike	J						325/. .	1 170		
	JA 37 fighter			(M 2)	(1968)	1974	(1977)	150/–		(6)	P (USA, Swe) E-d, E-n (USA) A (Switz.)
	AJ 37 strike/recce		16 000	M 2	1962	1967	1970	175/–		(5)	P (USA, Swe)
	J 35 Draken fighter/strike	J	15 000	M 2	1955	. .	yes	(550/62)[c]	. .	. .	P (UK)
	SAAB 105G jet trainer/light strike	J	6 500	960	. .	1972	no	–/. .	. .		P (USA) E-r (UK)
	MFI-17 Supporter light utility	P	1 100	260	. .	1969	(1972)	–/132	. .	(0.08)	P (USA)
Switzerland	*Turbo Porter* STOL light utility	T	2 200	260	1957	1959	(1960)	. ./. .	. .	(0.17)	P (Can.)
	PC-7 Turbo-Trainer trainer	T	2 250	425	. .	1966	. .	. ./. .	. .	. .	P (Can.)
Yugoslavia	*J-1 Jastreb* light strike	J	5 100	820	. .	. .	yes	(80)	. .	. .	P (UK)
	TJ-1 trainer vers					1974	yes				
	G2-A Galeb jet trainer	J	4 000	800	. .	1961	1963	. ./. .	. .	. .	P (UK) E-n (UK)
	G2-A-E current export vers					1974	1975	–/. .			
Other Developed											
Australia	*N22 Nomad* STOL utility	T	3 630	320	1965	1971	1974	12/25	. .	0.47	P (USA)
	N24 stretched vers					1975					
China[d]	*F-9* fighter	J	(13 500)	>M 2	(1969)	. .	no	. .	. .	. .	. .

Country	Designation, description	Power plant	Weight, *kg*	Speed, *km/hr* or *Mach no.*	Design begun	Proto-type flight	In pro-duction	No.: do-mestic/ export or total	R&D cost, *$ mn*	Unit price, *$ mn*	Foreign-designed Power plant, Electronics or Armaments
	F-8 (MiG-21) light fighter	J	10 400	M 2	. .	. .	(1973)	(75)/–[e]	. .	. .	. .
	F-6 (Improved MiG-19) light fighter[j]	J	8 700	1 452	. .	1961	1961	>1 000	. .	. .	. .
	. . jet transport	J	. .	. .	1972	. .	no	. .	. .	. .	P (Can.)
	. . hel	T	. .	. .	1972	. .	no	. .	. .	. .	P (Can.)
Japan	*T-2* advanced trainer	J	13 500	M 1.6	1967	1971	1974	59/–	. .	5.5[f]	P (Fr., UK) E-n (UK)
	F-1 Kai light strike vers		13 727	(M 1.6)	1973	1975	(1977)	68/–	. .	9.8	
	PS-1 ASW flying boat	T	43 000	545	1959	1967	(1972)	23/–	. .	18	P (USA)
	US-1 rescue vers							3/–			
	C-1 transport	J	38 700	815	1966	1970	1973	(23)/–	(50)	. .	P (USA)
	MU-2J/K utility	T	4 560	550	. .	1967	(1969)	. ./. .	. .	(1.5)	P (USA)
	KM-2B trainer	P	1 510	377	. .	1974	(1976)	60/–	. .	0.36	P (USA)
	KH-7 utility hel[k]	T	(2 700)	. .	1974	(1977)	. .	. .	. .	. .	. .[g]
New Zealand	*CT/4* trainer	P	1 066	295	. .	1972	1972	13/61	. .	. .	P (USA)

NATO, excluding the USA

[a] Production of earlier models ended in 1972 (59 aircraft). Production line re-opened in 1974 due to export orders.

[b] This programme, reduced to a single prototype in the autumn of 1975, was cancelled completely on 18 December and a decision was made to proceed with a new aircraft, the Delta 2000.

[c] Designed specifically for the NATO F-104 Starfighter replacement competition won by the US F-16.

[d] First seen in mid-1975. Believed to be on order by South Africa and Pakistan.

[e] Production of the Mk I (shared by France, Belgium, FR Germany, Italy, the Netherlands and the UK) completed in July 1974. The Mk II is purely a French initiative although partners are being sought.

[f] West German government support for this programme stopped early 1973. Subsequently US Navy leased the prototypes for VTOL research. This was completed in November 1975.

[g] Production is expected to consist predominantly of licence production abroad.

[h] Wankel engine.

[i] There is a limited degree of collaboration with the Italian A129 attack helicopter programme.

[j] In December 1975 the Bo-105 armed with HOT anti-tank missiles was selected as an interim attack helicopter.

[k] Only the UK has a requirement for this version.

[l] At September 1975 price levels.

[m] Puma and Gazelle predominately of French design; Lynx predominately of British design. All three aircraft co-produced by the two countries.

[n] Firm orders by September 1975. A large Egyptian order, involving the licensed production of some 250 units, is being negotiated.

[o] France is proceeding independently with the SA 331 Super Puma.

[p] Production virtually complete at the end of 1975.

[q] In addition, component production of the earlier 326 GB version is under way, these being shipped to Brazil for final assembly. In 1975 Brazil decided to build the "K" version on completion of the planned 112 GBs.

[r] New avionic sub-systems for the Mk 2 version are under development.

[s] At 1972 prices and including R&D.

[t] No prototype is planned; production to order.

[u] Approximate number ordered for military use.

[v] Early in January 1976, the French aerospace company Dassault announced a decision to develop independently a twin-engine version of the Delta 2000 with expanded offensive capabilities for the export market.

USA

[a] To help reduce the cost of the B-1 the intakes for the engines are to be made fixed rather than variable which reduces maximum speed from M 2.2 to M 1.6.
[b] Programme unit cost, that is, including a share of R&D costs.
[c] Unit cost at constant (January 1975) prices for 729 aircraft. In escalated dollars the average unit cost is estimated at $12.4 million.
[d] The F-18 design has been developed from the YF-17 Lightweight Fighter prototype. This programme previously carried the designation VFAX and is now called the Navy Air Combat Fighter.
[e] This aircraft won the NATO Starfighter replacement competition. In addition to the USA, assembly lines will be established in Belgium and the Netherlands. The European purchasing countries (Belgium, the Netherlands, Norway and Denmark) will manufacture components for all F-16s built including those expected to be ordered by third parties.
[f] This is a compromise aircraft resulting from the deferment of the AV-16A Super Harrier programme. The AV-8B is exclusively a US initiative although it is anticipated that Rolls-Royce in the UK will be given primary responsibility for the development of the engine. It is also considered likely that much of the airframe for the AV-8B (the main exception being the wings) will be built in the UK to take advantage of the existing facilities.
[g] Total firm orders in October 1975. Developed for the export market. The US Air Force acquired 71 F-5Es intended for South Viet-Nam. It will also acquire some F-5Fs to train foreign pilots under the military assistance and foreign military sales programmes.
[h] New production is being supplemented by the conversion of 228 A-6As.
[i] Production re-opened in 1974 to satisfy new export orders for 48 aircraft.
[j] Last delivered in September 1975. It was planned to retrofit the E-4As with E-4B equipment but the high cost of this conversion—$59 million per aircraft—may prevent this. In June 1975 the total programme cost for the seven aircraft was $881 million or $126 million per aircraft.
[k] Estimated R&D expenditure up to the completion of four prototypes.
[l] Estimated R&D costs through FY 1979.
[m] This is expected to be a derivative of one of the competitors in the UTTAS helicopter programme.
[n] The AH-1S was previously called the AH-1Q improved. New production is being supplemented by the conversion of about 280 AH-1Gs to the "S" configuration.
[o] Congress wanted to cancel this programme but eventually allowed sufficient funding to enable technological advances in the design of this helicopter to be demonstrated. A single prototype will be constructed and flight-tested through October 1976 after which no further activity is planned.
[p] New construction will be supplemented by the conversion of 292 earlier models to the 53E configurations.
[q] 1973–1975 orders only.
[r] Ordered by Iran. Most R&D costs paid by Iran.
[s] It is planned to use the airframe of one of the UTTAS competitors for this system.

WTO/Other Europe/Other Developed

[a] Late in 1974 reports appeared concerning a new delta-wing bomber. This aircraft was listed in *SIPRI Yearbook 1975*. It now appears that this was a competitive design for the requirement now being filled by the "Backfire B" bomber.
[b] The Tu-22 "Blinder" first entered service in 1964–65 as a supersonic medium bomber. During the latter part of 1974 an interceptor version was being phased into service. It is assumed here that the interceptor version represents new production rather than the modification of existing aircraft.
[c] Current production consists only of the J 35X attack version for export to Denmark.
[d] Aircraft of Soviet origin are shown with the Soviet designation in brackets. They are listed as indigenous weapons because China has been almost totally isolated from Soviet technology since 1960. A new combat aircraft has been reported, possibly with variable-geometry wings.
[e] In Congressional testimony in 1975 the Chairman of the Joint Chiefs of Staff, General Brown, stated that production of the MiG-21 appeared to have been suspended. He also stated that Chinese production of the Tu-16 medium bomber and Il-28 light bomber (both listed in *SIPRI Yearbook 1975*) had been completed.
[f] 1974 unit cost including spares.
[g] Negotiations on collaborative development have been held with firms in the USA and FR Germany.
[h] Assistance with systems, equipment and avionics is being received from industries in the UK, France and Sweden.
[i] Preliminary studies are under way on replacements for the Viggen and the SAAB 105 known as the A 20 and the B3LA, respectively.
[j] In December 1975 Rolls-Royce concluded a deal for the licence production of the military Spey turbofan engine in China. Rolls-Royce experts consider this engine too large for economical installation in the MiG-21 so the F-9 and the new fighter currently under development appear as the most likely platforms for the new engine.
[k] One report states that the development of this helicopter has been stopped in favour of an anti-tank helicopter.
[l] Project recently abandoned for budgetary reasons.
[m] Enlarged and substantially redesigned version of the Soviet Mi-2 helicopter produced in Poland under licence between 1966 and 1974.

Country	Designation, description	Power plant	Warhead weight, *kg* (if nuclear, *kt/mt*)	Range, *km*	Design begun	Proto-type flight	In pro-duction	No.: do-mestic/ export or total	R&D cost, $ *mn*	Unit price, $ *mn*	Foreign-designed Power plant, Electronics or Armaments
NATO											
France	*S-3* fixed-to-fixed	S	(1 mt)	3 500	1971	. .	no	(27)/–	. .	. .	. .
	Pluton mobile-to-fixed	S	15 kt	120	. .	1969	1973	(120)/–	. .	. .	–
	Harpon mobile/air.-to-fixed/tank	S	(2.6)	3	. .	. .	yes	. ./. .	. .	. .	–
	SS/AS-11 mobile/air.-to-fixed/tank[b]	S	(2.6)	3	. .	. .	(1958)	(170 000)	. .	. .	–
	SS/AS-12 mobile/air.-to-fixed/tank	S	30	8	. .	. .	(1962)	. .	. .	. .	–
	R.440 Crotale mobile/ship-to-air.	S	15	13	1964	1965	1968	. ./. .[a]		(5)	
	. . air.-to-fixed	. .	(500 kt)	(150)	(1974)	. .	. .	. ./–	. .	. .	–
	AS.20 air.-to-fixed/ship	S	30	7	. .	. .	yes	>8 000	. .	. .	–
	AS.30 air.-to-fixed/ship	S	230	12	. .	. .	yes	(3 200)	. .	. .	–
	AS.30L lighter vers		115				yes				
	R.530 air.-to-air.	S	27	18	1958	. .	(1963)	>2 500	. .	. .	–
	Super 530 air.-to-air.	S	HE	(40)	1971	1973	(1975)	(1 000)	. .	. .	–
	R.550 Magic air.-to-air.	S	HE	10	1968	1972	1974	. ./. .	. .	. .	–
	Hirondelle system[c] ship-to-air./miss.	S	HE	(40)	. .	. .	(1975)	. ./. .	. .	. .	–
	Exocet anti-shipping	S	200						. .		
	MM-38 ship-to-ship			(38)	(1967)		1972	>700		0.3	E-d (UK)
	AM-39 air./hel.-to-ship			70	. .	1973	1975	. ./. .		0.3	
	MM-39 ship-to-ship development			50	. .	. .	no	. ./. .		. .	
	MM-40 long-range vers			(70)	. .	. .	(1977)	. ./. .		. .	
	Malafon ship-to-sub.	S	. .	13	1956	(1958)	yes	. ./–	. .	. .	. .
	M-2 sub.-to-fixed	S	500 kt	(3 000)	. .	. .	1973	(48)/–	. .	. .	. .
	M-20 sub.-to-fixed[d]	S	1 mt	(3 000)	. .	. .	(1975)	. ./–	. .	. .	. .
	M-4 (MIRV) sub.-to-fixed[e]		(3–5)× 150 kt	5 550	. .	. .	(1979)	(96)/–	. .	. .	. .
FR Germany	*Cobra 2000* portable-to-tank	S	2.7	2	1957	. .	1960	>150 000	. .	. .	P (Switz.)
	Mamba portable-to-tank	S	2.7	2	. .	1972	1974	. ./. .	. .	. .	. .
	Jumbo air.-to-fixed	S	N/500	(40)	(1972)	. .	no	. ./–	. .	. .	. .
	. . air.-to-air.	S	HE	. .	1974	. .	. .	. .	. .	. .	. .
	AS.34 Kormoran air.-to-ship	S	160	37	1964	(1969)	1974	350/–	. .	(0.36)	E-g (Fr.)
	Hydra air.-to-ship	. .	HE	. .	1974	. .	. .	. .	. .	. .	. .
International: FR Germany,	*HOT* mobile/hel.-to-tank	S	6	4	1966	1971	1975	(20 000)	(44)	. .	. .

France											
	MILAN portable-to-tank	S	3	2	1963	..	1972	(30 000)	(45)		
Belgium, UK	*Atlas* portable-to-tank	S	HE	..	(1969)	..	no	..	..	..	..
FR Germany,	*Roland* mobile-to-air.	S	6.5								
France	*I* clear weather vers			..	1964	(1968)	1974	../..	(94)	..	..
	II all weather vers[g]			7.5		(1973)	(1976)	../..	..	..	..
France, UK	*Martel* air.-to-fixed	S	HE	(60)	1963	(1966)	1973	..	..	..	..
	AS.37 anti-radar vers										
	AJ.168 TV-guided vers										
Belgium,	*Sea Sparrow system*[h]	S	(30)	22.2	1969	..	(1973)	..	(35)	..	..
Denmark, Italy,	ship-to-air./miss.										
Netherlands,											
Norway, USA											
France,	*Otomat* ship/air.-to-ship	J	210								
Italy	*I* initial vers			60	1969	1971	yes	(400)	(50)	..	..
	II longer-range vers[r]			(100)		1974	(1975)	../..	..	..	..
Italy	*Spada system*[i] fixed-to-air.	S	HE			1974	no	../..	..	..	..
	Indigo mobile-to-air.	S	27	10	1962	..	(1972)	../..	..	..	E-f (Switz.)
	Sparviero portable-to-tank	S	4	(3)	1966	..	no	../..	..	..	..
	Aspide air./fixed-to-air.	S	(35)	50	1969	1974	(1976)	../..	..	..	..
	Airtos air.-to-ship	S	35	11	(1969)	(1974)	(1976)	../..	..	..	..
	Marte system[j] hel.-to-ship	S	(70)	(25)	1969	(1975)	no	../..	..	..	..
	Albatros system[k] ship-to-air./miss.	S	HE	..	1966	(1970)	1973	../..	..	..	..
	Sea Killer ship/hel.-to-ship	S									
	II current vers		70	(25)	1965	1969	1972	–/..	..	(0.2)	E-f (Switz.)
	III under development		150	(45)	(1972)	..	no	../..	..	..	..
Norway	*Penguin* ship-to-ship	S	120								
	Mk.1 initial vers			21	1961	..	1969	../..	(60)	..	..
	Mk.2 longer-range			(30)	..	..	no	../..	..	..	..
UK	*Swingfire* mobile-to-tank	S	HE	4	1958	..	(1968)	../..	..	..	..
	Beeswing infantry vers[l]										
	Hawkswing hel.-launched vers[q]										
	Vigilant portable-to-tank	S	5.4	1.4	1956	(1957)	1960	>15 000	2.5	..	..
	Rapier mobile-to-air.[m]	S	HE	(6)	1963		1967	../..	..	..	..
	Tigercat towed/fixed-to-air.	S	HE	5	..	..	(1969)	../..	..	..	..
	Blowpipe portable-to-air.	S	HE	..	1966	..	(1973)	../..	..	..	..
	XJ521 Goshawk[n] air.-to-air.	S	HE	..	1973	1975	1977	../..	..	..	..
	SRAAM (QC 434) air.-to-air.[o]	S	10	..	1972	..	no	..	..	..	..
	Red Top air.-to-air.	S	31	(12)	1957	..	(1962)	../..	..	..	..

Country	Designation, description	Power plant	Warhead weight, *kg* (if nuclear, *kt/mt*)	Range, *km*	Design begun	Proto-type flight	In pro-duction	No.: do-mestic/ export or total	R&D cost, $ *mn*	Unit price, $ *mn*	Foreign-designed Power plant, Electronics or Armaments
	Sea Skua air.-to-ship	S	20	(15)	(1970)	. .	no	. ./. .	. .	. .	. .
	Sea Dart ship-to-air.	S/L	HE	(80)	(1962)	(1965)	1972	. ./. .	. .	. .	. .
	Seacat ship-to-air.	S	HE	. .	1958	. .	(1962)	. ./. .	. .	. .	. .
	Sea Wolf ship-to-miss./air./ship	S	(14)	. .	(1967)	1975	(1976)	. ./–	(68)	. .	. .
	CL137 Sub-Martel sub.-to-ship[p]	S	HE	. .	1972	. .	. .	. .	. .	. .	. .
USA	*LGM-30G Minuteman 3* MIRV fixed-to-fixed	S	3×170 kt	13 000	1966	1968	1970	550/–	. .	5.5	–
	BGM-71A TOW fixed/hel.-to-tank	S	HE	3	1962	1968	1969	140 000[a]	156	. .	–
	Site Defense fixed-to-miss.[b]	. .	N	. .	1971	. .	. .	. ./–	1 310	. .	–
	Safeguard system fixed-to-miss.[c]										
	LIM-49A Spartan high attitude	S	N-mt	185	1965	1968	1970	. ./–	. .	. .	–
	Sprint low altitude	S	N-kt	45	1963	1965	1970	. ./–	. .	. .	–
	MGM-52 Lance SP/towed-to-fixed	SL	N/HE	139	1967	1969	1971	. ./. .	447.5	0.34	–
	SAM-D[d] mobile-to-air.	S	N/HE	. .	1965	1970	(1981)	. .	1 509	(26)	–
	MIM-23B Improved Hawk mobile-to-air.	S	HE	46	1964	1971	1972	2 988/. .	155	0.1	–
	MIM-72A/C Chaparral mobile-to-air.	S	HE	16.1	1964	1965	1966	. ./. .	143	0.75	–
	FGM-77A Dragon portable-to-tank	S	HE	1	1966	1968	1973	. ./. .	119	. .	–
	FIM-92A Stinger portable-to-air.	S	3	1	1972	1974	1976	. ./. .	(120)	. .	–
	AGM-69A SRAM air.-to-fixed	S	170 kt	222	1963	1969	1971	1 500/–[e]	. .	(0.35)	–
	AGM-86A ALCM air.-to-fixed	J	N-kt	2 775	1974	(1976)	(1979)	3 000/–	393[f]	(0.5)	–
	AGM-62B Walleye II air.-to-fixed	. .[g]	907	. .	1968	. .	(1972)	. ./. .	. .	. .	–
	AGM-88 HARM[h] air.-to-(fixed) radar	S	HE	18.5	1974	1975	(1978)	2 935/–	126.8	0.08	–
	AGM-78 Standard ARM air.-to-(fixed) radar	S	100	25	1966	1967	1968	. .	. .	0.12	–
	AGM-78D-2 current vers						(1973)	. ./. .			
	AGM-45A Shrike air.-to-(fixed)radar	S	HE	16	1962	. .	1963	24 030[i]	. .	0.37	–
	AGM-65 Maverick air.to-fixed/tank	S	59								–
	AGM-65A standard vers			26	1966	1969	1972	17 000/. .	. .	0.12	
	AGM-65B scene-magnification			. .	. .	1974	(1976)	6 000/. .	. .	0.12	
	AGM-65C laser guided[k]			. .	(1972)	(1976)	(1977)	. ./. .	56.2[j]	. .	
	AGM-65D imaging IR			. .	. .	1975	. .	. ./. .	117.4	. .	
	Hellfire air.-to-fixed/tank[l]	S	HE	5.6	1974	1976	1979	. ./. .	122.6	. .	–
	XAIM-97A Seekbat air.-to-air.[m]	S	HE	. .	1972	. .	no	. .	. .	. .	–
	SRAAM air.-to-air.[n]	S	HE	. .	1975	. .	. .	. .	. .	. .	–
	AIM-54 Phoenix air.-to-air./miss.	S	HE	140.6	1962	1966	1970	2 532/. .	416	0.2	–
	AIM-9 Sidewinder IR/IC air.-to-air.	S		(3.7)							–

	9L new IR vers		. .		1972	. .	1976	8 360/. .	52	0.05	
	9H current production vers	S	(3.5)		1968	. .	1971	4 720/. .	. .	(0.03)	
	AIM-7 Sparrow III air.-to-air.	S	30								
	7F latest vers			44.4	1968	1972	1975	12 270/. .[o]	128.5	(0.09)	–
	AGM-53 Condor air.-to-ship/fixed[u]	S	286	111	1963	1970	(1976)	(405)/. .	282	0.7	–
	RGM-66D Standard ship-to-(fixed/ship) radar[p]	S	100	. .	1972	. .	(1973)	88/–	. .	0.1	–
	Standard I ship-to-air./miss./ship	S	HE		1963	1965	1966	. ./. .	. .		–
	RIM-67A ER – Extended range			56				4 428/. .		(0.1)	
	RIM-66A MR – Medium range			20				. ./. .		(0.1)	
	Standard Missile II ship-to-air./miss./ship[q]	S	HE	(100)	1970	1972	(1976)	. ./. .	115	0.12	–
	ASMD missile[r] ship-to-miss.	. .	. .	. .	1974	. .	(1977)	. .	. .	. .	–
	Harpoon anti-shipping		232					2 420/. .	(318)	0.46	–
	AGM-84A air.-to-ship	J		. .	1968	1972	1975				
	RGM-84A-1 ship-to-ship	J+S		(110)	1968	1970	1975				
	UUM-84 Capoon sub.-to-ship[v]	J+S		. .	1970	1974	. .				
	RUR-5A Asroc ship-to-sub.	S	N/HE	(10)	1955	. .	1959	. ./. .	. .	. .	–
	UGM-93 Trident MIRV sub.-to-fixed	S	N								
	UGM-93A (C-4) initial vers			7 400	(1971)	(1976)	1979	576/–	2 926	10.4	–
	Trident II (D-5) longer-range			10 000	(1972)	. .	. .	. ./–	1 380	. .	–
	UGM-73A Poseidon MIRV sub.-to-fixed	S	(10× 40 kt)	4 630	1965	1968	1969	. ./–[s]	. .	5.6	–
	SLCM[t] sub./ship-to-fixed	J	N	(2 750)	1972	(1976)	(1980)	. ./–	585	0.8	–
	YBGM-110 competitive prototype										
	YBGM-109 competitive prototype										
	UUM-44A Subroc sub.-to-sub.	S	N	56	1958	1964	1965	. ./–	. .	. .	–
Warsaw Treaty Organization											
USSR[a]	*"SS-18"* MIRV fixed-to-fixed[b]	SL	(6–8 MIRV)	. .	. .	1973	(1974)	(10)/–	. .	. .	–
	"SS-19" MIRV fixed-to-fixed[c]	L	(6 MIRV)	10 140	. .	1973	(1974)	(50)/–	. .	. .	–
	"SS-17" MIRV fixed-to-fixed	L	(4 MIRV)	>9 000	. .	1972	(1975)	(10)/–[d]	. .	. .	–
	"SS-16" fixed/(mobile)-to-fixed[e]	S	(1 mt)	(8 000)	. .	1973	(1975)	. ./–	. .	. .	–
	"SS-X-20" MIRV fixed-to-fixed[f]	. .	. .	(3 860)	. .	1974	no	. ./–	. .	. .	–
	"SS 12 Scaleboard" mobile-to-fixed	. .	(1 mt)	(800)	. .	. .	(1968)	. .	. .	. .	–
	"SS-1C Scud B" mobile-to-fixed	L	N/HE	(280)	. .	. .	(1962)	. .	. .	. .	–
	"Sagger" mobile-to-tank[g]	S	11.5	3	. .	(1965)	yes	. ./. .	. .	. .	–
	"SA-5 Gammon" fixed-to-air.	S	. .	(250)	. .	(1963)	(1966)	. ./–	. .	. .	–
	"SA-8" mobile-to-air.	. .	. .	. .	. .	(1973)	(1975)	. ./. .	. .	. .	–
	"SA-9 Gaskin" mobile-to-air.[h]	S	. .	. .	. .	. .	(1974)	. ./. .	. .	. .	–
	"SA-6 Gainful" mobile-to-air.	S	80	35[i]	. .	1967	(1970)	. ./. .	. .	. .	–
	"SA-2 Guideline" mobile-to-air.	S/L	130[j]	40	. .	1967[k]	(yes)	. ./. .	. .	. .	–
	"SA-3 Goa" mobile-to-air.	S	HE	(30)	. .	. .	(1960)	. ./. .	. .	. .	–

Country	Designation, description	Power plant	Warhead weight, *kg* (if nuclear, *kt/mt*)	Range, *km*	Design begun	Prototype flight	In production	No.: domestic/ export or total	R&D cost, *$mn*	Unit price, *$mn*	Foreign-designed Power plant, Electronics or Armaments
	"*SA-7 Grail*" portable/mobile-to-air.[l]	S	1.8	2.5	. .	. .	(1966)	. ./. .	. .	. .	–
	"*AS-7 Kerry*" air.-to-fixed/tank[m]	(S)	HE	. .	. .	. .	(1975)	. .	. .	. .	–
	"*AS-6*" air.-to-ship/fixed	L	N	(800)[n]	. .	. .	(1970)	. ./. .	. .	. .	–
	"*AS-5 Kelt*" air.-to-ship/fixed	L	. .	220	. .	. .	(1968)	. ./. .	. .	. .	–
	"*AA.6*" air.-to-air.[o]	S	(100)	(45)	. .	. .	(1973)	. .	. .	. .	–
	"*SS-N-13*" sub.-to-ship/fixed[p]	. .	(N)	(750)	. .	1973	. .	. .	. .	. .	–
	"*SS-N-12*" ship-to-ship/fixed	. .	. .	(750)	. .	. .	. .	. .	. .	. .	–
	"*SS-N-11*" ship-to-ship[q]	S	. .	(54)	. .	. .	(1968)	. .	. .	. .	–
	"*SS-N-10*" ship-to-ship[r]	. .	. .	(54)	. .	. .	(1968)	. .	. .	. .	–
	"*SS-N-9*" ship-to-ship[s]	S	. .	(275)	. .	. .	(1968)	. .	. .	. .	–
	"*SA-N-4*" ship-to-hel.[t]	. .	. .	(37)	. .	(1969)	yes	. .	. .	. .	–
	"*SA-N-3 Goblet*" ship-to-air.[u]	S	HE	(30)	. .	1967	yes	. .	. .	. .	–
	"*SS-N-8*" sub.-to-fixed[v]	L	(1 mt)	7 725	. .	. .	(1973)	. ./–	. .	. .	–
	"*SS-N-6 Mod.3*" MRV sub.-to-fixed[w]	L	(1 mt)	2 960	. .	. .	(1967)	. ./–	. .	. .	–
	"*SS-N-7*" sub.-to-ship[x]	S	HE	(55)	. .	1967	(1968)	. ./–	. .	. .	–
Other Europe											
Sweden	*RbS-70* mobile-to-air.	S	HE	5	1969	(1973)	1977	. ./. .	20[a]	. .	. .
	Bantam anti-tank[b]	S	1.9	2	1956	. .	1963	. ./. .	. .	. .	. .
	Rb 05A air.-to-ship/fixed[h]	L	HE	. .	1960	(1968)	1971	. ./–	. .	. .	. .
	Rb 04E air.-to-ship	S	HE	. .	(1969)	. .	1973	. ./–	. .	. .	E-g (Fr.)
	Type 372 air.-to-air.	S	HE	. .	1975	. .	. .	. .	. .	. .	. .
Switzerland[c]	*Micon* fixed/mobile-to-air.	S	HE	35	. .	. .	no	. .	. .	. .	. .
Other Developed											
Australia	*Ikara* ship-to-sub.	S	HE	(20)[d]	. .	. .	1961	. ./. .	. .	. .	. .
Japan	*Tan Sam* fixed-to-air.	S	HE	. .	. .	. .	no	. .	. .	. .	. .
	Kam-9[e] mobile/ship-to-tank/ship	S	HE	3	1966	. .	(1975)	. .	. .	. .	. .
	ASM-1 air.-to-fixed/ship	S	136	45	1973	(1977)	(1980)	(68)/–	(32)	. .	. .
	AAM-2 air.-to-air.	S	HE	. .	. .	1968	(1975)	. ./–	. .	. .	. .
China[f]	"CSS-3" fixed-to-fixed[g]	L	(3 mt)	(5 500)	. .	. .	(1975)	. ./–	. .	. .	. .
	"CSS-2" fixed-to-fixed	SL	(1 mt)	(2 780)	. .	. .	(1971)	(30)/–	. .	. .	. .
	"*CSA-1*" *(SA-2)* mobile-to-air.	S/L	(130)	(40)	. .	. .	yes	. ./–	. .	. .	. .
	"*CSS-N-1*" *(SSN-2)* ship-to-ship	S	HE	42	. .	. .	yes	. ./–	. .	. .	. .

NATO, excluding the USA

[a] Eighty-five per cent of development costs paid by South Africa. Ten batteries (each battery consisting of two acquisition and tracking vehicles and six firing units) produced for South Africa; ten batteries ordered by France. Other developments include a navalized version for French C-70 destroyers and the *Chahinn* anti-aircraft tank system under development for Saudi Arabia.

[b] There are some reports of a new supersonic anti-tank missile under development.

[c] With the Super 530 missile.

[d] M-20 and M-2 have interchangeable second stages. The M-20 (with a thermonuclear warhead) will eventually become standard.

[e] Some sources claim that the M-4 will only have a MRV warhead.

[f] Late in 1974 AEG Telefunken (FR Germany) and UFW-Fokker (FR Germany and the Netherlands) began studies on a missile for defence against anti-ship missiles.

[g] In January 1975 this missile system was selected by the US Army as its short-range air defence system (Shorads). Missiles for FR Germany will be mounted on 135 new production Marder vehicles having a unit cost of $4.5 million (including the acquisition radar and the tracking and missile radar). France intends to mount its missiles on AMX-30 tank chassis and the USA on a vehicle called "Goer".

[h] Referred to in the USA as the "improved point defense surface missile system". The system uses the RIM-7H Sparrow missile. Development of the RIM-7H began in the USA in 1975 and is expected to cost $28.6 million.

[i] With US AIM-7 Sparrow III or Italian Aspide missiles.

[j] With Sea Killer missiles.

[k] With US RIM-7H Sparrow III or Italian Aspide missiles. Italy has ordered ten systems.

[l] In September 1975 the UK decided to purchase the Milan infantry anti-tank missile in preference to this version of the Swingfire.

[m] A special version of this missile system, mounted on tracked vehicles, has been developed to Iranian specifications. A production contract for this version was finalized in December 1975.

[n] Also called the UK Sparrow, this is the US AIM-7E with a new guidance section developed in the UK.

[o] Hawker Siddeley Dynamics is privately developing a system called "Shields" for short-range defence against anti-ship missiles using the SRAAM missile.

[p] Cancelled in September 1975 when the decision was taken to purchase the submarine-launched version of the US Harpoon missile.

[q] Cancelled in September 1975 as an economy measure. The developing company (BAC) intends to complete development of the missile for export.

[r] A third variant called Téséo (range 200 km) is under development, probably for coastal defence.

USA

[a] TOW stands for Tube-launched, Optically-tracked, Wire-guided. The production figure is estimated total production, domestic and export, through FY 1976.

[b] Only the radar for this ABM system is currently being developed. The associated missile, called Sprint II, has been developed but funding constraints have delayed production.

[c] This ABM system became fully operational in April 1975. Later in 1975 Congress voted to mothball the system except for the Perimeter Acquisition Radar (PAR) which can detect incoming missiles at very long range.

[d] SAM-D stands for "Surface-to-Air Missile-Development". The $26 million unit price refers to a "fire-section" which consists of two tracked vehicles, one carrying a phased-array radar and a radar/missile fire-control computer and the other carrying a launcher for six missiles.

[e] SRAM stands for "Short Range Attack Missile". Production of 1 500 missiles for B-52 and FB-111 aircraft was completed in August 1975. Additional missiles will be procured if the B-1 is ordered into production.

[f] ALCM stands for "Air-Launched Cruise Missile". This missile employs much of the technology developed under the SCAD (Subsonic Cruise Armed Decoy) programme on which $68 million was spent prior to cancellation in 1973.

[g] Unpowered guided bombs often called "smart bombs".

[h] HARM stands for "High Speed Anti-Radiation Missile".

[i] Total production 1963 through 1977. Current production versions are the AGM-45-7A and AGM-45-9. An AGM-45-10 version is under development.

[j] Combined R&D costs for the B, C and D versions are estimated at $133.2 million.

[k] This version is also referred to as CASWS (Close Air Support Weapon System).

[l] A number of guidance systems for this helicopter-launched anti-tank missile are being developed, including semi-active laser homing, TV, infrared and imaging infrared. The ultimate objective is a guidance system that is wholly independent of the launching helicopter. Hellfire is a loose acronym for "Heliborne fire and forget".

[m] Based on the Standard ARM missile.

[n] This programme is the result of Congressional insistence that the air force and the navy attempt to develop a single short-range air-to-air missile (SRAAM). The navy "Agile" and the air force "CLAW" air-to-air missile programmes were both cancelled late in 1974.

[o] US production of the C, D and E Sparrow III models totalled approximately 34 000. Production of the E model is believed to have ended late in 1974. There is an on-going programme to improve further the radar seeker on the AIM-7F called ARAAM (Advanced Radar Air-to-Air Missile). It is possible that ARAAM is another name for a radar-homing air-to-air missile programme called Brazo (navy) or Pave Arm (air force) which has the Sparrow airframe. The first tests of the latter missile were made in 1974.

[p] This missile has semi-active radar-homing. Development of an active-radar homing version was pursued as a precaution in the event of any delay in the development of the Harpoon anti-shipping missile. This was abandoned during 1975.

[q] This missile has been developed primarily for the Aegis system, a highly sophisti-

cated shipborne anti-aircraft and anti-missile defence system, the development cost of which is currently estimated at $577 million. Aegis has been under development since 1969.

[r] ASMD stands for Anti-Ship Missile Defence.

[s] Production of the Poseidon missile is virtually completed.

[t] SLCM stands for Sea-Launched Cruise Missile. The details provided refer to the strategic version of this missile. In addition, a tactical version with a 450-kg conventional warhead and a range of about 550 km is being developed at an estimated cost of $285 million. The unit cost of the tactical variant is expected to be about $700 000.

[u] Production funding of this missile has been denied by Congress in two successive budgets (1975 and 1976). In the autumn of 1975 the programme was cancelled as part of a series of measures to reduce the FY 1977 defence budget. In December 1975, the programme was reinstated in the 1977 budget.

[v] Previously known as Encapsulated Harpoon because the missile is sealed in a capsule designed to fit into standard torpedo tubes.

USSR

[a] In addition to the missile systems listed, isolated references were found concerning the following systems: (*a*) a high-acceleration SAM believed to be capable of intercepting missiles such as the US AGM-69A SRAM; (*b*) active testing during 1974–75 of two new ballsitic missile defence missiles, one long-range and the other short-range; (*c*) test of a new SLBM (range 5 630 km) around July 1975; and (*d*) development of a submarine-launched active-homing anti-ship missile.

[b] Initially deployed late in 1974 with a single warhead. Testing of a MIRVed warhead continued during 1975. The number given (ten) is a US estimate of the number deployed by mid-1975.

[c] The first Soviet MIRVed missile to be deployed. The number given (50) is a US estimate of the number deployed by mid-1975.

[d] US estimate of the number deployed by mid-1975.

[e] Senior US defence officials have stated that a "production run" of these missiles has been stockpiled but that the mode of deployment is still not determined.

[f] Believed to be a replacement for the SS-5 Skean IRBM and the SS-4 Sandal MRBM.

[g] The earlier "Swatter" anti-tank missile may also be in production as the Mi-24 "Hind" attack helicopter which is now entering service has been seen carrying both types.

[h] Believed to be a large and heavier version of the SA-7 "Grail". An SA-10 system is believed to be under development.

[i] Maximum range at low-medium altitudes.

[j] One version (MK 4) shown in 1967 with a white-painted nose may have a nuclear warhead.

[k] Improved versions reported to be in production.

[l] The introduction of the heavier SA-9 with a larger warhead may mean that production of this missile has stopped.

[m] Apparently the first Soviet tactical ASM. Reported to be roughly equivalent to the US AGM-12 Bullpup.

[n] One version of this missile is apparently deployed on Tu-16 medium bombers. Another longer-range (800 km) version is deployed on the new "Backfire B" bomber.

[o] New AAM carried by the MiG-25 Foxbat. It is also likely that advanced versions of some earlier AAMs (Awl, Anab, Atoll) are still in production.

[p] Former US Chief of Naval Operations Admiral Zumwalt believes that this missile could be a replacement for the SSN-4 short-range SLBM deployed in "Golf"-class diesel-powered submarines.

[q] Deployed on "Osa-II"-class patrol boats and "Kildin"-class destroyers.

[r] Deployed on "Kara"-, "Krivak"- and "Kresta II"-class ships.

[s] Deployed on "Nanuchka"-class corvettes. Effective range considered to be much less than maximum range.

[t] Deployed on "Kara"-, "Krivak"-, "Nanuchka"- and "Grisha"-class vessels.

[u] Deployed on "Moskva"-, "Kara"- and "Kresta II"-class vessels.

[v] Deployed on "Delta"-class submarines. The first observed test of a MIRV warhead for this missile occurred in 1975.

[w] Deployed on "Yankee"-class submarines. The NATO code-name "Sawfly" may apply to this missile or the SS-N-8 or possibly to both.

[x] Deployed on "Charlie"- and possibly "Papa"-class submarines.

Other Europe/Other Developed

[a] Switzerland is considering the purchase of this system. In this event it will share the development costs and probably become a co-producer.

[b] Initially a portable anti-tank missile but can also be deployed on light vehicles, light aircraft and helicopters.

[c] Contraves, which has developed and is now producing the Skyguard anti-aircraft fire control system, is now developing and testing a multiple launcher for the US Sparrow missile which will supplement the 35-mm anti-aircraft guns now used with Skyguard.

[d] Range is determined more by the effective range of the sonar than by the Ikara missile itself.

[e] Also known as Tan-SSM.

[f] Although senior US defence officials state that the Chinese nuclear weapon programme has lost momentum, they still believe that a full-range ICBM (CSS-X-4) and an SLBM are under development.

[g] What were believed to be the final tests of this limited-range ICBM were observed in 1975.

[h] A 05B model with electro-optical guidance is under development.

Country	Class, description, armaments	Power plant	Displace-ment, *tons*	Speed, *knots*	Laid down	Launched	Com-mis-sioned or com-pleted	No.: do-mestic/ export or total	Aircraft capacity	Unit price, *$mn*	Foreign-designed Power plant, Electronics or Armaments
NATO											
Belgium	*E71* frigate ShSh, SA, 100 mm, A/S TT	GT	1 500	28	1974	. .	1976	4/–	–	. .	P (UK) Ar (NATO+ Fr.) E-r (Neth.+ USA)
Denmark	*Beskytteren* frigate 76 mm	D	(1 500)	18	1970	. .	1975	1/–	1 hel	. .	Ar (Fr.)
	Willemoes missile boat ShSh, 76 mm or 57 mm	GT	220	40	(1974)	. .	1975	10/–	–	. .	P (UK) Ar (USA)
France	*Le Redoutable* strategic sub 16 SLBM	N	7 500	(25)	1964	1967	1971	6/–	–	(230)	–
	Agosta patrol sub 4A/S TT	D	1 200	20	1972	1974	1976	4/–	–	. .	–
	Daphne patrol sub 12TT	D	870	12.5	1958	1959	1964	9/10	–	. .	–
	Tourville destroyer ShSh, ShSu, 3×100 mm, 2A/S TT	GT	4 580	31	1970	1972	1973	3/–	2A/S hel		Ar-hel (UK+Fr.)
	Georges Leygues destroyer	GT	3 800	30				24/–	2A/S hel	. .	P (UK) Ar-hel (UK +Fr.)
	A/S vers ShSh, SA, 100 mm, 10TT				1974	. .	1978	18/–			
	A/A vers SA, 2×100 mm				(1976)	. .	. .	6/–			Ar (USA)
	A69 corvette 100 mm, 2×20 mm, 4A/STT	D	950	24	1972	1973	1975	14/1	–	. .	–
	PR72 missile boat ShSh, 76 mm	D	370	28	(1975)	. .	. .	–/10	–	. .	Ar (It.+Fr.)
	PR72 patrol boat 76 mm, 40 mm	D	370	28	(1974)	. .	. .	–/4	–	. .	Ar (It., Swe.)
	S148 missile boat ShSh, 76 mm, 40 mm	D	234	38	1971	1972	1972	–/20[a]	–	(14)	P (FRG) Ar (It., Swe.)
	La Combattante III missile boat ShSh, 2×76 mm, 2A/S TT	D	332	32	(1975)	. .	. .	–/4	–	. .	–
	La Combattante II missile boat ShSh	D	234	40	. .	. .	. .	–/12	–	. .	–
	Trident missile boat ShSh, 40 mm	D	125	25	1973	. .	1975	30/–	–	. .	–
FR Germany	*Type 209* patrol sub 8TT	D	1 000	22	. .	. .	. .	–/14	–	. .	E-f (Neth.)
	Type 143 missile boat ShSh, 76 mm, 2TT	D	360	38	1973	1973	1974	10/–	–	(27)[b]	E-f (Neth.) Ar (Fr., It.)
	. . missile boat, ShSh, 76 mm, 40 mm	D	230	40	. .	. .	. .	–/6	–	. .	Ar (Israel)
International:											
FR Germany	*PHM-Patrol Hydrofoil Missile* ShSh,	GT	220	>40	1973	1974	1975	(45)[c]	–	(39)	E-r (Neth.)

Country	Class, description, armaments	Power plant	Displacement, *tons*	Speed, *knots*	Laid down	Launched	Commissioned or completed	No.: domestic/ export or total	Aircraft capacity	Unit price, *$mn*	Foreign-designed Powerplant, Electronics or Armaments
Italy, USA	76 mm										
FR Germany, Norway	*Type 210* coastal sub	D	750	. .	. .	. .	. .	21[d]	–	. .	. .
Italy	*Sauro* patrol sub 6TT	D	1 300	19	(1973)	. .	. .	3/–	–	. .	. .
	Lupo frigate ShSh, SA, 127 m, 2×35 mm	GT	2 208	35	1974	1976	1976	8/2[f]	2 hel	. .	P (USA) Ar (NATO)
Netherlands	*Tromp* destroyer SA, 2×120 mm	GT	4 300	30	1971	1973	1975	2/–	1A/S hel	. .	P (UK) Ar (USA, NATO)
	Kortenaer frigate ShSh, SA, 76 mm, 6A/S TT	GT	3 500	30	1975	. .	(1978)	8/–	1A/S hel	. .	P (UK) Ar (USA, NATO)
Norway	*Jägaren* missile boat ShSh, 57 mm	D	140	35	1975	. .	. .	–/16	–	(5)	P (FRG)
UK	*Swiftsure* attack sub 5A/S TT	N	3 500	(30)	1969	1971	1973	7/–	–	(75)	. .
	Oberon patrol sub 8TT	D	1 610	17	1957	1959	1961	13/14[e]	–	(12)	. .
	Type 206 coastal sub 8TT	D	420	17	(1973)	. .	(1975)	–/3	–	. .	Design UK+FRG
	Invincible A/S cruiser SA/ShSh	GT	19 000	30	1973	. .	(1978)	3/–	9 hel+6 V/STOL	. .	E-r (Neth.)
	Sheffield destroyer SA/ShSh, 115 mm	GT	3 500	30	1970	1971	1975	8/1	1A/S hel	(45)	. .
	Vospers Mk10 destroyer ShSh, 2× 115 mm	GT	3 300	30	1972	1974	(1976)	–/4[g]	1A/S hel	(45)	E-r (Neth., It.) Ar (Aust., Swe.)
	Weapon frigate ShSh, SA, 2×40 mm	GT	3 500	30	1975	. .	1978	2/–[h]	2A/S hel	. .	Ar (Fr.)
	Amazon frigate ShSh, SA, 115 mm, 6TT	GT	2 000	34	1969	1971	1973	8/–	1A/S hel	. .	A (Fr.)
	. . missile boat ShSh, 76 mm	D	150	30	1973	1974	1975	–/3	–	. .	P (FRG) E-r, E-f,
	patrol boat version 76 mm				1973	1973	1974	–/3	–	. .	(It.) Ar (Fr.+ It.)
	BH.7 Mk5 hovercraft[i]	GT	10	60	(1972)	. .	1974	–/4	–	. .	. .
	VT-2 missile hovercraft ShSh	GT	(100)	(60)	(1974)	. .	. .	. .	–	. .	. .
USA	*Trident* strategic sub 24 SLBM	N	(12 000)	30	1974	(1976)	1979	10/–	–	(790)	–
	Los Angeles attack sub SuSu, 4A/S TT	N	6 900	40	1972	1974	1975	26/–	–	245	–
	Sturgeon attack sub SuSu, 4A/S TT	N	3 860	30	1963	1966	1967	37/–[j]	–	. .	–
	Nimitz aircraft carrier SA	N	91 400	>30	1968	1972	1975	3/–	90	(780)	–
	Virginia cruiser SA, ShSu, 2×127 mm, 6A/S TT	N	10 000	>30	1972	1974	1976	5/–	2 hel	275	–
	Spruance destroyer SA, ShSu, 2× 127 mm, 6A/S TT	GT	6 900	>30	1972	1973	1975	30/7	1 hel	(100)	–
	Perry frigate[k] ShSh, SA, 76 mm, 6A/S TT	GT	3 500	(28)	1975	1976	1977	56/6	2 hel	95.5	E-f (Neth.) Ar (It.)

	SES-Surface Effect Ship air cushion frigate ShSh, SA	GT	2 000	>80	(1977)[l]	. .	. .	. .	(VTOL, hel)	602[m]	–
	Tarawa amphibious assault SA, 3× 127 mm	T	39 300	(24)	1971	1973	1975	5/–	(30) hel	230	–
	AALC-Amphibious Assault Landing Craft	GT	(160)	(50)	. .	1975	. .	. .	–	82[n]	–
	. . missile boat ShSh, 76 mm	GT	(230)	>40	. .	1975	. .	–/2	–	. .	–
Warsaw Treaty Organization											
German DR	*Kondor II* coastal minesweeper 6×25 mm	D	245	21	. .	. .	(1971)	(40)/–	–	. .	. .
Poland	*Wisla* patrol boat 2×30 mm, 4TT	D	70	>30	. .	. .	. .	12/–	–	. .	. .
USSR	*"Delta II"* strategic sub (16) SLBM	N	. .	. .	(1973)	(1975)	. .	(2)/–	–	. .	–
	"Delta" strategic sub 12 SLBM	N	(8 000)	25	. .	1972	1973	(6)/–[o]	–	. .	–
	"Papa" patrol sub SuSh, TT	N	. .	. .	. .	(1971)	(1974)	. ./–	–	. .	–
	"Charlie" patrol sub 8 SuSh, 8TT	N	4 300	(30)	. .	1967	1968	12/–	–	. .	–
	"Victor" patrol sub 8TT	N	3 600	>30	. .	(1966)	(1968)	16/–	–	. .	–
	"Uniform" patrol sub TT	N	4 500	. .	. .	. .	(1975)	1/–	–	. .	–
	"Tango" patrol sub	D	1 900	. .	. .	. .	(1974)	1/–	–	. .	–
	"Kuril" A/S cruiser SA, ShSu, 28× 57 mm	. .	(40 000)	(30)	1970	1972	(1976)	3/–	50 hel, V/STOL	. .	–
	"Kara" cruiser SA, ShSh, 4×76 mm, 4×30 mm, 10TT	GT	8 200	(34)	. .	. .	(1973)	3/–	1 hel	. .	–
	"Kresta II" cruiser SA, ShSh, 4× 57 mm, 8×30 mm, 10TT	ST	6 000	33	1968	. .	. .	8/–	1 hel	. .	–
	"Krivak" destroyer SA, ShSh, 4× 76 mm, 8TT	GT	4 800	38	. .	. .	(1971)	9/–	–	. .	–
	"Grisha" corvette SA, 2×57 mm, 4A/S TT	GT	750	30	. .	1970	1972	17/–	–	. .	–
	"Nanuchka" corvette SA, ShSh, 2× 57 mm	D	(800)	32	. .	1971	. .	12/–	–	. .	–
	"Turya" hydrofoil patrol boat 2× 57 mm, 2×25 mm, 4TT	D	165	40	. .	. .	1973	12/–	–	. .	–
Other Europe											
Spain	*Baleares* frigate SA, ShSu, 127 mm, 4A/S TT	ST	3 000	28	1969	1971	1973	5/–[p]	–	. .	E-r, E-s, (USA) Ar (USA)
	João Coutinho frigate 100 mm, 2× 40 mm	D	1 200	24	. .	1969	1970	–/7[q]	–	. .	P (Fr.) E-r (UK) Ar (Fr.)
	F.80 frigate SA, 76 mm	D	1 200	27	(1973)	. .	. .	10/–	–	. .	P (FRG) E-r (Neth.) E-s (USA) Ar (NATO, It.)

Country	Class, description, armaments	Power plant	Displacement, *tons*	Speed, *knots*	Laid down	Launched	Commissioned or completed	No.: domestic/ export or total	Aircraft capacity	Unit price, $ *mn*	Foreign-designed Power plant, Electronics or Armaments
Sweden	*Näcken* patrol sub 8TT	D	980	20	1973	. .	1977	5/–	–	(20)	. .
	Spica II patrol boat 57 mm, 6TT	GT	230	40	. .	1972	1973	12/–	–	(8)	P (UK)
Yugoslavia	. . patrol boat ShSh[r]	GT	(250)	(35)	(1973)	. .	. .	. .	–	. .	P (UK), Ar (Fr.)
Other Developed											
China[v]	*Han* patrol sub	(N)	. .	. .	(1971)	. .	. .	1/–	–	. .	. .
	Ming patrol sub 6TT	D	(1 500)	. .	(1971)	. .	(1975)	2/–	–	. .	. .
	"Romeo"[s] patrol sub 6TT	D	1 100	17	. .	. .	(1971)	30/–	–	. .	. .
	Luta destroyer ShSh, 4×130 mm, 8×57 mm, 8×25 mm	(ST)	3 250	>32	. .	. .	1971	7/–	–	. .	. .
	Kiangtung frigate SA, (4)×100 mm	. .	(1 500)	. .	(1971)	(1973)	. .	2/–[t]	–	. .	. .
	Hainan corvette 2×76 mm, 4×57 mm	D	500	(25)	(1963)	. .	. .	12/. .	–	. .	. .
	Hola missile boat ShSh, 4×30 mm	D	165	32	(1972)	. .	(1974)	(15)/–[u]	–	. .	. .
	Hoku missile boat ShSh, 2×25 mm	D	70	40	(1973)	. .	(1974)	(15)/–[u]	–	. .	. .
	Shanghai patrol boat guns	D	120	30	1960	. .	. .	310/(52)	–	. .	. .
Japan	*Uzushio* patrol sub 6TT	D	1 850	20	1968	1970	1971	7/–	–	. .	. .
	Haruna destroyer ShSu, 2×127 mm, 6A/S TT	GT	4 700	32	1970	1972	1973	3/–	3A/S hel	. .	Ar (USA)
	Tachikaze destroyer SA, ShSu, 2×127 mm, 6A/S TT	GT	3 850	32	1973	1974	1976	2/–	–	. .	Ar (USA)
	Yamagumo destroyer ShSu, 4×76 mm, 6A/S TT	D	2 150	27	1964	1965	1966	6/–	–	. .	Ar (USA)
	Chikugo escort ShSu, 2×76 mm	D	1 470	25	1968	1970	1970	11/–	–	. .	Ar (USA)
	. . patrol boat 2×40 mm, 4TT	D	100	40	1970	. .	1971	6/–	–	. .	. .

[a] All were expected to be operational by late 1975.

[b] Including development costs and sub-systems.

[c] The USA plans to acquire 30, FR Germany ten (to be built in the USA) and Italy five or six (to be built in Italy).

[d] Joint development to replace the Type 205 and Type 207 (in FR Germany and Norway, respectively) in the 1980s.

[e] Current production entirely for export. Two units for Chile were completed late 1974; two are under construction for Australia (to be fitted with US fire-control systems); and one is under construction for Brazil.

[f] Four vessels of this type ordered by Peru, two of which will be built in Peru.

[g] These vessels are configured for antisubmarine operations. Two multi-purpose versions, armed with the French *Exocet* anti-shipping missile, are being built in Brazil with material and technical assistance from the UK.

[h] Number ordered by the end of 1975.

[i] Fitted for, but not with, anti-ship missiles. Last unit delivered early in 1975.

[j] Last unit commissioned in June 1975.

[k] Previously called "Patrol Frigate", now designated FFG (Guided Missile Frigate).

[l] Construction of a prototype 2 000-ton vessel was expected to begin in FY 1976

but it was decided to prolong the testing of the two existing 100-ton prototypes for an additional year.

[m] Estimated programme costs up to the construction of one 2 000-ton prototype.

[n] R&D costs, including two prototypes.

[o] Official US sources estimate that nine boats were launched by the end of 1974. Given a building rate of six to eight SSBNs per year, the number of "Delta"-class boats launched by the end of 1975 could be about 15 unless a decision has been made to devote most of the available building-ways to the construction of "Delta II"-class boats.

[p] The last was completed in November 1975.

[q] The last of these vessels, built for Portugal, was completed in February 1975.

[r] Believed to be based on the Swedish "Spica II"-class.

[s] NATO designation for the equivalent Soviet class submarine.

[t] Further construction has apparently been delayed or suspended.

[u] "Hola" and "Hoka" are slightly modified versions of the Soviet "OSA"- and "Komar"-class boats, respectively. About five of each type were transferred directly from the Soviet Union followed by the Chinese construction of about 30 of each type. Some 20–30 "Hola" and "Hoku" units were completed by the end of 1975.

[v] In the autumn of 1975 there were reports of a new class of patrol boat displacing about 220 tons and equipped with six launchers for anti-ship missiles.

Part 4. *Armoured vehicles*[s]

Country	Designation, description	Main armament, *mm*	Combat weight, *tons*	Road speed, *km/hr*	Design begun	Prototype test	In production	No.: domestic/ export or total	R&D cost, *$mn*	Unit price, *$mn*	Foreign-designed Power plant, Electronics or Armaments
NATO											
France	*AMX-30* main battle tank	105	36	65	1957	. .	1966	(1 000)/(850)	. .	. .	–
	A/A vers, guns	30			. .	. .	yes	. ./. .	. .	. .	–
	A/A vers, missiles[a]	–			(1974)	. .	1978	–/. .	. .	. .	–
	AMX-13 light tank	105	15	64	(1947)	. .	(1955)	. ./(4 000)[b]			
	VXB-170A armoured personnel carrier	20	15.5	85	1965	1969	1973	600/. .	. .	. .	–
	170B A/A vers	20	. .	. .	. .	. .	no	. .	. .	. .	–
	AMX-10P armoured personnel carrier	20	13.8	65	(1965)	1971	1974	. ./(250)	. .	. .	–
	AMX-10 anti-tank, cannon	105			. .	. .	no	. .	. .	. .	–
	AMX-10M anti-tank, missile[c]	20			. .	(1975)	no	. .	. .	. .	–
	AMX-10RC recce vers	. .			. .	. .	(1977)	. .	. .	. .	–
	VAB forward armoured vehicle	. .	12.9	90	(1969)	1973	1975	(4 000)/. .			
	M-3 armoured personnel carrier	. .	6.1	100	. .	1969	1971	700/3 300	. .	. .	–
	M-3 VDA A/A vers	20			. .	. .	(1976)	. .	. .	. .	–
	M-3 anti-tank, missile[d]	. .			. .	. .	(1976)	–/. .	. .	. .	–
	AML-245 armoured car	. .	4.8–5.5	100	. .	. .	(1960)	(4 000)[e]	. .	. .	–
	H.90 current vers	90									
	HS.30 current vers	30									
FR Germany	*Leopard II* main battle tank	120	50.5	68	(1966)	1973	(1978)	. ./. .	. .	. .	E-f (USA)
	Leopard I main battle tank	105	42.2	65	1957	. .	1965	2 440/(1 500)[r]	(25)	0.72	Ar (UK)
	Gepard anti-aircraft tank system[h]	35	. .	. .	1966	1969	1976	420/150	. .	1.7	Ar, E-f, E-r (Switz.)
	Marder armoured personnel carrier	20	28.2	75	1959	. .	1970	2 176/–	. .	0.39	. .
	Spähpanzer-2 Luchs armoured car	20	19.5	100	1965	1968	1975	408/. .	. .	. .	. .
	UR.416 amoured personnel carrier	. .	6.3	80	. .	1973	yes	. ./(106)	. .	. .	. .
International:											
FR Germany, UK	*FMBT-80* main battle tank[f]	(120)	. .	. .	1972	. .	no	. .	. .	. .	. .
Italy	*Type 6616* armoured recce car	20	7	100	. .	1973	yes	. ./. .	. .	. .	Ar (Fr.)
UK	*Chieftain* main battle tank	120	53.8	48	(1958)	1960	1965	(800)/1950[q]		(0.5)	. .
	Scorpion light tank[g]	76	8	80	1964	. .	1974	>2 000	. .	(0.2)	–
	FV721 Fox armoured car	30	6	100	. .	1967	1973	. ./(300)	. .	. .	–
USA	*XM-1* main battle tank	(105)	58	80	1972	1976	1979	3 312/–	. .	(0.7)	–

	M-60 main battle tank	105		48				(7 000)[i]	. .		–
	M-60A1 current vers		54.8		. .	. .	1962	4 186/. .[j]		0.59	
	M-60A3 improved vehicle		57.3		1971	. .	1977	1 514/. .[k]		(0.7)	
	XM-723 MICV—Mechanised Infantry Combat vehicle	20–30	8.8	72	1967	1974	1977	1 200/. .	67	0.22	–
	M113A1 armoured personnel carrier	12.7	10.8	64	. .	1964	(1965)	. ./. .[l]	. .	. .	–
	V-150 Commando armoured car	20	9.5	89	. .	1971	yes	–/. .	. .	. .	–
	XM-163 Vulcan anti-aircraft vehicle[m]	20	. .	(64)	. .	1964	yes	. ./. .	. .	(0.5)	–
Warsaw Treaty Organization											
Czechoslovakia	*SKOT-2A (OT-64)* amoured personnel carrier	14.5	12.8	95	1959	. .	(1963)	. ./. .	. .	. .	. .
Hungary	*FUG-70* scout car	14.5	7	100	. .	. .	(1970)	. ./. .	. .	. .	. .
USSR	*T-70* main battle tank	122	(40)	. .	. .	. .	(1971)	. ./–	. .	. .	–
	T-62 main battle tank	115	37.5	55	. .	1963	1965	. ./. .	. .	. .	–
	BMD light tank	73	9	60	. .	. .	(1970)	. ./–	. .	. .	–
	BMP-1 infantry combat vehicle	73	12	60	. .	(1967)	yes	. ./. .	. .	. .	–
	M-1970 armoured personnel carrier	7.62	10	55	. .	(1970)	yes	. ./–	. .	. .	–
	BRDM-2 (BTR-40P) recce car	14.5	7	100	. .	(1966)	yes	. ./. .	. .	. .	–
	ZSU-23-4 anti-aircraft vehicle	23	14.5	44	. .	. .	(1965)	. ./. .	. .	. .	–
Other Europe											
Austria	*Panzerjäger K* anti-tank vehicle	105	17	65	1965	(1968)	(1974)	(120)/–	. .	. .	Ar (Fr.)
Sweden	*IKv 91* light tank	90	15.5	67	1968	(1970)	1973	. ./–	. .	. .	. .
	Pbv 302 (improved) armoured personnel carrier	20	13	65	. .	. .	yes	. ./–	. .	. .	. .
Switzerland	*Pz 68* main battle tank	105	38	55	. .	. .	(1967)	(280)/–	. .	(0.4)	P (FRG) Ar (UK)
	Tornado 2 infantry combat vehicle	20	(21)	70	1967	1968	no[n]	–/. .	. .	. .	. .
Yugoslavia	*M60* armoured personnel carrier	12.7	9.5	45	. .	(1965)	(yes)	. ./–	. .	. .	. .
Other Developed											
China[o]	*T-59 (T-54)* main battle tank	100	36.5	48	. .	. .	(1963)	. ./. .	. .	. .	–
	T-63 (light) tank	85	. .	. .	. .	. .	yes[p]	. .	. .	. .	–
	T-62 light tank	85	21	. .	. .	. .	(1968)	. ./. .	. .	. .	–
	T-60 (PT-76) light amphibious tank	85	(14)	. .	. .	. .	(yes)	. ./. .	. .	. .	–
	M-1967 armoured personnel carrier	12.7	10	. .	. .	. .	(1967)	. ./. .	. .	. .	–
Japan	*STB-6* main battle tank	105	38	53	1964	1969	1974	(280)/–	. .	(0.7)	Ar (UK)
	Type 73 infantry combat vehicle	12.7	13.5	60	. .	. .	(1974)	. ./–	. .	. .	. .

[a] Armed with Crotale missiles. Being developed to Saudi Arabian specifications. System is called Chahinn.
[b] Total exports, all versions and variants.
[c] With HOT missiles.
[d] With HOT missiles. At least one export order has been finalized.
[e] All versions.
[f] Known as KPZ-3 in FR Germany. There are two related activities; FR Germany has been invited to submit its Leopard II MBT in the US XM-1 competition and the USA, FR Germany and the UK held trials in 1975 in an effort to select at least a common gun for the FMBT-80 and the XM-1.
[g] Seven special-purpose variants are also in production or available on order. An eighth version, armed with TOW anti-tank missiles, is under development for Iran. Belgium has some 700 vehicles on order with assembly and fitting-out taking place in that country.
[h] Manufacture of the complete system is being undertaken by FR Germany. The basic component of the system, the twin 35-mm guns and associated fire-control system, was developed and is produced in Switzerland.
[i] Total M-60 production through FY 1975. Exports of this tank have been substantial. For example, between October 1973 and February 1975, 569 M-60s were transferred to foreign countries and an additional 411 committed for export.
[j] US Army inventory plus Army and Marine Corps procurement for FY 1975.
[k] Planned procurement through FY 1978 after which XM-1 will enter production.
[l] Total production of M 113 series in the USA approximately 50 000 units.
[m] This is a modified M 113 carrying the six-barrel Vulcan gun. A towed version, XM-167, may also still be in production.
[n] Development continuing. Enlarged version (24 tons) called "Taifun"; version with 90-mm anti-tank gun called "Gepard". Intended for export and/or licence production.
[o] Vehicles of Soviet origin shown with Soviet designation in brackets. They are listed as indigenous because China has been almost totally isolated from Soviet technology since 1960.
[p] The simultaneous production of three light tanks seems unlikely. The T-63 may have replaced either the T-60 or the T-62 or both, in production.
[q] All export orders to date have been from Iran. Iran is providing the funding for extensive modifications to the Chieftain.
[r] There are reports of a special version of the Leopard I for export to non-NATO countries which will be partially manufactured and fully assembled in Italy to avoid West German export restrictions.
[s] Only basic vehicles are listed. It is common for numerous versions/derivatives of a basic vehicle to be produced or at least designed and available for production if ordered.

II. Register of licensed production of major weapons in industrialized countries, 1975

For sources and methods, see chapter 7. For conventions, see page 145.

Part 1. *Aircraft*

Country	Licenser	Date	Designation, description	Power plant	Weight, *kg*	Speed, *km/hr* or *Mach no.*	Nature of licence, technical changes by licensee	In production	No.: domestic/ export or total	Unit price, *$mn*
NATO										
FR Germany	USA	1969	*CH-53G* medium transp hel	T	19 050	315	Indigenous manufacture except avionics	1971	110/–[a]	. .
Italy	USA	(1966)	*F-104S* fighter/strike	J	14 060	M2.2	Mainly indigenous manufacture	1968	205/36	. .
		1968	*CH-47C* transp hel	T	17 780	285	Partial indigenous manufacture	1970	26/42	. .
		1965	*SH-3D* A/S hel[b]	T	9 525	265	Indigenous manufacture except radar	1967	(60)	. .
		. .	*AB 214B* utility hel	T	7 257	241		. .	. .	. .
		. .	*AB 212A* A/S hel[c]		5 080	195	Indigenously developed A/S version of US aircraft	1975	28/25	(1.8)
		. .	*AB 204AS* A/S hel	T	4 310	95	Indigenously developed A/S version of US aircraft	yes	. .	. .
		. .	*AB 205A-1* utility hel[f]	T	4 310	220	Indigenous manufacture	yes	. ./(50)	. .
		1961	*AB 206B-1* utility hel	T	1 520	220	Indigenous manufacture	1971	. .	(0.5)
		. .	*NH-500M* light hel	T	1 157	244	Assembly	1973	. .[d]	. .
Portugal	Brazil	1974	*T-23 Uirapuru* trainer	P	840	225	Indigenous manufacture	(1974)	(110)/–	. .
UK	USA	1966	*SH-3 Sea King* A/S hel	T	9 300	(215)	Indigenous manufacture, UK engines and avionics	1969	71/98	. .
			Commando transp vers		9 525	208		1972	–/30	. .
USA	Switzerland	(1965)	*AU-23A Peacemaker* COIN aircraft	T	2 200	216	Military version of Porter developed in the USA	(1970)	15/51	. .

Country	Licenser	Date	Designation, description	Power plant	Weight, *kg*	Speed, *km/hr* or *Mach no.*	Nature of licence, technical changes by licensee	In production	No.: domestic/ export or total	Unit price, *$mn*
Warsaw Treaty Organization										
Romania	UK	1968	*Islander* light transp	P	2 860	290	Indigenous manufacture	1969	315	. .
	France	1971	*Alouette III* utility hel	T	2 250	220	Assembly, some indigenous manufacture	1971	50/–	. .
Other Europe										
Finland	Sweden	1966	*J 35 Draken* fighter/strike	J	15 000	M2	Assembly	1974	12/–[e]	. .
Spain	FR Germany	. .	*CASA 223K1* trainer	P	821	249	Indigenous manufacture	1972	–/50	. .
Yugoslavia	UK, France	1971	*Gazelle* light utility hel	T	1 700	310	Assembly	1973	. .	. .
Other Developed										
Australia	USA	1971	*B206B-1* utility hel	T	1 520	220	Some indigenous manufacture	1973	58/–	. .
Japan	USA	1969	*F-4EJ* fighter/bomber	J	24 765	>M2	Mainly indigenous manufacture	1972	118/–	(12.8)
		1959	*P-2J* maritime patrol	T	34 000	(370)	Indigenous manufacture, substantial modification of US design	1969	89/–	(10.0)
		(1962)	*SH-3A/D* A/S hel	T	9 300	265	Mainly indigenous manufacture	yes	107/–	(5.2)
		(1961)	*KV-107II/IIA* transp hel	T	8 620	270	Indigenous manufacture	(1962)	115/(7)	(3.7)
		(1961)	*B205A-1* utility hel	T	4 310	220	Indigenous manufacture	(1972)	(55)/–	(1.4)
		1967	*OH-6J* light hel	T	1 225	240	Assembly	1969	135/–	0.45
		. .	*TH-55J* light hel	P	861	169	. .	1974	48/–	0.09

Part 2. *Missiles*

Country	Licenser	Date	Designation, description	Power plant	Warhead weight, *kg* (if nuclear, *kt/mt*)	Range, *km*	Nature of licence, technical changes by licensee	In production	No.: domestic/ export or total	Unit price, *$mn*
NATO										
International: European NATO Consortium (leader, FRG)	USA	. .	*AIM-9 Sidewinder* air.-to-air.	S	(11)	. .	Consortium manufacture, improved homing system	. .[g]	. .	. .
European NATO Consortium (leader, Norway)	USA	. .	*AGM-12B Bullpup* air.-to-ship/fixed	S	113	11	. .	yes	. .	. .
Italy[h]	USA	. .	*AIM-7 Sparrow III* air./ship-to-air./miss	S	30	(25)	Indigenous manufacture	yes	. .	. .
Turkey	FR Germany		*Cobra 2 000* portable-to-tank	S	2.7	2	. .	yes	. .	. .
Other Europe										
Yugoslavia	USSR	. .	*"Sagger"* portable/mobile-to-tank	S	11.5	3	. .	(yes)	. .	. .
Other Developed										
Japan	USA	1972	*MIM-14C Nike Hercules* fixed-to-air.	S	HE	(140)	. .	(1973)	(36)/–	(3.0)
		1972	*MIM-23 Hawk* mobile-to-air.	S	HE	(11)	. .	(1973)	(30)/–	(2.5)
		. .	*AIM-7 Sparrow III* air.-to-air.	S	30	(25)	. .	(1973)	600/–	. .

Part 3. *Ships*

Country	Licenser	Date	Class, description	Dis-place-ment, *tons*	Speed, *knots*	Nature of licence, technical changes by licensee	Laid down	Launched	Commis-sioned or completed	No.: do-mestic/ export or total	Unit price, $ *mn*
NATO											
Turkey	FR Germany	. .	Jaguar III missile boat ShSh	(400)	(38)	–	. .	. .	(1974)	3/–[i]	. .
. .											
Other Europe											
Spain	France	. .	Agosta sub 4A/S TT	1 200	20	Some French assistance	1974	. .	. .	2/–	. .
		. .	Daphne sub 12TT	870	12.5	Extensive French assistance	1968	1972	1973	4/–[j]	. .

Part 4. *Armoured vehicles*

Country	Licenser	Date	Designation, description	Main arma-ment, *mm*	Combat weight, *tons*	Road speed, *km/hr*	Nature of licence, technical changes by licensee	In pro-duction	No.: do-mestic/ export or total	Unit price, *$ mn*
NATO										
Belgium	UK		*Scorpion* light tank	76	8	87	Substantial indigenous manufacture	(1973)	(700)/–[k]	. .
	FR Germany	(1973)	*Kanone JPZ4–5* anti-tank	90	25.7	70	Assembly	(1974)	80/–	0.37
Italy	FR Germany		*Leopard* main battle tank	105	40	65	Indigenous manufacture	(1973)	600/–	. .
	USA	1963	*M113* armoured personnel carrier	–	10	65	Indigenous manufacture	yes	3 600/1 620	. .
Warsaw Treaty Organization										
Czechoslovakia	USSR	. .	*T-62* main battle tank	115	37.5	55	Probably indigenous manufacture		. ./. .	. .
Hungary	Czechoslo-vakia	. .	*OT-64* armoured personnel carrier	14.5	12.8	95	. .		. ./–[l]	. .
Poland[m]	USSR	. .	*T-62* main battle tank	115	37.5	55	. .			
	Czechoslo-vakia	. .	*OT-64* armoured personnel carrier	14.5	12.8	95	. .		. ./–[l]	. .
Other Europe										
Spain	France	1972	*AMX-30* main battle tank	105	36	65	Assembly	(1974)	180/–	. .

[a] Production was scheduled to be completed during 1975.

[b] The production of 20 air/sea rescue versions of this helicopter, designated HH-3F, commenced in 1974.

[c] Some basic AB 212s have also been produced for export to military customers. In addition, a version with air-to-surface missiles, designated AB 212 AWW (Above Water Warfare), is under development.

[d] Initial production for civil orders; military observation and A/S versions are planned.

[e] Completed mid-1975.

[f] This programme was preceded by the production of 90 AB 204Bs.

[g] This consortium produced some 9 000 AIM-9B Sidewinders including a version designated FGW Mod 2 with an improved guidance and control unit developed in FR Germany. This work has been completed. However, prior to the cancellation of its Viper air-to-air missile programme, FR Germany secured the right to manufacture the latest Sidewinder (AIM-9L) under licence.

[h] Italy may also be producing the Cobra 2000 anti-tank missile under licence from FR Germany.

[i] A fourth unit is being built in FR Germany.

[j] Fourth unit commissioned late in 1975.

[k] The number includes both the "Scorpion" and a version armed with anti-tank missiles known as "Striker".

[l] Production may be complete.

[m] The Soviet BMP-1 infantry combat vehicle may also be licence-produced in Poland.

Appendix 6C

Register of arms trade to industrialized countries, 1975

For sources and methods, see chapter 7. For conventions, see page 145. For abbreviations of manufacturers' names, see *Arms Trade Registers: The Arms Trade with the Third World* (Stockholm, Almqvist & Wiksell, 1975, Stockholm International Peace Research Institute), pp. 131–48.

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
NATO							
North America:							
USA	UK	12	HS AV-8A Harrier	V/STOL fighter	$112 mn: final batch of total 110	1973	1975–76
		8	HS TAV-8A Harrier	V/STOL trainer			
Canada	UK	100	Short Blowpipe launchers	Infantry SAM system	$28 mn	1973	1975–
	USA	8	Boeing-Vertol CH-47C Chinook	Transport helicopter	$30 mn incl spares and support equipment	1973	1974–75
		5	Lockheed C-130H Hercules	Transport	$26.4 mn	1974	1974–75
		18	Lockheed P-3C Orion	Long-range patrol aircraft	$950 mn total programme cost incl anticipated inflation; contract under negotiation	. .	1979–80
		150	Hughes TOW launcher	ATM system	$30 mn incl missiles and support equipment	1973	1975–
		10	Eglen Hovercraft			(1975)	. .
Europe:							
Belgium	France/FR Germany	33	Dassault-Breguet/Dornier Alpha Jet	Trainer	Contract signed	Sept 1975	1978–80
	FR Germany	80	Rheinstahl Jagdpanzer-kanone 90	Tank destroyer	$29.7 mn incl spares and training	1972	Apr 1975–
	FR Germany/ Switzerland	55	Krauss-Maffei/Oerlikon-Contraves 5 PFZ Gepard	35-mm anti-air-craft tank		1973	1976
	UK	12	Fairey/Britten-Norman BN.2 Islander	STOL transport	$3.6 mn	Nov 1975	1976–77
		3	HS 748	Transport	$7 mn	1974	(1975–76)
		5	Westland Sea King Mk 48	SAR helicopter	$14 mn	1974	(1976)
		(500)	BAC Swingfire	ATM	To equip Striker in British CVR (T) series in production in collaboration with Belgium	1973	. .

	USA	102	General Dynamics F-16	Light-weight fighter	$850 mn incl option on 14 more; final contract not signed as of Mar 1976	June 1975	(1979–)
		6	Swearingen Merlin III	Transport	$8.6 mn	1975	1976
		. .	LTV Lance	SSM		May 1975	. .
Denmark	FR Germany	120	Krauss-Maffei Leopard I A3	Main battle tank	$85 mn	1974	1976–
	Sweden	5	Saab Draken TF-35	Trainer	$14.2 mn	1973	1975–
		32	Saab Supporter T-17	Trainer and observation aircr	$4.2 mn	Jan 1975	1975–77
	USA	48	General Dynamics F-16	Light-weight fighter	Plus option on 10 more	June 1975	1979–
		3	Lockheed C-130H Hercules	Transport	$20 mn incl spares	1973	1975
		. .	Hughes TOW	ATM		1973	By mid-1975
		. .	McDonnell-Douglas Harpoon	ShShM	$10 mn initial order for shipboard launching equipment	Dec 1975	. .
France	USA	1	McDonnell-Douglas DC-8	ECM aircr	$8.7 mn	1973	(1975)
		1	McDonnell-Douglas DC-8 Super 62	Transp and liaison aircr	$11.2 mn	1975	1976
FR Germany	France	. .	Aérospatiale AS-30	ASM		1975	1975–
		20	Fast attack craft–missile, Type 148	Displ: 234 t	8 hulls built in FR Germany; equipped with Exocet ShShM	1970	1973–75
		200	Aérospatiale MM-38 Exocet	ShShM	To equip 30 patrol craft	. .	1976–80
	USA	175	McDonnell-Douglas F-4F Phantom	Fighter	$1 400 mn total programme cost	1971	1973–76
		10	McDonnell-Douglas F-4F Phantom	Fighter/trainer	$51 mn excl engines; follow-up batch to 175	Mid-1975	(1977)
		100	Hughes TOW launcher	ATM system		1972	1973–75
		3 000	Missile				
		26	LTV Lance system	SSM	($100 mn)	1974	1974–
		175	Missile				
		. .	General Dynamics RIM-66A Standard	SAM	To replace Tartar	. .	1976–77
		. .	Fast attack craft–missile, Type 162	Hydrofoil		Apr 1974	. .
Greece	Canada	3	Canadair CL-215	Amphibian water-bomber	In addition to 2 delivered in 1974	Mid-1975	. .
	France	4	Aérospatiale Alouette III	ASW helicopter		. .	Apr 1975
		40	Dassault-Breguet Mirage F-1C	Fighter	$295 mn	1974	1975–76
		4	Fast attack craft–missile, "La Combattante III"-class	Displ: 332 t	Equipped with MM-38 Exocet ShShM	1974	. .

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
		1	Fast patrol boat		Equipped with SS-12 ShShM; from Chantiers de l'Esterel	1975	. .
		2	Patrol craft	32-metre		1974	1975–76
		120	AMX-30	MBT	$63 mn	1974	Mar 1975–
		(100	Armoured personnel carrier			Mid-1974	. .)
	France/ FR Germany	. .	Aérospatiale/MBB Milan	ATM		By mid-1975	1975–76
	FR Germany	33	Lockheed T-33A	Trainer	Ex-Luftwaffe	. .	Mid-1975
		3	Improved Type 209 submarine	Displ: ~ 1 000 t	Plus option on one more	Oct 1975	. .
	Italy	40	Agusta-Bell 204B and 205	Helicopter		(Mid-1974)	Mid-1975
		300	Armoured personnel carrier			(Mid-1974)	. .
	USA	10	Bell UH-1D	Helicopter		. .	Mid-1975
		8	Lockheed C-130H Hercules	Transport	U.c.: $5.84 mn incl spares	1974–75	1975–76
		60	LTV A-7H Corsair	Strike aircr	$259 mn	1974	Aug 1975–1977
		8	McDonnell-Douglas RF-4E Phantom	Tactical recce	$91 mn incl spares and support equipment	Dec 1975	. .
		40	NAA Rockwell T-2E Buckeye	Trainer		1974	1976–
		12	Northrop F-5A	Light fighter	Formerly leased by Iran; bought by Greece from USA	. .	(Late 1975)
		. .	Hughes TOW	ATM system		(1974)	1974–76
		(240)	Raytheon AIM-7 Sparrow	AAM		. .	1973–75
		2	Patrol gunboat, "Asheville"-class	Displ: 225 t	Ex-USN	. .	1975
		1	Medium harbour tug (YTM)		Ex-USN	. .	1975
Iceland	Denmark	1	Patrol vessel	Displ: ~1 150 t	For coast guard	1973	1975
	Netherlands	1	Fokker Friendship F.27 Mk200	Maritime patrol and SAR	For coast guard	Sept 1975	Nov 1976
	Spain	1	Patrol vessel	Displ: 941 t	For coast guard; launched Feb 1974	(1973)	(1975)
Italy	Netherlands	2	Fokker-VFW F-28	Transport		(1974)	. .
	USA	2	Boeing-Vertol CH-47C Chinook	Helicopter	Delays in licence production of 26 for army caused licenser to produce these	(1974)	1974–75
		130	Hughes TOW launcher	ATM system	$51.5 mn	1972	Late 1974–
		5 000	Missile	ATM system	$51.5 mn	1972	Late 1974–

		..	LTV Lance	SSM	$48 mn; order confirmed July 1975	(1973)	Mar 1975–
		..	General Dynamics RIM-66A Standard	SAM	On order	..	(1976)
		1	Submarine, "Tang"-class	Displ: 2 100 t	Ex-USN; refitted in USA	..	Apr 1975
Luxembourg	USA	6	Hughes TOW	ATM system		1973	By mid-1975
Netherlands	FR Germany	30	MBB BO-105C	LOH	$23 mn	1974	July 1975–1976
	FR Germany/ Switzerland	95	Krauss-Maffei/Oerlikon-Contraves 5 PFZ-CA Gepard	35 mm anti-aircraft tank	$86 mn for first 60; production version	1973	1977–
	UK/France	6	Westland/Aérospatiale Sea Lynx SH-13A	SAR hel	$16.4 mn	1974	1976–
		2	Westland/Aérospatiale Sea Lynx SH-13B	ASW hel		Apr 1975	..
	USA	84	General Dynamics F-16	Light-weight fighter	$943 mn incl option on additional 18	June 1975	1979–
		..	Hughes TOW	ATM	Third contract	Late 1975	..
		1 battalion	LTV Lance	SSM	$35 mn	May 1975	By 1978
		28	McDonnell-Douglas Harpoon RGM-84A	ShShM	Letter of offer signed	1975	1976–77
		..	General Dynamics Standard RIM-66	SAM	To equip "Tromp"-class GM destroyers	On order	Sep 1976
		850	FMC M-113PI	APC	$230 mn; contract may involve some coproduction	Early 1975	1977–78
Norway	France/FR Germany/USA	..	Roland II Aerospatiale/MBB Boeing and Hughes	SAM system Missiles Missile launch units	$108 mn purchase authorized by Norwegian Parliament	Nov 1975	1979–80
	Sweden	1	Inshore minesweeper	Displ: 130 t	On order	..	..
		..	Carl Gustav	ATM	$10 mn	Early 1975	..
	USA	72	General Dynamics F-16	Light-weight fighter	Overall cost between $547 mn and $587 mn	June 1975	1980–
		..	Hughes TOW	ATM system		1974	(1975)
				Missiles		Late 1975	..
Portugal	(France)	32	(Reims Aviation) Cessna 337G	Liaison/light strike aircr	Cessna Super Skymaster reported to have been built by Reims	..	1974–75
	FR Germany	6	Fiat G-91T	Trainer	From Luftwaffe surplus	..	Late 1975
	Spain	24	CASA C.212 Aviocar	Transport	$34.5 mn	1974	1975–76
		2	Frigate, "João Coutinho"-class	Displ: 1 203 t	Last 2 of total 10 built in FR Germany and Spain	..	1975

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
Turkey	FR Germany	1	Fast attack craft–missile	Displ: 400 t	First of 4; other 3 being built in Turkey	1973	Late 1976
		2	Submarine, Type 209	Displ: 990 t		. .	Late 1975–
		5	Coastal minesweeper ("Vegesack"-class)	Displ: 362 t	2 identified as "Vegesack"-class		
		7	Motor torpedo boat	. .	With coastal minesweepers; ex FR German navy; part of free military aid (total value $40 mn) agreement	Aug 1975	Aug 1975
	Italy	18			Initial batch: $68 mn excl spares paid by Libya as loan	1974	1974–75
		18	Aeritalia (/Lockheed) F-104S Starfighter	Fighter/interceptor	Second batch: $73.8 mn	Mar 1975	Oct 1975–mid-1976
		4			Third batch: plus option on 20 more	July 1975	By mid-1976
		. .	Agusta-Bell AB-212	ASW helicopter		1975	1976–
		200	Selenia (/Raytheon) Sparrow	AAM	Turkey reported to be buying	(Apr 1975)	1976–
	Libya	7	Northrop F-5A	Light fighter	$33.6 mn gift incl engines and spares; ex-Libyan AF	. .	Sep 1975
	(USA)	Several	Boeing-Vertol CH-47 Chinook	Medium transport helicopter	In service	(1974)	(Mid-1975)
	USA	3	Cessna 421B Golden Eagle	Light transport		. .	Mid-1975
		40	McDonnell-Douglas F-4E Phantom	Multirole fighter	US Congress voted embargo which blocked deliveries from 5 Feb to Oct 1975	1972	Aug 1974–Feb 1975: 16; Oct 1975: 24
	USA	. .	Hughes AGM-65A Maverick	ASM		(Dec 1975)	. .
		(. .	Hughes TOW	ATM		Late 1974	. .)
		. .	McDonnell-Douglas Harpoon RGM-84A	ShShM	USN has signed letter of offer with Turkey	Late 1975	Feb 1977–
		. .	Raytheon AIM-7 Sparrow 3	AAM	To equip F-4E and F-104S	Late 1975	. .
		2	Submarine, "GUPPY III"-class	Displ: 1 975 t	Ex-USN; purchased	. .	June–July 1975
		. .	M-107/M-109/M-110	SP howitzers	On order	. .	. .
	USA/Iran	. .	Northrop F-5A	Light fighter	Ex-Iranian AF; from Iran through USA auspices	. .	By Nov 1975
	(USSR	60	Mil Mi-8	Helicopter	Reported by USA intelligence sources; denied by Turkish military source	Oct 1975	. .)

UK	France	300	Aérospatiale MM-38 Exocet	ShShM	$70 mn; to equip destroyers and frigates	1971	1973–
	USA	. .	LTV MGM-52 Lance	SSM	$128 mn	1974	Late 1975–
		. .	McDonnell-Douglas Harpoon	SuShM	$6 mn initial pre-development contract	Dec 1975	. .

Warsaw Treaty Organization							
Bulgaria	Czechoslovakia	. .	Aero L-39	Trainer	Has been adopted	. .	. .
	USSR	. .	BMP-1 (BMP-76)	APC	Is replacing BTR-50P	. .	. .
		. .	T-62	Main battle tank	Delivery continuing	. .	1969–
		. .	ZSU-23-4 Shilka	SP anti-aircraft gun	Delivery continuing	. .	. .
Czechoslovakia	USSR	. .	BMP-1 (BMP-76)	APC	Is replacing BTR-50P	. .	. .
		Small number	T-62	Main battle tank	(Delivery continuing)	. .	1969–
		. .	ZSU-23-4 Shilka	SP anti-aircraft gun	Delivery continuing	. .	. .
German DR	Czechoslovakia	. .	Aero L-39	Trainer	Has been adopted	. .	. .
	USSR	. .	BMP-1 (BMP-76)	APC	Is replacing BTR-50P	. .	. .
		. .	T-62	Main battle tank	Delivery continuing	. .	1969–
		. .	ZSU-23-4 Shilka	SP anti-aircraft gun	Delivery continuing	. .	. .
Hungary	Czechoslovakia	. .	Aero L-39	Trainer	Has been adopted	. .	. .
	USSR	. .	BMP-1 (BMP-76)	APC	Is replacing BTR-50P	. .	. .
		. .	T-62	Main battle tank	Delivery continuing	. .	1969–
		. .	ZSU-23-4 Shilka	SP anti-aircraft gun	Delivery continuing	. .	. .
Poland	Czechoslovakia	. .	M(T)-55	Bridge-laying tank		. .	Early 1975–
	USSR	. .	BMP-1 (BMP-76)	APC	Is replacing BTR-50P	. .	. .
		. .	T-62	Main battle tank	Delivery continuing	. .	1969–
		. .	ZSU-23-4 Shilka	SP anti-aircraft gun	Delivery continuing	. .	. .
Romania	China	~10	FAC-gun, "Shanghai"-class	Displ: 120 t	Either transferred by China, or licence-built in Romania	. .	1973–
	Czechoslovakia	. .	Aero L-39	Trainer	Has been adopted	. .	. .
	France	~100	Aérospatiale SA-330 Puma	Helicopter	Up to $83 mn; being mainly licence-produced	Sep 1974	. .
	USSR	. .	BMP-1 (BMP-76)	APC	Is replacing BTR-50P	. .	. .
		. .	T-62	Main battle tank	Delivery continuing	. .	1969–
		. .	ZSU-23-4 Shilka	SP anti-aircraft gun	Delivery continuing	. .	. .
USSR	Czechoslovakia	. .	Aero L-39	Trainer	Is replacing L-29	. .	1973–
		. .	OT-64 (SKOT)	APC	Reportedly being bought	. .	. .
	Finland	2	Cable ships	Displ: 6 000 t		July 1974	. .

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
		3	Icebreaker, "Ermak"-class	Displ: 20 241 t		. .	1974: 1 1975: 1 (1976: 1)
		3	Icebreaker, shallow water type	Length: 185 feet		1974	(1976)
	Viet-Nam	. .	Military equipment		USA-made/ex-Republic of Viet-Nam equipment captured by DR Viet-Nam; most modern reportedly acquired by USSR	. .	By Sep 1975
Other Europe							
Albania	China	4	FAC-gun, "Shanghai"-class	Displ: 120 t		. .	(1975)
Austria	Switzerland	12	Pilatus PC-6 Turbo Porter	STOL utility transport		Apr 1975	Late 1975–
	USA	12	Bell 206A Jet Ranger	Helicopter		(Aug 1975)	(1975)
Finland	Sweden	12	Saab 35S Draken	All weather fighter	Authorized $49 mn in Apr 1970 incl spares etc.: by Apr 1974 $70–75 mn incl interest and various cost increases; assembly in Finland	1970	Apr 1974–Late 1975
	35S	6	Saab J35F Draken	Interceptor	$16 mn; low hour ex-Swedish AF (from storage) to replace 6 on lease, on which there may be option to purchase	Oct 1975	1976
	(USA)	1	Cessna 402	Light transport	On lease	. .	Aug 1975
		2	Hughes 500	Light observation helicopter		. .	Mid-1975
	USSR	4	FAC-missile, "OSA"-class	Displ: 165 t	Each equipped with 4 SSN-2 ShShM launchers	. .	Due 1974–75
Ireland	France	6	Aérospatiale CM-170-2 Super Magister	Trainer/light strike	$2.4 mn; refurbished, ex-French AF	1974	Late 1975
Spain	(France)	3	Aérospatiale/Westland SA-330 Puma	Medium transport helicopter		. .	1975–76
	France	15	Dassault Mirage F-1CE	Multirole fighter	$91.5 mn final contract price fixed in May 1975; option on 21 more	. .	Mid-1975–
		(. .	Matra R550 Magic	AAM	Reportedly on order	. .	. .)

		(. .	Thomson-CSF/Matra Crotale	SAM system	Reportedly on order	1975	. .)
	FR Germany	1	Fishery protection, "Lazaga (P-00)"-class	Displ: 400 t full load	First of 6: other 5 being built in Spain; may be equipped with 2 ShShM launchers	1972	1975
		1	Large patrol craft, "Barcelo (P-10)"-class	Displ: 139 t	Prototype of 6, other 5 to be built in Spain	Late 1973	(1976)
	Italy	4	Agusta-Bell 205	SAR helicopter		. .	Mid-1975
		. .	Agusta-Bell 212 ASW	ASW helicopter		. .	(1975–76)
	USA	8	Beechcraft Baron B-55	Trainer	$ several mn, incl spares and support equipment; for Air Ministry civilian flying school	. .	1975
		12	Beechcraft Bonanza F-33A			1973	Early 1975
		4	Beechcraft King Air C-90			. .	1975
		12	Bell AH-1G Huey Cobra	Helicopter		Late 1974	. .
		11	Bell UH-1H Iroquois	Helicopter	8 to Army; 3 to AF	. .	Early 1975
		6	HS Harrier AV-8A (Mk 50)	V/STOL fighter	$30 mn (1973); US Marine Corps acting as procurement agent for Spain	1973	1976
		2	HS Harrier TAV-8A (Mk 54)	V/STOL trainer			
		3	Lockheed KC-130H Hercules	Tanker aircr	To replace KC-97L	March 1975	. .
		24	McDonnell-Douglas Phantom F-4E RF-4E	Fighter Recce aircr	~$203 mn; Spain renounced plans to purchase; USA may deliver as military aid under late 1975 five-year bases agreement	(1975)	. .
		5	Piper Aztec E	Utility transport		. .	Early 1975
		1	Piper Pressurized Navajo	Light transport		. .	Early 1975
		12	Sikorsky SH-3D Sea King	ASW helicopter		1974	1974: 2
		1	General Dynamics RIM-67A Standard SM-1	SAM launcher	On each of 5 "Baleares (F-70)"-class frigates	. .	1973–75
		Plus 80		Missile			
		1 battalion	Raytheon MIM-23B Improved HAWK	SAM	US DoD notified US Congress of its intention to sell	Mid-1975	. .
		5	Destroyer, "D 60" (ex-US "Gearing" FRAM I)-class	Displ: 2 425 t	Transferred from USA in 1972–73; purchased by Spain	. .	1975
Sweden	Finland	2	Icebreaker, "Urho"-class	Displ: 7 800 t		. .	1974: 1
	France	. .	Euromissile Milan	ATM	Evaluation batch	1975	. .
	FR Germany	1	Douglas C-47	Transport aircr	Ex-FR German AF	. .	Late 1975
	Norway	16	FAC-missile, "Jägaren"-class	Displ: 140 t	$33.7 mn initial order for hulls; Sweden to supply guns and electronics; to be equipped with Penguin ShShM	Mid-1975	(1976–80)
	USA	1	Lockheed C-130E Hercules	Transport aircr	$6.9 mn incl crew training and spares	Late 1974	Nov 1975

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
		Small number	Hughes TOW	ATM	Evaluation batch	Oct 1975	Early 1976
Switzerland	Sweden	. .	Bofors Bantam	ATM	Production continuing for Army	. .	1967–
	UK	30	HS Hunter F.58	Fighter-bomber	$35 mn; refurbished; assembled in Switzerland	1971	1974–75
		22	HS Hunter F.58	Fighter-bomber	$43.3 mn; additional refurbished aircraft; assembled in Switzerland	1973	Late 1975–
		8	HS Hunter T.66	Trainer			
	USA	120	M-109A1	155-mm (long-barrel) SP howitzer	$128 mn	1974	(1975–)
Yugoslavia	France	132	Aérospatiale/Westland SA-341 Gazelle	Helicopter	First 8 supplied direct; rest built under licence in Yugoslavia	1971	1973–
		. .	Aérospatiale MM-38 Exocet	ShShM	Reported as missile for new 200–250 t FAC-missile under construction in Yugoslavia	. .	. .
	USA	1	Boeing 727	VIP transport		. .	Mid-1975
	USSR	. .	Kamov KA-25 "Hormone"	ASW helicopter		. .	Early 1975
Far East							
China	Australia	. .	Government Aircraft Factories Nomad	Light transport	Order reported	(1974)	. .
	France	13	Aérospatiale SA-321Ja Super Frelon	SAR helicopter		1973	1974–75
	(USSR)	Several	Mil Mi-8	Helicopter	Possibly built in China	. .	1975
Japan	USA	1	Beechcraft C-90 King Air	Trainer		Mar 1975	. .
		14	McDonnell-Douglas RF-4EJ Phantom	Tactical recce aircr	$90 mn	1973	Dec 1974–1975
		80	General Dynamics RIM-60A Standard	SAM	To equip 2 "Tachikaze"-class DDGs under construction	. .	(1976–77)
		. .	Hughes Falcon AIM-26B	AAM	Is importing to equip F-4EJ	. .	1975
		16	Raytheon RIM-7H Sea Sparrow	SAM	To equip new frigate	(1975)	. .

Oceania

Australia	FR Germany		Leopard IA3	Tank			
		42		MBT			
		6		Armoured recovery vehicle	$47 mn	May 1975	1976–77
		5		Bridge-layer			
	New Zealand	37	N.Z. Aerospace Industries CT-4 Airtrainer	Trainer	$3.5 mn	1973	Jan 1975–1976
	UK	10	Westland Sea King Mk 50	ASW helicopter	$24 mn; delivery from manufacturer began in late 1974; aircr re-assembled in Australia; to Navy 1975–76	1972	1975–76
		20	BAC Rapier	SAM system with optical tracking	$44 mn	Late 1975	1978–81
		100		Missiles			
		2	Patrol submarine, "Oxley" (British "Oberon")-class	Displ: 1 610 t	$64 mn; delivery due in 1975: delayed by electric cable faults	1971	1977
	USA	8	Lockheed C-130E Hercules	Transport	U.c.: $6.3 mn; to replace C-130A	(Late 1975)	. .
		8	Lockheed P-3C Orion	Long-range maritime patrol aircraft		June 1975	1977–78
	USA	2	GM frigate, FFG-7 "Perry"-class	Displ: 3 500 t (full load)	Original price quoted $60 mn per ship; estimated cost late 1975–$217 mn per ship; definitive contract awaited in 1976	Letter of intent signed in Aug 1974	(1981–82)
New Zealand	UK	6	BAC Strikemaster Mk 88	Strike/trainer	$6 mn	1974	1975
		4	Patrol craft, "Lake"-class	Displ: 105 t		. .	1974–75
	USA	1	Bell UH-1H Iroquois	Helicopter	Airframe only: engine from stock being fitted in New Zealand	(May) 1975	. .
		Small number	Raytheon AIM-9(H) Sidewinder	AAM	To equip Skyhawk; part of Skyhawk contract	. .	Late 1975

Appendix 6D

Chronology of indigenous combat aircraft, missiles and warships made operational in the USA, the USSR, the UK and France, 1946–1975

Weapon systems are entered in the first year in which they attained operational status. For aircraft and missiles, new systems are printed against the margin; versions are indented.

Conventions

For a list of conventions used generally in Part II, see page 145. Other conventions for these registers only are given below.

m =New designation resulting from the modernization or conversion of existing aircraft or missiles
n =Nuclear warhead or optional nuclear/conventional warheads (for missiles)
* =Introduced prior to 1970 and believed to be still operational in 1975 (in the originating country). All weapon systems introduced in 1970 or later are believed to be still operational
con.=Conversion to missile armament (for ships)

Designation and code names

Soviet aircraft

All names for Soviet aircraft are US-NATO code names. The letters in the designation (for example, MiG or Su) are the Soviet abbreviation for the design bureau concerned. Thus, for example, MiG and Su identify the design bureaus Mikoyan and Gurevich and Sukhoi, respectively.

The number in the designation is either the design bureau's number for a particular aircraft or the official military number which is assigned when the aircraft has completed the development process and goes into production.

The letters which follow the numbers in designations of some aircraft are abbreviations of Russian words describing the main role or distinguishing features of a particular aircraft or variant. For example, "R" (*Razvedchik*) means "reconnaissance aircraft"; "F" (*Forsirovanny*) means "boosted" indicating either an uprated engine or the addition of an afterburner to existing engines; and "M" (*Modifikatsirovanny*) means "modified".

Soviet missiles

All missile designations and names are US-NATO codes:
SS =Surface-to-surface
SA=Surface-to-air
AS=Air-to-surface
AT=Anti-tank
N =Naval

US missiles

The US missile designation system consists of (*a*) three letters describing respectively the launch environment, the nature or location of the target and the type of vehicle; (*b*) a number which is assigned at a very early stage of the development process, each major class of missile having its own numbering sequence; (*c*) an additional letter to differentiate between models; and (*d*) (in most cases) a popular name.

Launch environment symbols:
A =Aircraft
B =Multiple launching platforms
C =Stored horizontally in a protective enclosure and launched from the ground
F =Carried by one man
H =Stored in a silo but launched from ground level
L =Stored in and launched from a silo
M =Launched from a mobile platform
P =Launched from unprotected, ground-level sites
R =Launched from a surface vessel
U =Launched from a submarine

Target or missile function symbols:
D =Decay
G =Surface attack
I =Aerial intercept
u =Underwater attack

Vehicle type symbols:
M =Guided missile
R =Rocket

Part I. Aircraft

Year/country		Interceptor	Fighter/ fighter-bomber	Attack/strike	Bomber	Maritime patrol/ antisubmarine	Reconnaissance[7]	Cancelled prior to operational deployment
1946	USA		F-80A Shooting Star					
	USSR		LA-7 Fritz	Il-10M				
			Su-9					
	UK		Vampire Mk1					
			Hornet Mk1					
1947	USA		FH-1 Phantom	A-1 Skyraider		P-2A Neptune		
			F-84 Thunderjet			P-2B		
			F-80B					
			F-84B					
			F4U-5 Corsair[1]					
	USSR	MiG-9 Fargo	Yak-15		Tu-4 Bull			La-150(F)
					Tu-12			Yak-25(F)
	UK		Hornet Mk3					
			Sea Fury Mk10					
1948	USA		FJ-1Fury	AM-1 Mauler	B-36B	P-2C		F-87(F)
			F-84C	A-1C	B-45A Tornado			
	USSR	MiG-15 Fagot	Yak-17 Feather					Il-16(B)
		MiG-9FR	Yak-23 Flora					Su-10(A)
			La-15 Fantail					
			La-11 Fang					
	UK		Meteor Mk4[1]					
			Sea Hornet F20					
1949	USA		F-86 Sabre	A-2A Savage	B-36D	P-2D		B-48(B)
			F-2A Banshee	A-1B	B-45C			B-54(B)
			F-9B Panther	A-1D				
			F6U-1 Pirate					
			F-80C					
			F-2B					
			F-9C					
	USSR				Il-28 Beagle*			Su-17(F)
								Su-15(F)
	UK		Vampire Mk5					Gloster Ace(F)
			Sea Hornet NF21					

1950	USA	F-94A Starfire	F-10A Skynight				RB-45C	B-35(B)
			F7U-1 Cutlass				RF-84	
			F-94B					
			F-84D					
			F-84E					
			F-9D					
			F-9E					
			F-2C					
			F-2D					
	USSR							Tu-82(B)
	UK		Meteor Mk8					
1951	USA	F-94C	F-9F Cougar		B-47B Stratojet	P-2E	(EC-121 Warning Star) (AEW)	F-93A(I)
		F-86D	F-89A Scorpion					
			F-89B					
			F-86E					
			F-10B					
	USSR					Be-6 Madge*	(I1-28R)	Mi-13 Barge (B)
	UK		Attacker F1		Canberra B Mk2	Schackleton Mk1	Canberra PR Mk3	
1952	USA		F-89C	A-2B	B-36H	P-5A Marlin		B-60(B)
			F-89D	A-1E				
			F-86F					
			F-84G					
	USSR	MiG-15 bis[11]	MiG-17 Fresco A					Yak-42 Backfin(B)
	UK		Venom FB Mk1					
	France		MD450 Ouragan					
1953	USA		F-100A Super Sabre		B-47E	P-2F	RB-47E	F10F-1(F)
			F-9H					
			F-86H					
	USSR		MiG-17P Fresco B		Tu-14 Bosun			
	UK		Sea Hawk F Mk1	Wyvern S Mk4				
			Venom NF Mk2					
			Sea Venom					
			Meteor NF Mk11					
1954	USA		F-84F Thunderstreak			S-2A Tracker	RB-66A	A2D-1 Skyshark(A)
			F-1B Fury			P-5B	RF-84F Thunder-flash	
			F-9J					
			F-1C					

Year/country	Interceptor	Fighter/ fighter-bomber	Attack/strike	Bomber	Maritime patrol/ antisubmarine	Reconnaissance[7]	Cancelled prior to operational deployment
USSR		MiG-17F Fresco C*					
UK		Hunter F Mk1		Canberra B Mk6		Canberra PR Mk7*	
		Swift F Mk1					
		Sea Hawk Mk2					
		Sea Hawk Mk3					Type 760 Vultur(A)
France		Mystère IIC					
1955 USA	F-86K	F-100C		B-52A Strato-Fortress	P-2H*		F2Y-1(F)
		F7U-3					
		F-1E					
USSR	Yak-25 Flashlight A	MiG-19 Farmer A		Tu-16 Badger A*			Il-40 Brawny(A)
	MiG-17PF Fresco D*						
UK		Hunter Mk4	Sea Hawk Mk4	Valiant B Mk1	Gannet AS Mk1		
		Hunter Mk5		Canberra B Mk8			
France		Mystère IV A					
1956 USA	F-102 Delta Dagger*	F-6A Skyray	A-3A Skywarrior	B-52C		RB-66C	
		F-3A Demon	A-4A Skyhawk	B-52D*			
		F-3B					
		F-100D*					
		F-89H					
USSR	Yak-27P Flash-light C	MiG-19S*		M-4 Bison A		Yak-25R Flashlight B	Il-54 Blowlamp(B)
		(MiG-17PFU FrescoE)*		Tu-20 Bear A*			Tu-91 Boot(A)
UK		Javelin F Mk1		Vulcan B Mk1		Valiant B (PR) Mk1	
		Hunter F Mk6*					
		Sea Hawk Mk6					
France		Vautour IIA					(Mystère IV N(I))
1957 USA		F-101A Voodoo	A-3B	B-66B Destroyer		U-2	F5D-1(F)
		F-8A Crusader	A-4B			RF-101A	F-103(F)
		F-11A Tiger	AF-1E			RB-66B	F-107(F)
		F-100F*				WB-66D[4]	
		F-86L					

	USSR	MiG-19PF Farmer B	MiG-19 SF Farmer C*					Ye-2A Faceplate (I)
	UK		Javelin F Mk4 Javelin F Mk5 Javelin F Mk6				Shackleton Mk3	
	France		Super Mystère B-2*					(SE 5000 Baroudeur) (F)
1958	USA	F-104A Starfighter*	F-105B Thunderchief F-3C F-8C F-101C		B-52E B-52F* B-52G*		RF-8A RA-3B RF-101C*	F8U-3(F)
	USSR		MiG-19PM Farmer D*				Yak-26 Mandrake	La-250(I)
	UK		Scimitar F Mk1 Gnat Mk1 Javelin F Mk7		Victor B Mk1			Trident II(I)
	France		Vautour IIN		Vautour IIB*			(Breguet Type 1 100) (F)
1959	USA	F-106A Delta Dart* F-106B* F-101B*	F-104C* F-8B				EA-3B (ECM)*	F-108 Rapier(I) F-105E (FB) PGM Sea Master (B)[8]
	USSR	Yak-25 Flashlight D	MiG-21F Fishbed C*	Su-7B Fitter A*	Tu-16 Badger B		Yak-27R Mangrove*	M-50 Bounder (B)
	UK		Sea Vixen F Mk1	Jet Provost Mk51			Canberra (PR) Mk9* Gannet (AEW) Mk3*	
	France					Breguet 1050 Alizé*		(SE 212 Durandel) (I) (SE 116 Voltigeur) (A)
1960	USA		F-105D* F-8D	A-4C	B-58A Hustler		E-1B Tracer (AEW)*	XV-3 Convertiplane
	UK	Lightning F Mk1	Javelin Mk8	Hunter Mk9*	Vulcan B Mk2*		Hunter Mk10	
1961	USA		F-4B Phantom II*	A-5A Vigilante	B-52H*	S-2D		Missileer (F)
	USSR	Tu-28P Fiddler* Su-9 Fishpot B*			Tu-20 Bear B* Tu-16 Badger C*	Be-10 Mallow		
	France		Mirage IIIC*					
1962	USA		F-104G[2] F-8E	A-5B A-4E*		P-3A Orion* S-2E*	OV-1 A Mohawk[5]	
	USSR		MiG-21 PF Fish- bed D*			(M-4 Bison B).m		

Year/country		Interceptor	Fighter/ fighter-bomber	Attack/strike	Bomber	Maritime patrol/ antisubmarine	Reconnaissance[7]	Cancelled prior to operational deployment
	UK	Lightning F Mk2*			Victor B Mk2			
	France			Etendard IVM*				
1963	USA		F-5A Freedom Fighter[2] F-4C*	A-6A Intruder*				A2J-1(A) B-70 Valkyrie(B)
	USSR			Yak-28 Brewer A Yak-28 L Brewer B				
	UK			Buccaneer S Mk1			Victor B(SR) Mk2	
	France						Etendard IV-P* Mirage III-R*	
1964	USA		F-4G	B-26K Counter Invader[9]			E-2A Hawkeye(AEW)* RA-5C* F-105F (ECM) RF-4C*	
	USSR	Yak-28P Firebar*	MiG-21 Fishbed E*	Yak-28I Brewer C* (Su-7BMK Fitter A)*	Tu-22 Blinder A*	M-4 Bison C.m	Tu-20 Bear C*.m Yak-28R Brewer D*	
	UK	Lightning F Mk3	Sea Vixen Mk3					
	France		Mirage IIIE*		Mirage IVA*			
1965	USA						RF-4B* RF-8G.m* EA-6A (ECM)*	
	USSR					Be-12 Mail*		(I-75F Flipper) (I)
	UK	Lightning F Mk6*		Buccaneer S Mk2*				TSR-2(I+A)
	France					Breguet 1150 Atlantic*		
1966	USA		F-4D*	A-7A Corsair II		P-3B*	SR-71*	F-12A(I)
	USSR	Su-11 Fishpot C*	MiG-21 PFM Fishbed F*			Tu-22 Blinder B*		
1967	USA		F-4J* F-8H.m	A-37A Dragonfly[10] OV-10A Bronco				

				A-4F* A-4H*				
	USSR						(Tu-20 Bear D)*.m	
1968	USA		F-111A* F-4E* F-8J.m* F-8K.m*	A-7B A-37B* F-105G.m*			RF-5A	F-111B(FB)
	USSR						Tu-22 Blinder C*	
	UK	Lightning F Mk53[2]		BAC 167 Strikema- ster[2]				
	France			Mirage 5*[2]				
1969	USA		F-104S[2] F-4K[2] F-4M[2]	A-7D* A-7E* A-4L*		P-3C*	EA-6B(ECM)*	
	USSR	Su-15 Flagon A*						Faithless (STOL FB)
	UK			Harrier GR Mk1*		Nimrod Mk1*		
1970	USA		F-111E	A-4M Skyhawk II	FB-111A		(E-2B).m	
	USSR		MiG-21PFMA Fishbed J		(Tu-16 Badger B.m)[6]	Il-38 May	MiG-21R Fishbed H Moss (AWACS)	
	UK			Buccaneer S Mk2B				
	France			Mirage V-BA				
1971	USA		F-111F					
	USSR	MiG-25 Foxbat A	MiG-23B Flogger B				MiG-25 Foxbat B (An-12 Cub C) (ECM).m	
	UK			Harrier Mk50[2]				
1972	USA			A-6E A-4N[2]				
	USSR	Su-15 Flagon D		Su-17 Fitter C				
1973	USA		F-5E Tiger II[2] F-4N.m				E-2C	
	USSR		MiG-21 SMT Fishbed K			Tu-20 Bear F.m	(Yak-28 Brewer E) (ECM)	

Year/country		Interceptor	Fighter/ fighter-bomber	Attack/strike	Bomber	Maritime patrol/ antisubmarine	Reconnaissance[7]	Cancelled prior to operational deployment
	France	Mirage FIC		Jaguar A[3]				
1974	USA		F-14A Tomcat F-4F[2]			S-3A Viking		
	USSR	Tu-22 Blinder Su-15 Flagon E	(MiG-21 Fishbed L)	Su-19 Fencer A	(Tu-26) Backfire B			
	UK			Jaguar GR Mk1[3]				
1975	USA		F-15 Eagle	A-7H[2]				
	USSR		(Yak-36 Freehand)					
	France		Mirage FIA					

[1] Initially operational during World War II but post-war production substantial and remained in operational service in the originating country until the 1950s.
[2] Developed primarily or exclusively for export and/or licensed production abroad.
[3] Developed jointly by the UK and France.
[4] For weather reconnaissance under operational conditions.
[5] Classified as an observation aircraft but carries a wide range of sophisticated equipment and essentially performs a reconnaissance role. There are in addition OV-IB and OV-IC production versions plus versions resulting from a modification to the electronic reconnaissance role.
[6] Prior to this, three other versions of the Badger appeared, designated Badger D, E and F. The primary role of these versions is maritime reconnaissance and electronic intelligence.
[7] Including airborne early warning (AEW) and electronic countermeasure (ECM) aircraft.
[8] A jet-powered bomber flying boat.
[9] A substantially re-designed and re-manufactured counterinsurgency version of the World War II B-26 Invader tactical bomber.
[10] A substantial re-design of the earlier T-37 jet trainer.
[11] "Bis" is a Latin word for "twice" or "repeat", and can be regarded as roughly equivalent to Mk 2.

Part II. Missiles

Year/ country	Strategic	Surface-to-surface	Surface-to-air	Air-to-surface	Air-to-air	Anti-tank	Ship-to-ship/ antisubmarine	Cancelled prior to operational deployment
1953[1] USA		MGR-1A Honest John (N)[9]	MIM-3 Nike Ajax					Rigel (SSM)[15] Oriole (AAM)[15]
1954 USA	RGM-6A Regulus I (SLCM)[15]	MGM-5A Corporal I (N) MGM-1A Matador (N)[15]						Hermes (SSM) Meteor (SAM/AAM)[15]
USSR			SA-1 Guild					
1955 USA					AIM-7A Sparrow I			[Gorgon 5 (ASM)]
1956 USA		MGM-5B (N)	RIM-2A Terrier		AIM-4 Falcon AIM-9A Sidewinder I AIM-4A* AIM-4C*			Dove (ASM)
USSR			AS-1 Kennel[15]		(Alkali)			
UK					Fireflash			Red Dean (AAM)
France		SE 4200 Caisseur[15]				SS-10		
1957 USA		(MGM-1C) (N)			AIR-2A Genie (N)*			Sparrow II (AAM) Navaho (LRCM)[15] Petrel (A/SM)[15] Triton (LRCM)[15] SM-70 (SAM)
USSR	SS-3 Shyster (MRBM)	SS-1B Scud A (N)						

Year/ country	Strategic	Surface-to-surface	Surface-to-air	Air-to-surface	Air-to-air	Anti-tank	Ship-to-ship/ antisubmarine	Cancelled prior to operational deployment
		Frog-1 (N)[10] Frog-2 (N)						
France					R.510	Entac		
1958 USA	SM-62 Snark (LRCM)[15]	PGM-11A Redstone (N)	MIM-14A Nike Hercules (RIM-2B)		AIM-7C Sparrow III AIM-4E*			Dart (ATM) Crossbow (AWM) Regulus II (SLCM) Rascal (ASM) Goose (ALCM) Plato (ABM)
USSR	SSN-4 Sark (SLBM)*		SA-2 Guideline				SSN-1 Scrubber	
UK			Bloodhound 1[15]		Firestreak			
France					AA.20	(SS-11)		
1959 USA	PGM-17A Thor (IRBM) CGM-16D Atlas (ICBM)	MGM-18A Lacrosse (N) MGM-13A Mace (N)[14 15]	RIM-8A Talos[2 15] MIM-23A Hawk*	AGM-12 Bullpup	AIM-4F* AIM-4G*			
USSR	SS-4 Sandal (MRBM)* (SS-6 Sapwood) (ICBM)[11]						SSN-2 Styx	
France			Parca	AS.20	R.511			
1960 USA	SM-78 Jupiter (IRBM) UGM-27A Polaris A1 (SLBM) AGM-28A Hound Dog (ALCM)*	MGR-1B (N)*[9]	CIM-10A Bomarc (N)[15] (RIM-2C) (RIM-8B)	AGM-12B*	AIM-26A Falcon (N)* AIM-7D		RUR-5A Asroc* (AS)	Corvus (ASM) Wag Tail (ASM)
USSR		Frog-3 (N)		AS-2 Kipper*[15]	(Atoll)	(AT-1 Snapper)		
France		SE 4280	R-422 B3		AA.25			
UK			Thunderbird 1					Blue Streak (IRBM)

1961	USA	ADM-20C Quail (ALCM)*[15] CGM-16E	MGR-3A Little John (N)[9]	RIM-24A Tartar CIM-10B (N) RIM-2D (N)*					Eagle (AAM)
	USSR	SS-7 Saddler Mod. 1 (ICBM)* AS-3 Kangaroo (ALCM)[15] SS-5 Skean (IRBM)*		SA-3 Goa* SAN-1 "Goa"*			(AT-2 Swatter)		
	UK								[Blue Water (SSM)]
	France				AS.30*				[Masalca (SAM)]
1962	USA	HGM-25 Titan 1 (ICBM) UGM-27B* Polaris A2 HGM-16F	MGM-31A Pershing 1 (N)* MGM-29A Sergeant (N)* M-388 Davy Crockett (N)	RIM-2E (RIM-8C)		AIM-9B			Skybolt (ALBM) Mobile Minuteman (ICBM)
	USSR			SA-2 (Improved)*		(Ash)		SSN-3 Shaddock*[15,25]	
	UK	Blue Steel (ASM)		Seacat* Sea Slug 1					
	France						SS-12* (SS-11 B1)*	Malafon 1 (AS)	Malaface (ShShM)
1963	USA	LGM-30A Minuteman 1 (ICBM) LGM-25 Titan II* AGM-28B*	CGM-13B (N)	RIM-24B* RIM-2F* (RIM-8D)		AIM-26B* AIM-7E*			[Nike Zeus (ABM)]
	USSR	SSN-5 Serb (SLBM)* SS-8 Sasin (ICBM)* SS-7 Mod. 3	Frog-4 (N) SS-1C Scud B (N)*					(SSN-3D*	
	UK					Red Top*			
	France					R.530*			
1964	USA	UGM-27C Polaris A3 (MRV)*		FIM-43A Redeye*[4] (RIM-8E)	AGM-45A Shrike*[6] AGM-12C*	AIM-7E-2*			Typhon (SAM/SSM)[15] MMRBM (IRBM)[12]

Year/ country		Strategic	Surface-to-surface	Surface-to-air	Air-to-surface	Air-to-air	Anti-tank	Ship-to-ship/ antisubmarine	Cancelled prior to operational deployment
				MIM-14B[5]	AGM-12D (N)*				
	USSR	"Galosh" (ABM)*	(SSC-1A "Shaddock") Frog-5 (N)	SA-4 Ganef*[15]		(Anab)*			
	UK			Bloodhound 2*					
	France						Harpon*		
1965	USA					AIM-9C Side-winder 1C* AIM-9D*		UUM-44A Subroc* (SuSu)	Mauler (SAM)
	USSR	AS-4 Kitchen (ASM)* SS-9 Scarp (ICBM)*	Frog 7 (N)				AT-3 Sagger*		
	France				AS.30 L*			Malafon 2* (AS)	
1966	USA	LGM-30F Minuteman II*				AIM-4D*			
	USSR	SS-11 Sego Mod. 1 (ICBM)*		SA-7 Grail*					
	UK			Sea Slug II* Thunderbird 2*					[ET.316] SAM
1967	USA			MIM-72A Chaparral*	AGM-62A Walleye 1*	AIM-9E*.m	Mgm-51A Shillelagh*[7]		
	USSR	(SS-14 Scapegoat) (IRBM)*[16]		SA-5 Gammon*					
1968	USA			(RIM-8F)*	AGM-78B Stand-ard ARM*	AIM-47A (N)			
	USSR	SSN-6 Sawfly Mod. 1 (SLBM)* SS-13 Savage (ICBM)*		SAN-3 Goblet*	AS-5 Kelt*	(Awl)*		SSN-10* SSN-11* SSN-11* "Asroc"* (AS)[21]	

	France			Masurca II					
1969	USA			RIM-66A Stand- ard (MR)* RIM-67A (ER)* (RIM-8G)* MIM-72C		(AIM-9G)*			
	USSR		SS-12 Scale- board* (N)			(Advanced Anab)*		SSN-9* SSN-7*[22]	
	UK				AS.37/AJ.168 Martel*		Swingfire*		
	France				AS.37/AJ.168 Martel*				
1970	USA	LGM-30G Minute- man III (MIRV)		(RIM-24C) (RIM-8H)	AGM-78C AGM-12E		BGM-71A TOW MGM-51C		
	USSR	(SS-XZ Scrooge) IRBM[17]		SA-6 Gainful[15]	AS-5 Kelt				
	UK			Tigercat					
1971	USA	UGM-73 Poseidon (SLBM) (MIRV)		(RIM-66B) (RIM-67B)[8] (RIM-8J)					
	USSR			SAN-4	AS-6[15, 26]	(Advanced Atoll)			
	UK			Rapier					
	France	S-2 (IRBM) M-1 (SLBM)		Crotale					
1972	USA	AGM-69A SRAM (ASM)	MGM-52A Lance (N)		AGM-62B Walleye II (AGM-78D)*				
	USSR	SSN-8 (SLBM)							
1973	USA			RIM-7H Sea Sparrow MIM-23B	AGM-65A Maverick (AGM-78D-2)	(AIM-9).m		RGM-66D Standard-ARM	SCAD (ALCM)
	USSR	SS-11 Mod. 3 (MRV)				(AAM)[27]			

Year/ country	Strategic	Surface- to-surface	Surface-to-air	Air-to-surface	Air-to-air	Anti-tank	Ship-to-ship/ antisubmarine	Cancelled prior to operational deployment
UK			Sea Dart					
France						Milan[23]	MM-38 Exocet	
1974 USA					AIM-54A Phoenix	FGM-77A Dragon	(RGM-66E)	Agile (AAM) CLAW (AAM)
USSR	(SS-18) (ICBM)[13] SSN-6 Mod. 2 SSN-6 Mod. 3 (MRV)		SA-9[18]					
UK			Blowpipe					
France		Pluton (N)						
1975 USA	LIM-49A Spartan (ABM)[19] Sprint (ABM)[20]				(AIM-7F)			RGM-66 Standard Active(ShShM)
USSR	(SS-19) (MIRV) (ICBM) (SS-17) (MIRV) (ICBM) (SS-16) (ICBM)[24] AS-X (ALCM)[26]							
France					(R.550 Magic)			

[1] The missile chronology begins in 1953 with the initial deployment of the first fully operational missile system in the USA, the Nike Ajax. At least two US missile systems came close to reaching operational status prior to 1953. One was the Lark surface-to-air missile, several hundred of which were procured after 1952 for training purposes. The other was an air-to-air missile known as the Firebird. Regarding cancelled programmes in this early period, the Meteor surface-to-air missile was cancelled (probably in 1951) and the programme re-directed towards an air-to-air missile; this programme was also dropped in 1954, as indicated in the chronology.

The first entry for the Soviet Union does not occur until 1956 but there is some evidence that operational systems were available earlier. For example, some sources claim that improved versions of the German World War II V2 surface-to-surface missile were being mass-produced in 1950–51. This type of missile, apparently known in the Soviet Union as the Pobeda (Victory) class, was progressively refined and culminated in two IRBMs known in the West as the SS-3 *Shyster* (1957) and the SS-4 *Sandal* (1959). The US-NATO designation system includes two other members of the Pobeda family: the SS-2 *Scunnar* (range 800 km) and the (SS-2A) *Sibling* (range 1 000 km). If these two missiles were operationally deployed it would presumably have been during 1952–56. It is also possible that a surface-to-air missile system was deployed prior to the SA-1 *Guild*, entered in 1956. A number of sources claim that such a missile became operational in 1953–54 and was probably a development of the German World War II *Wasserfall* missile. This may be the missile referred to as the T-6 under the old US designation system. A 1957 source claimed that the T-6 had been operational for "several years", putting its initial deployment in the 1953–54 period. Another source claims that the T-6 and the *Guild* are the same missile. It should be remembered, however, that the Soviet Union tends to "deploy" new weapons at a fairly early stage of development and uses the experience gained to bring the weapons up to operational standards. This, together with the fact that information on Soviet armaments in the 1950s was extremely scarce, suggests that many of the weapons reported to have been in existence were probably only prototypes.

[2] At least one version has an optional nuclear warhead.

[3] There is also a 2B version.

[4] There are also 43B and 43C versions.

[5] There is also a 14C version.

[6] The Shrike is an anti-radiation missile. The frequency coverage of the seeker has been continuously refined, resulting in twelve distinct models of the missile: AGM-45, 1A, 2, 3, 3A, 3B, 4, 6, 7, 7A, 9, and 10. Agm-45-9 went into production in 1974 and AGM-45-10 is scheduled to go into production in 1976.

[7] There is also a 51B version.

[8] Improved Standard with additional horizon-limited surface-to-surface capability.

[9] Not a true missile since it is unguided.

[10] Frog (free rocket over ground) 1–7 are unguided rockets.

[11] There is reason to doubt whether this ICBM was ever operationally deployed. If it was, it was presumably in very small numbers and its operational life was relatively short. By 1963–64 when details of the present US-NATO designation system began to become available this missile was not listed as a component of the Soviet arsenal in any missile surveys.

[12] MMRBM=mobile mid-range ballistic missile.

[13] The fact that this new ICBM had been deployed was announced by former US Secretary of Defense Schlesinger early in January 1975, so the event presumably took place late in 1974.

[14] Although classified as a tactical missile, the MACE had a range equivalent to an MRBM. The range of MACE-A was over 1 050 km; that of MACE-B (1963), over 1 930 km.

[15] A missile which employs an air-breathing main propulsion unit (jet or ramjet) rather than rocket propulsion. An air-breathing propulsion unit is the primary criterion for classification as a cruise missile.

[16] This is a mobile ballistic missile system. The missile itself carries the code-name "Scapegoat" and the entire system is referred to as "Scamp".

[17] This is a mobile ballistic missile system that may have the alpha-numerical designation SS-15. Estimates of the range of the missile go as high as 6 400 km, putting it in the ICBM class.

[18] Believed to be an improved version of the SA-7 Grail.

[19] Long-range intercept missile.

[20] Short-range intercept missile.

[21] A weapon system comparable to the US *Asroc* antisubmarine missile was first seen on the Soviet antisubmarine cruisers Moskva and Leningrad.

[22] An anti-ship cruise missile capable of being launched from a submerged submarine.

[23] Developed in collaboration with FR Germany.

[24] Being deployed in silos but thought to be readily adaptable to a mobile system.

[25] This missile is primarily deployed on submarines and almost certainly has optional nuclear/conventional warheads. Published estimates of its range extend from 275 km to 1 000 km for the latest versions. Thus, although listed as an anti-ship missile it could also be used to attack coastal cities and other targets from international waters.

[26] At the present time (January 1976) there is considerable confusion regarding current Soviet air-to-surface missile developments. It would seem that there are at least two and perhaps three new Soviet ASMs: (*a*) one deployed on modified Tu-16 medium bombers, presumably intended primarily for the anti-shipping role; (*b*) one deployed on the new "Backfire" bomber; and (*c*) a third deployed on Su-7 Fitter A and Su-17 Fitter C fighter-bombers.

The latest volumes of *Jane's* illustrate the prevailing confusion over these missiles. In the foreword to *Jane's Weapon Systems*, mention is made of the AS-6 Kerry and another missile of the same type but of greater capability presumably referring to missiles (*a*) and (*b*), respectively. In *Jane's Aircraft*, however, (*c*) is identified as the AS-7 Kerry and (*b*) only as the AS-6. No mention is made of (*a*).

For the purposes of this chronology, we have assumed that there are in fact three missiles: the AS-6 (1971) corresponding to (*a*) above with an estimated range of 550 km; the AS-X (1975) corresponding to (*b*) above with an estimated range of 800 km; and the AS-7 Kerry (1975) corresponding to (*c*) above which one source describes as roughly equivalent to the US AGM-12 Bullpup which has a range of 11–17 km depending on the version

[27] A new air-to-air missile has recently been observed on the MiG-25.

Part III. Warships[1,11]

Year/ country	Ballistic missile submarine[2]	Patrol submarines: Nuclear	Patrol submarines: Conventional	Aircraft carriers	Amphibious assult	Surface ships: Over 10 000 tons	Surface ships: 5 000–9 900 tons	Surface ships: 2 500–4 990 tons	Surface ships: 1 000–2 490 tons	Missile-armed patrol boats
1950 USA										
USSR								Skory	Kola	
1951 USA			Tang							
1952 USSR			Zulu Whisky			Sverdlov			Riga	
UK				Eagle[9]				Daring		
1953 USA								Mitscher		
1954 USA									Dealey	
1955 USA				Forrestal				Forrest Sherman		
USSR	Zulu V[3,10]		Quebec					Kotlin		
1956 USA			Sailfish							
UK								Whitby	Blackwood	
France						De Grasse[9]		Surcouf	Le Normand	
1957 USA		Skate								
USSR								Kindin, ShSh		
UK								Leopard	Salisbury	
France			Narval							
1958 USA						Cleveland, SA, con.				
USSR	Hotel Golf[10]	November	Foxtrot Romeo							
France			Arethuse							

1959	USA	G. Washington	Skipjack	Barbel						Claud Jones	
	USSR			Whisky, SuSh, con.[4]					Krupny, ShSh		
	UK			Porpoise	Hermes[9]		Tiger				
	France						Colbert[9]				
1960	USA							Coontz, SA, A/S	CF Adam, SA, A/S		
	USSR		Echo I, SuSh								OSA, ShSh
	UK					Bulwark, con.[8]			Rothesay		
1961	USA	Ethan Allen			Kitty Hawk Enterprise[9]	Iwo Jima	Long Beach, SA, A/S[9]				
	USSR			Whisky, SuSh, con.[5]						Petya	Komar, ShSh
	UK			Oberon					Tribal		
	France				Clemenceau						
1962	USA		Permit			Raleigh	Albany, SA, A/S, con.	Leahy, SA, A/S Bainbridge, SA, A/S[9]			
	USSR		Victor	Juliet, SuSh				Kynda, ShSh, SA Kashin, SA			
	UK							Country, SA			
	France									Commandant	
1963	USA	Lafayette							Bronstein, A/S		
	USSR		Echo II, SuSh								
	UK								Leander		
1964	USA							Belknap, SA, A/S	Garcia, A/S		
	USSR									Mirka	
	France			Daphne		Jeanne d'Arc[9]					
1965	USA					Austin					
	UK								Leander, SA, con.		

Year/ country	Ballistic missile submarine[2]	Patrol submarines		Aircraft carriers	Amphibious assult	Surface ships				Missile-armed patrol boats
		Nuclear	Conventional			Over 10000 tons	5000–9900 tons	2500–4990 tons	1000–2490 tons	
France					Ouragan			Rothesay, SA, con. Surcouf, SA, con. Surcouf, A/S, con.		
1966 USA								Brooke, SA, A/S		
USSR					Alligator			Kotlin, SA, con.		
UK		Valiant			Fearless					
1967 USA		Sturgeon, SuSu					Truxton, SA, A/S[9]	Forest Sherman, SA, A/S, con.		
USSR							Kresta I, ShSh, SA			
UK	Resolution									
France							Suffren, SA, A/S			
1968 USA								Mitscher, SA, A/S, con.		
USSR	Yankee	Charlie, SuSh	Bravo	Moskva, SA, A/S				Kanin, SA, con.		Osa II, ShSh
1969 USA					Anchorage Newport			Knox, SA, A/S		
USSR							Kresta II, ShSh, SA			
1970 USSR							Krivak, ShSh, SA		Grisha, SA[6]	

										Nanuchka, ShSh, SA[7]
	UK		Churchill							
1971	France	Redoubtable								
1972	USSR	Delta I					Kara, ShSh, SA			
1973	USSR		Papa, SuSh	Tango						
	UK		Swiftsure					Bristol, SA, A/S[9]		
	France						Colbert, ShSh, con.			
1974	USA		LosAngeles, SuSu				California, SA, A/S			
	USSR	Delta II								
	UK								Amazon, SA	
	France							Tourville, ShSh, A/S		
1975	USA				Nimitz, SA	Tarawa		Spruance, SA, A/S		
	USSR		Uniform		Kuril, SA, A/S			Kashin, ShSh, con.		
	UK							County, ShSh, SA, con.	Sheffield, SA Leander, ShSh, con.	
	France			Agosta						A69, ShSh

[1] Classes of vessels are included only if construction commenced after World War II. Modernization of ships has not been recorded unless this involved conversion to missile armament.
[2] Nuclear-powered unless otherwise indicated.
[3] Initially deployed only with prototype missiles. The SSN-4, considered to be the first operational Soviet submarine-launched ballistic missile, did not enter service until about 1958.
[4] These boats are usually referred to as the "Whisky Twin-Cylinder" type (two launchers for cruise missile).
[5] These boats are usually referred to as the "Whisky Long Bin" type (four launchers for cruise missile).
[6] Full load displacement of 750 tons.
[7] Full load displacement of about 800 tons.
[8] "Bulwark" and her sister ship "Albion" were converted from aircraft carriers (Hermes class) to commando carriers. A third vessel, "Hermes", was similarly converted in 1971–73.
[9] Class consists of only one vessel. It is included here because it is judged to be of significant importance to the navy concerned.
[10] Diesel-powered.
[11] To save space, missile abbreviations have been shortened thus: ShSh=ShShM= ship-to-ship missile. Similarly, SA=SAM. A/S=A/SM and so on (see page 145).

Appendix 6E

Registers of indigenous and licensed production of major weapons in third world countries, 1975

I. Register of indigenously designed major weapons in development or production in third world countries, 1975

For sources and methods, see chapter 7. For conventions, see page 145.

Country	Designation, description	Power plant	Armament	Date design begun	Date in production	Production rate	Status of programme; other information	No. planned/ produced	Unit price, $*mn*
Argentina	*IA-50 Gurani II* light transp	T (Fr.)	–	1960	1966–75	. .	Req: 24 for AF; E: UK	41	. .
	IA-58 Pucará COIN combat	T (Fr.)	MG (USA); cannon (Switz.)	1966	1972	1/month	Req: 70 for AF; interest shown by AF in Bolivia, Libya, Peru; production severely delayed	~5/100	. .
	Pucará jet vers	J (Fr.)	. .	. .	. .	. .	Developing	. .	. .
	Pucará 8-seat high-speed vers	. .	. .	. .	. .	. .	Developing; speed Mk 0.66	. .	. .
	Cicaré CH-111 Colibrí hel	P (USA)	–	1973	–	–	For AF training; first flight early 1976	. .	. .
	Survey ship, "*Commadore Rivadavia*"	D (FRG)	–	. .	1971	–	Displ: 665 t; commissioned late 1974	1/1	. .
	Survey ship	. .	. .	. .	1974	. .	Displ: 1 960 t	1/1	. .
Brazil	*Aerotec T-23 Uirapuru* primary trainer	P (USA)	–	1965	1968	4/month	For export to Paraguay: 8; Bolivia: 18; Guatemala negotiating for 10	100+/118	0.02
	Aerotec A-144 Uirapuru 4-seat tourer vers	P (USA)	–	Design completed 1974	–	–	Prototype trial mid-1975	–	–

EMB-110C Bandeirante light transp	P (Can.)	–	1965	1973	4/month	By Jan 1975, 41 out of 110 delivered; 5 sold to Uruguay AF 1975; E: UK, Fr.	115/100	0.7
EMB-110A navaid checking and calibration vers	P (Can.)	–	. .	. .	. .	2 to be ordered by AF; E: UK, Fr.	. .	. .
EMB-110B aerial photographic vers	P (Can.)	–	. .	. .	. .	6 to be ordered by AF; E: UK, Fr.	. .	. .
EMB-110E executive transp	P (Can.)	–	. .	. .	. .	1 delivered 1974, 15 during 1975; E: UK, Fr.	16	. .
EMB-120 Bandeirante 11-seat pressurized vers	P (Can.)	–	1972	. .	. .	Development in abeyance in 1975	–	. .
EMB-121 7-seat executive transp	P (Can.)	–	1975	. .	–	Instead of EMB-120; prototype under construction; first flight scheduled Jan 1976	–	. .
EMB-111 maritime surveillance	T (USA)	–	1973	(1974)	–	Proposed to AF	–	. .
EMB-CX twin-engine medium transp	T (USA)	–	1974	. .	–	Construction of prototype planned 1976; this design replaced original EMB-500 Amazonas project	–	. .
EMB Maraba medium transp	. .	–	1974	–	–	Maraba project of 1969 revived in late 1974 to meet Army req	–	. .
Neiva T-25 Universal basic trainer	P (USA)	MG, bombs, rockets	1963	1971–75	8–10/year	Export to Chile: 10	160/~160	. .
Neiva N-621A Universal II T-25 trainer vers	P (USA)	Light bombs, rockets	1972	(1975)	–	Successor to T-25; prototype construction ordered 1974	–	–
Neiva N-721 Carajá T-25 turboprop vers	T (USA)	2 fixed 7.62-mm MG	1973	–	–	Designing; proposed to AF	–	–
Neiva Ventura Bi-Universal	P (USA)	. .	(1974)	–	–	Developing: first flight expected during 1975	–	–
Avibras MAS-1 ASM	. .	Warhead: HE	. .	1973	. .	Developing	. .	. .
CCM wire-guided ATM	. .	Warhead: HE	. .	. .	. .	Developing; range: 3 km	. .	. .
Type X-40 miss	. .	. .	. .	(1975)	. .	Seen during military parade; range: 60 km	. .	. .

Country	Designation, description	Power plant	Arma-ment	Date design begun	Date in pro-duction	Produc-tion rate	Status of programme; other information	No. planned/ produced	Unit price, $*mn*
	EE-9 Cascavel COIN APC/armed recce	FRG	MG/90-mm cannon	1970	1975	. .	10.75 t; now ready for series production; similar to French AML90	. .	. .
	CTRA EE-11 Urutu AC	–	. .	1970	. .	. .	No further information	. .	. .
	Submarine	. .	. .	(1977)	. .	. .	Planning	. .	. .
	Computers	–	–	1974	(1976)	. .	Initial assembly of UK industrial computers	. .	. .
	Electronics	–	–	. .	(1970)	. .	. .	. .	. .
	Turbojet engines	J	–	1970	. .	. .	Developing	. .	. .
	Small arms	–	–	1974	(1976)	. .	Planning to produce standardized small arms for all military services	. .	. .
Egypt	Defence industry	. .	. .	. .	. .	. .	Four-country agreement signed on joint Arab arms industry 29 Apr 1975; initial funds: $1 bn	. .	. .
India	*HAL HJT-16 MkI Kiran* jet trainer	J (I: UK)	7.62-mm MG rockets	1961	1968	25/year	Total AF/Navy req: 180	180/~100	Export 1972: 0.4
	HAL HJT-16 MkII Kiran COIN/ground attack vers	J (L: UK)	. .	1974	. .	–	Under development	. .	. .
	HAL HF-24 Marut MkI light fighter-bomber	J (L:UK)	Aden guns (UK); rockets; bombs	1956	1963	. .	Doubtful whether more than 125 single seaters will be produced	214/~125	Export 1973: 1.04
	HAL HF-24 Marut MkI T tandem trainer vers	J (L:UK)	Aden guns (UK); rockets; bombs	1967	1974	. .	AF req: 10; production will close by end-1976 with delivery of last MkI T trainer	10/~8	. .

	(*HAL HF-24 Marut* Mk2	J (UK or Fr.)	. .	1969	Test flight 1972	–	4 pre-production planes ordered; AF prefers HF-73 Marut Mk3 and HF-24 Mk2 probably cancelled	4/. .	–)
	HAL HF-73 deep-penetration strike fighter (HAL-24 Mk3 derivative)	J (UK)	. .	1969	Prototype flight 1980	–	Design studies completed; progress slow, further development not yet financed	–	–
	HAL HAC-33 light STOL transp	T (UK)	. .	Design completed 1974	–	–	AF and Navy req: "large number"	–	Est. cost 0.3
	HAL HPT-32 basic trainer	P (USA)	–	Design completed 1974	–	–	Scheduled to replace AF HT-2 from 1981–82	–	Est. cost 0.08 on production run of 50
	Ship-to-ship missile	. .	. .	. .	. .	. .	Test completed Dec 1975; no further details available	. .	. .
	Main battle tank	–	–	(1970)	1980	. .	Design: Avadi R&D Dept	–	–
	APC	–	–	Prototype trials 1973	. .	. .	Large-scale production shortly	–	. .
	Corvette-type patrol boat	. .	. .	1974	. .	. .	Planning	. .	. .
	Nuclear-powered submarine	N	. .	1974	Design to be completed 1980	. .	Planning; no details released	. .	. .
	Aeroengines	. .	. .	1965	. .	. .	HAL, Bangalore, R&D	. .	. .
	Electronics	. .	. .	1956	. .	. .	Bharat Electronics; HAL Lucknow: avionics	. .	. .
	Small arms	. .	. .	1962	. .	. .	India nearly self-sufficient in small arms	. .	. .
	Target drones	. .	. .	(1970)	. .	. .	Testing: July 1974; speed: Mk 1.4	. .	. .
	Unguided rockets	. .	. .	. .	. .	. .	. .	. .	. .
Indonesia	*Lipnur LT-200* 2-seat light trainer (Pazmany PL-2 derivative)	T (USA)	–	. .	First 2 prototypes Sep 1973	–	Initial order of 30 expected of AF; in early 1975 Lipnur setting up necessary facilities for certification and production	–	–

Country	Designation, description	Power plant	Arma-ment	Date design begun	Date in pro-duction	Produc-tion rate	Status of programme; other information	No. planned/ produced	Unit price, $*mn*
	"*Mawar*"-class large patrol craft	D	A/A guns	. .	(1970)	. .	Displ: 147 t; 21 knots; more to be built	5/3	. .
	Small arms	–	–	1965	. .	. .	. .	. .	. .
Israel	*IAI-201 Arava* STOL military transp	T (Can.)	MG	1966	1972	4/month	Export to Latin America: 50; E: USA	100+	0.7
	IAI "*Kfir*" combat aircr Mk 2.2 (Mirage III/5 development)	J (USA)	DEFA cannon Rafael Shafrir AAM	1968	Early 1974	3–4/month	AF req: 200; Peru and Venezuela show great interest in assembly by local industries; offer to S. Africa for licence production	~100 in service	4.0
	IAI Air Superiority fighter	. .	. .	Design finalized 1975	. .	. .	. .	. .	. .
	IAI-1123 Westwind light transp	J (USA)	–	. .	1971	2/month	E: USA	36/~30	1.1
	IAI-1124 Westwind executive jet	J (USA)	–	. .	Test flight 1975	. .	Expected to be certified Feb 1976	12/. .	1.6
	Jericho fixed-to-fixed miss	S	Warhead HE/N	1966	No	–	Design range previously 500 km; now 1 000 km	–	–
	Rafael Shafrir air-to-air miss, IR-homing	S	11 kg	1965	1969	. .	Range 5 km; sales made to several oversea customers incl Taiwan	(200+)	0.02
	Gabriel ship-to-ship miss, vers I and II	S	180 kg	1966	I: 1970 II: 1974	. .	Range 41 km; exports: Argentina, Singapore, S. Africa	I: L/200 II: 400/. .	1971: 0.09 missile; 2.5 on board system of 6 launchers
	Ship-to-ship miss	. .	. .	(1975)	. .	. .	At present producing engine for new model of SSM with almost double range of Gabriel	. .	. .

	Luz air-to-surface miss	. .	. .	(1970)	. .	. .	Developing; TV-guided	. .	. .
	"*Katyusha*" artillery rocket	. .	. .	Copy	1971	. .	Israeli version of captured Soviet rocket	. .	. .
	Ze'ev short-range unguided artillery rocket, 2 vers	. .	170 kg/ 70 kg	. .	(1973)	. .	Range ~1 km; 4.5 km; used in Oct 1973 War	. .	. .
	RBY-MkI armoured recce/COIN "*Rabix*" AC vehicle	G (USA)	Light MG	. .	. .	. .	3.6 t; first displayed in 1975	–	. .
	Sabra medium tank	D (USA)	Gun (UK)	(1969)	1971	. .	40 t; entered service in 1972	. .	. .
	Main battle tank	. .	. .	1975	. .	. .	. .	. .	. .
	SAAR IV fast miss boat	D (FRG)	7 Gabriel SSM; 2 76-mm guns (It.); cannon	First launched 1973	First completed 1973	2/year	Displ: 415 t; 32 knots; extremely long cruising speed; expansion of Haifa dockyard allows more rapid construction of next 6, ordered Jan 1975	12/6	Without arms 8.9
	Dabur coastal patrol boat	D	MG; 2 22-mm cannons	. .	. .	. .	Displ: 35 t; 22 knots; built to general design of US "Swift"-class but bigger; good rough-weather performance	10+	. .
	Soltam L-33 155-mm self-prop gun	. .	7.62-mm A/A gun	. .	1973	. .	41 t; mounted on Sherman chassis; first heavy artillery produced in Israel	. .	. .
	Avionics and electronics	–	–	. .	1960	. .	Tadiran largest electronics producer; export: $70 mn/year	. .	. .
	Engines	–	–	. .	1969	. .	Bet Shemesh plant; IAI Bedek Aviation	. .	. .
	Napalm	–	–	. .	(1951)	. .	First used in 1956 war with Egypt	. .	. .
	Small arms	–	–	. .	1951	. .	Soltam, founded by the Koor Company and Scandinavian investors	. .	. .
Nepal	Munitions	–	–	. .	Factory 1975	–	. .	. .	. .

Country	Designation, description	Power plant	Arma-ment	Date design begun	Date in pro-duction	Produc-tion rate	Status of programme; other information	No. planned/ produced	Unit price, $*mn*
Korea, South	Defence industry; ground, sea and aviation equipment	–	–	1975	Self-sufficiency by 1981	. .	No details on indigenous design plans	. .	. .
Kuwait	Rockets	–	–	1975	Tested 1974	. .	With guiding device	. .	. .
Malaysia	Munitions, small arms	–	–	. .	1972	20-mm rounds of ammunition/ year	Sharikat Explosives, owned by M. government, Oerlikon of Switz., Dynamit Noblag of FRG, and 3 M. companies	. .	. .
Pakistan	Shipbuilding	. .	. .	(1974)	. .	. .	Karachi shipyard constructing ships for Saudi Arabia and Abu Dhabi	8	. .
	Small arms, ammunition	. .	. .	. .	. .	Ordance factory 1970, Chinese-built	A total of 9 factories are producing small arms and ammunition; self-sufficiency planned by 1975	. .	. .
Peru	Aircraft industry	–	–	1975	. .	. .	No details on indigenous design; may start with licence production	. .	. .
Philippines	Aircraft industry	–	–	1975	. .	. .	See above	. .	. .
	Bong-Bong II unguided artillery rocket	–	–	1972	Test-fired 1975	. .	R&D financing from President Marco's social welfare fund	. .	. .
	Small arms	–	. .	. .	1975	. .	Indig: 75–90%	. .	. .

Saudi Arabia	Small arms	–	–	. .	. .	. .	Self-sufficient in small fire-arms	. .	. .
Singapore	*"Perwira"*-class coastal patrol craft	D	2 20-mm Hispano Suiza; 2 7.62 MG	. .	1974: 2	First launched May 1974	Displ: 30 t; 32 knots; UK-owned subsidiary of Vosper Thornycroft	3/3	Total 5
	Electronics	–	–	1974	. .	. .	Singapore Electronics and Eng. Pte. Ltd: precision equipment for military aircraft	. .	. .
South Africa	Mine-clearing vehicle	–	–	. .	1973	. .	No further information since 1973	. .	. .
	Atlas air-to-air IR homing missile "Whiplash"	S	Warhead: HE	1966	1972	. .	Range: 550 km	. .	. .
	Electronics	–	–	. .	. .	. .	. .	. .	. .
	Engines	. .	. .	(1968)	. .	. .	Local engine on Eland II AC	. .	. .
	Napalm	–	–	. .	1968	. .	Manufactured entirely of local materials	. .	. .
	Small arms, ammunition	–	–	1960	. .	. .	Near total	. .	. .
	Chemical weapons: nerve gas, tear gas	–	–	1960	. .	. .	Self-sufficiency achieved since large investments in arms industries	. .	. .
Taiwan	*XT-CH-IB Chunghsing* medium trainer	T (USA)	. .	1970	First flight 1974	. .	E: USA; modified version of XT-CH-IA	. .	. .
	Medium-range surface-to-surface missile	. .	Warhead: HE	(1973)	. .	. .	Range: 960 km; developing	. .	. .
	Electronics	–	–	. .	1960	. .	R&D at four major institutes	. .	. .

Country	Designation, description	Power-plant	Arma-ment	Date design begun	Date in pro-duction	Produc-tion rate	Status of programme; other information	No. planned/ produced	Unit price, $mn
	Small arms	–	–	. .	1972	. .	A series of small arms projects started after Taiwan was ousted from the UN	. .	. .
Thailand	Ammunition, explosives and small arms	–	–	Factory planned 1975	–	–	For production of grenades and AT rockets, due to the reduction of US military aid to Thailand	. .	. .
Venezuela	Aircraft industry	–	–	Planning in 1975	. .	. .	To be established with foreign aid; will probably begin with licence production	. .	. .
	Shipbuilding industry	–	–	Planning in 1975	. .	. .	Three major shipyards to be built	. .	. .
Viet-Nam	Small arms and ammunition	–	–	. .	(1965)	. .	Production in both North and South Viet-Nam for past several years	. .	. .

Note: The following countries have shipbuilding industries, but there is no specific information on current projects: Argentina, Bangladesh, Brazil, Burma, Cameroon, Chile, Colombia, Congo, Cuba, Dominican Republic, Egypt, Gabon, Guyana, Ivory Coast, N. Korea, S. Korea, Mexico, Philippines, Syria, Taiwan, Thailand, N. Viet-Nam and S. Viet-Nam.

II. Register of licensed production of major weapons in third world countries, 1975[a]

For sources and methods, see chapter 7. For conventions, see page 145.

Country	Licenser	Designation, description	Power plant	Arma-ment	Date of licence	Date in pro-duction	Produc-tion rate	Status of programme; other information	No. ordered/ produced	Unit price $mn
Argen-tina	USA	*FMA Cessna 182/ Agwagon* monoplane	P (Imp: USA)	. .	1971	1971	7/month	Primarily civilian; manu-facture from indigenous components; order includes Agwagon agricultural air-craft	. ./(336)	. .
		FMA Cessna 150 trainer	P (Imp: USA)	–	1971	1973	. .	Assembly from imported com-ponents	. ./30	. .
		Chincul Piper Cherokee light plane	P (Imp: USA)	–	1973	1973	. .	5 phases; assembly from knocked-down parts; AF order expected	1 000/50	. .
		Chincul Piper Seneca light plane	P (Imp: USA)	–	1973	1973	. .	5 phases; assembly from knocked-down parts; AF order expected	340/30	. .
		Raca Hughes Model 500C light hel	T (Imp: USA)	–	1973	Apr 1975	15/month	Three-service; indig: 22%; req: 120	120/25	0.07
	(Switzer-land	*Mowag Roland* APC 2 vers	D (Imp: Switz.)	MG on vers I (Imp: Switz.)	1970	1974	. .	No information since 1974	. ./. .	. .)
	FR Ger-many	*Type 148* fast missile boat	D (Imp: FRG)	Triple launcher for Gabriel SSM; Bo-fors and Oto Melara guns	1970	1971	Both de-livered 1975	Displ: 234 t; 30 knots	2/2	. .

Country	Licenser	Designation, description	Power plant	Armament	Date of licence	Date in production	Production rate	Status of programme; other information	No. ordered/ produced	Unit price $*mn*
	UK	*Type 42* guided missile armed destroyer	GT (Imp: UK)	Sea Dart SSM (Imp: UK); 1 hel (Imp: UK); A/A guns (Imp: Switz.)	1970	Launched first: Oct 1972; second: Mar 1974	Commissioned first: mid-1975; second: 1976	Assembly; 1 built in UK; 1 in Argentina; displ: 3 500 t; 30 knots	. ./2	43.8
		Type 21 destroyer	GT (Imp: UK)	Exocet, Early Seawolf SSM (Imp: UK)	1975	–	–	2 to be built in UK; 6 in Argentina; displ: 2 500 t; 34 knots	8/–	. .
Brazil	Italy	*EMB AT 26 Xavante* armed trainer/COIN (MB-326B)	J (Imp: UK)	AS 11/12 ASM (Imp: Fr.); MG (Imp: It; Switz; UK)	1970	Nov 1971	2/month	Brazilian contents of Xavante increasing; only basic elements still from Italy; EMBRAER negotiating extension of licence for 50 more	162/~100	Aug 1972 0.6
		EMB-330 armed trainer	. .	. .	. .	. .	. .	Offered on joint basis by EMBRAER and Aermacchi	. ./. .	. .
		EMB MB.326K light strike/COIN	J (Imp: UK)	. .	(1975)	. .	. .	Eventually to replace Xavante production	–/–	–
		(*Audi SH-4 Silvercraft* utility hel (SIAI Marchetti SH-4)	P (Imp: USA)	–	Sep 1973	–	. .	No further information since 1974	100 planned	. .)
	USA	*Piper-PA31 Navajo* / *Piper-PA34 Seneca* light plane	P (Imp: USA)	–	1974	1975	2 types: 111/year expected	Assembly started mid-1975; E: USA	1 092/142	–
	FR Germany	*MBB Cobra* antitank missile	S	Warhead: HE	1973	1975	. .	. .	. ./. .	. .
	UK	"*Nitheroi*"-class ASW frigate	GT (Imp: UK) D (Imp: FRG)	Ikara ASM (Imp: Austr.); 1 Lynx hel (Imp: UK); Vickers gun	1970	First launched Feb 1974 in UK; first launched	Completion 1976–80	2 being built in Brazil; 4 in UK	6/1	45

				(Imp: UK); Bofors RL/gun (Imp: Swe.); Seacat SAM (Imp: UK)		in Brazil Sep 1974				
Colombia	USA	*Cessna* utility light plane various types	P (Imp: USA)	–	(1971)	1972	200/year planned 1976	Planned to manufacture complete airframe by end-1976; *Cessna* Agwagon agricultural plane indig: 40%; other types: 25%	. ./158	. .
	Italy	*Midget* experimental assault submarine	D	TT	1971	1972	. .	Assembly; displ: 70 t; 14 knots; completed	2/2	. .
Egypt	UK	*Westland-Aérospatiale WG-13 Lynx* hel	T (Imp: UK)	. .	(1975)	–	26 by 1977	Advanced negotiations; financed by Saudi Arabia; req: 250; 20 to be built in UK	. ./. .	1.65
		HS Hawk strike/aircr	T (Imp: UK; Fr.)	. .	(1975)	–	. .	Advanced negotiations; financed by Saudi Arabia; req: 200; assembly	. ./. .	. .
		BAC Golfswing ATM	. .	. .	(Late 1975)	. .	. .	Vehicle-mounted vers of Swingfire; vehicle (landrover) and possibly missile to be licence-produced	. ./. .	. .
India	Czechoslovakia	*OT-62/64(2A)* APC	. .	. .	1970	. .	. .	Czech version of BTR-50	. ./. .	. .
	France	*HAL SA-315 Cheetah* high-altitude hel (Aérospatiale SA-315 Lama)	T (Imp: Fr.)	. .	Sep 1970	1972	. .	Delivery of locally built raw materials aircr start 1976; AF receiving; E: USA	40 of total order of 140	. .
		HAL Alouette III hel	T (Imp: Fr.)	. .	1962	1965	. .	Manufactured from local raw material	~150 of total order of 160	. .
		Bharat SS-11 antitank missile	S	Warhead: HE	1970	1971	. .	Complete production rights handed over 1974	. ./. .	. .

Country	Licenser	Designation, description	Power plant	Arma-ment	Date of licence	Date in pro-duction	Produc-tion rate	Status of programme; other information	No. ordered/ produced	Unit price $mn
		Type A69 Avisos frigate	D (Imp: Fr.)	Exocet SSM (Imp: Fr.); ASW; RL; TT	Feb 1974	First to be laid down mid-1975	. .	Displ: 1 260 t; 25 knots	25–30 planned	. .
	UK	*HAL Ajeet* light-weight fighter (Gnat Mark II)	J (L: UK)	Aden cannon (Imp: UK)	1973	(1976)	. .	Req: at least 100 for AF; initial production planned for 20	First proto-type flight expected 1975	. .
		HAL HS-748 transp	J (L: UK)	–	. .	1959	. .	Production may end with completion of 79th plane mid-1977	69 of order for 79	1.5
		Vijayanta medium battle tank	D (Imp: UK)	105 mm guns	1965	1967	100/year	Indig: 95% by 1977	~800 of total order of 1 000	. .
		"*Leander*"-class ASW frigate	T (Imp: UK)	1 Wasp hel (Imp: UK); 2 Seacat SAM launchers (Imp: UK); ASW	1965	Second commis-sioned 1974	1/year from 1974	First two commissioned 1972 and 1974; indig: 53%; displ: 2 450 t; 30 knots	2 of total order of 6; 2 may be replaced by 2 French A69 Avisos	. .
	USSR	*HAL MiG-21M* fighter Mk 2.0	J (L: USSR)	Atoll AAM (L: USSR)	1970	1973	10/year	Indig: ~90%	36 of total order of 150	. .
		Bharat K-13A Atoll air-to-air missile	S	Warhead: HE	1964	1969	. .	IR missile for HAL MiG-21 fighter	600+	
	Switzer-land	Electronics	. .	. .	1975	. .	. .	Contraves fire-control radar for L-70 AA gun	. .	. .
Indonesia	Spain	*Casa C-212* light STOL transp	. .	. .	. .	. .	. .	Facility established for assembly and later licence production	6 ordered	. .
	FR Ger-many	*MB Bo-105* hel	. .	. .	. .	. .	. .	Selected for licence produc-tion	. ./. .	. .
	Poland	*PZL-104 Gelatik 32* STOL utility aircr	P (Imp: USA)	–	(1962)	1965	–	Production completed 1975 including agricultural version	39/. .	. .

Korea, North	USSR	"P-6"-class fast attack torpedo boat	D (Imp: USSR)	TT	(1970)	(1972)	. .	Growing number of these craft locally built; displ: 66 t; 30 knots	~15 produced	. .
		Aircraft industry	. .	. .	. .	. .	. .	Established with Soviet assistance for licence manufacture of MiG-21 starting 1978	. ./. .	. .
Korea, South	USA	. .Fighter	–	–	–	–	–	Seeking US aid; component production and assembly req: 400	–/–	. .
		Multi-mission patrol ship	GT (Imp: USA)	Standard SSM planned	. .	2 launched 1975	. .	2 to be built in USA; third being built in S. Korea	3/. .	. .
Mexico	Israel	*Arava* STOL transp	T (Imp: Can.)	. .	. .	. .	. .	Negotiating assembly	. ./. .	. .
Pakistan	China	. .SAM system	–	–	(1975)	–	–	Advanced negotiations	–/–	. .
	FR Germany	*MB Bo-810 Cobra* antitank miss	S	Warhead: 2.7 kg	1963	(1964)	. .	Indig: 100%; production continues despite FRG arms embargo since 1965	. ./. .	. .
	France	*Dassault Mirage F-1* fighter	J (Imp: Fr.)	. .	Negotiations started 1972	–	–	Assembly; agreement reportedly reached late 1975	–/–	–
		Dhamial Alouette III hel	T (Imp: Fr.)	. .	1971	1972	1/month	Assembly of imported components; all 3 services receiving	. ./. .	. .
	USA	*Cessna O-1 Bird Dog* light plane	. .	. .	–	1970	1/month	Indig: 60%; no licence acquired	. ./. .	. .
		Cessna T-41D primary trainer	. .	. .	. .	. .	50–70/year planned	Agreement late 1975	. ./. .	. .
		Hughes 500 LOH hel	. .	. .	. .	. .	50/year planned	Agreement late 1975; sales rights in Middle East completed	. ./. .	. .
Peru	Italy	"*Super Alpino*"-class guided-miss frigate	D (Imp: It.); GT (Imp: It.)	2 Otomat SSM (Imp: It.) 1 ASW hel	1974	First laid down Aug 1974	. .	2 to be built in Italy; 2 in Peru; displ: 2 500 t; 35 knots	4/. .	. .

Country	Licenser	Designation, description	Power plant	Arma-ment	Date of licence	Date in pro-duction	Produc-tion rate	Status of programme; other information	No. ordered/ produced	Unit price $*mn*
Philip-pines	FR Ger-many	*PADC MBB Bo-105* hel	T (Imp: FRG)	. .	1974	1974	. .	Assembly of imported com-ponents; 5 delivered com-plete; 5 in component form	5 of total order of 38	. .
	Italy	*XT-001* primary trainer	P (Imp: USA)	–	(1975)	Prototype started flying late 1975	. .	Virtually a duplicate of Italian SF-260; suggests some form of collaboration or licence agreement	. ./. .	. .
	UK	*BN Islander* light transp	P (Imp: USA)	–	1974	1974	1–2/month	Partial assembly; first 6 de-livered 1974 prior to licence production	2+ of total order of 100	Cost of deal: 15
	USA	Small arms	. .	–	(1974)	. .	. .	M-16 rifle	. ./	–
Singa-pore	FR Ger-many	*"Jaguar"*-class fast missile boat	D (Imp: FRG)	Gabriel SSM (Imp: Israel)	. .	1973	All now in commission	2 imported 1972; 4 built in Singapore; displ: 230 t	2 of total order of 6	. .
South Africa	France	*Atlas Mirage F-1* fighter	J (Imp: Fr.)	AAM; ASM	1971	1977–78	. .	Phase 2: manufacture of com-ponent for 32; received 16 1975 prior to licence produc-tion	Req: 100; initial order: 48	. .
		Eland armoured car (Panhard AML 60/90)	Indi-genous	60-mm, 90-mm, cannon	1965	1967	100/year	Indig: ~100%; second-generation development locally	~900 of total order of 1 000	. .
	FR Ger-many	. .Main battle tank	. .	. .	(1975)	(1976)	–	Advanced negotiations	–	–
	Israel	*"Ramta"*-class patrol boat	. .	Gabriel SSM (Imp: Israel)	(1975)	. .	(1979 commis-sioned)	Similar to "João Coutinho"-class; no further details have been released	6/. .	. .
	Italy	*Atlas AM-3C "Bosbok"* monoplane	P (Imp: It.)	–	1971	1975	40/year	Delivered 1974 in component form and assembled by Atlas	40	. .
		Atlas Impala I armed trainer/COIN (MB-326M)	J (Imp: UK)	. .	1965	1967	. .	Indig: 70%; production near completion	~300 pro-duced	0.4

		Atlas Impala II light strike (MB-326K)	J (Imp: UK)	. .	1973	1975	. .	4 supplied complete from Italy 1974	Total of 100+ on order	0.6
		AFIC RSA-200 Falcon civil/military light plane	P (Imp: It.)	–	1965	1967	. .	Possible military use with Commando AF	Total of 40 produced 1974	. .
	Italy/ USA	*C4M Kudu* (AL-60/AM-3C derivative) light observation transp	P (Imp: It.)	–	(1974)	Production started 1975	. .	Probably some indigenous manufacture; AL-60 built under US licence in Italy	. .	. .
Taiwan	USA	*Northrop F-5E Tiger II* fighter	J (Imp: USA)	. .	1973	1974	First delivered Nov 1974	Manufacture of components; E (Imp: USA)	6 of ~100 on order	. .
		Bell 205 A-1 utility hel	T (Imp: USA)	. .	1972	1973	. .	–	60+ of total order of 118	. .
Thailand	FR Germany	Small arms	–	. .	. .	. .	. .	Type HK 43 gun	4 000 in production	. .
Venezuela	Italy	. . Corvette	. .	. .	Mar 1973	1974	. .	Some to be built in Venezuela	Total order: 21	. .
(Viet-Nam, South	USA	*Pazmany PL-2* light trainer	P (Imp: USA)	–	1971	1971	. .	Current political and military situation makes it likely that these planes are in abeyance	. ./11	. .)

[a] The values of the licence-produced weapons are included in the arms trade tables, pages 250–53, estimated at 100 per cent of the import value.

Appendix 6F

Register of arms trade to third world countries, 1975

For sources and methods, see chapter 7. For conventions, see page 145. For abbreviations of manufacturers' names, see *Arms Trade Registers: The Arms Trade with the Third World* (Stockholm, Almqvist & Wiksell, 1975, Stockholm International Peace Research Institute), pp. 131–48.

In the register, the countries in the Recipient column are listed by third world region in the following order: Middle East, South Asia, Far East, Africa, Central America and South America. The weapons in the Item column are entered in the following order: aircraft, missiles, armoured fighting vehicles and ships.

Tables 6F.1 and 6F.2 give the values of imports and exports of these weapons for the period 1950–1975.

Table 6F.1. Values of imports of major weapons by third world countries: by region, 1950–75[a]

Region		1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
Far East (excl	A	147	152	57	209	174	222	227	211	506	396	583	153
Viet-Nam)	B[c]	–	–	148	163	178	209	268	312	385	370	382	328
South Asia	A	44	20	19	92	104	108	176	254	488	148	205	221
	B	–	–	56	69	100	147	226	235	254	263	241	178
Middle East	A	35	55	12	70	81	186	350	300	249	238	123	150
	B	–	–	51	81	140	197	233	265	252	212	240	250
North Africa	A	–	–	–	–	–	–	6	5	4	6	9	12
	B	–	–	–	–	–	–	–	–	6	7	12	17
Sub-Saharan	A	–	5	4	16	18	12	1	1	3	46	27	43
Africa	B	–	–	–	11	10	10	7	13	16	24	31	38
South Africa	A	8	–	16	15	17	15	54	22	18	17	4	3
	B	–	–	11	13	23	25	25	25	23	13	11	31
Central	A	6	5	27	12	10	18	15	6	11	14	45	162
America	B	–	–	12	14	16	12	12	13	18	48	92	105
South	A	54	52	35	73	144	195	118	112	134	45	139	156
America	B	–	–	92	100	113	128	141	121	110	117	111	96
Total (excl	A	**294**	**289**	**201**	**488**	**547**	**755**	**947**	**912**	**1 413**	**911**	**1 135**	**900**
Viet-Nam)	B	–	–	**364**	**456**	**588**	**730**	**915**	**988**	**1 064**	**1 054**	**1 121**	**1 041**
Viet-Nam	A	–	–	–	–	9	9	11	7	48	9	24	56
	B	–	–	–	–	–	–	17	17	20	29	39	38
Total[b]	A	**294**	**289**	**201**	**488**	**556**	**765**	**957**	**919**	**1 461**	**920**	**1 159**	**957**
	B	–	–	**366**	**460**	**593**	**737**	**932**	**1 004**	**1 083**	**1 083**	**1 160**	**1 079**

[a] The values include licensed production.

[b] Items may not add up to totals because of rounding. Figures are rounded to nearest 10.

[c] Five-year moving averages are calculated from the year arms imports began, as a more stable measure of the trend in arms imports than the often erratic year-to-year figures.

Source: SIPRI worksheets. Information on individual countries and arms transactions is available on request.

US $ mn, at constant (1973) prices. A = yearly figures, B = five-year moving averages

1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	**Total**[b]
272	237	300	260	380	152	203	448	207	320	124	231	190	489	**6 850**
309	244	290	266	259	289	278	266	260	266	214	270	–	–	–
144	169	61	163	299	207	227	239	229	381	313	221	285	136	**4 953**
160	152	167	180	192	228	241	257	278	277	286	267	–	–	–
439	301	296	337	336	813	962	927	1 118	1 350	831	1 704	2 260	2 696	**16 219**
262	305	342	417	549	675	831	1 033	1 035	1 181	1 437	1 753	–	–	–
30	26	30	62	93	103	64	67	92	94	128	111	174	582	**1 698**
21	32	48	63	70	78	84	84	89	98	120	218	–	–	–
36	36	52	72	71	62	42	55	95	102	68	142	299	177	**1 481**
39	48	53	59	60	60	65	71	72	87	135	148	–	–	–
12	118	39	142	70	60	34	35	59	53	28	28	210	137	**1 213**
35	63	76	86	69	68	52	48	40	39	74	90	–	–	–
228	74	26	14	16	13	6	8	4	36	27	43	90	105	**1 035**
107	101	72	29	15	11	9	13	16	24	35	55	–	–	–
83	55	39	84	106	98	159	121	113	170	237	367	406	482	**3 777**
94	83	73	76	97	114	119	132	160	182	226	300	–	–	–
1 245	**1 015**	**844**	**1 135**	**1 372**	**1 507**	**1 697**	**1 898**	**1 916**	**2 502**	**1 738**	**2 711**	**3 769**	**4 788**	**37 281**
1 028	**1 028**	**1 122**	**1 175**	**1 311**	**1 522**	**1 678**	**1 877**	**1 923**	**2 126**	**2 500**	**3 074**	**–**	**–**	**–**
57	43	70	57	181	378	362	228	331	333	917	63	142	15	**3 350**
50	57	82	146	210	241	296	326	434	374	357	294	–	–	–
1 302	**1 058**	**914**	**1 192**	**1 553**	**1 885**	**2 059**	**2 126**	**2 247**	**2 835**	**2 673**	**2 909**	**4 070**	**4 843**	**40 632**
1 078	**1 085**	**1 204**	**1 320**	**1 521**	**1 763**	**1 974**	**2 230**	**2 385**	**2 527**	**2 884**	**3 395**	**–**	**–**	**–**

Table 6F.2. Values of exports of major weapons to regions listed in table 6F.1: by supplier, 1950–75[a]

Country	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
USA	91	109	103	73	285	305	330	346	381	249	545	300
USSR	25	43	28	176	9	66	148	256	196	111	165	391
UK	96	64	46	165	166	175	198	180	358	183	196	185
France	3	3	1	41	70	70	123	70	131	49	37	38
Canada	14	4	1	*	–	1	39	4	5	62	11	16
China	23	23	–	–	–	–	–	5	231	133	125	–
Czechoslovakia	–	–	–	–	–	43	58	6	23	58	45	5
FR Germany	*	*	–	1	4	7	9	5	7	26	23	5
Italy	7	29	–	2	–	2	31	29	28	*	7	–
Japan	–	–	–	1	15	–	9	11	23	12	–	11
Netherlands	35	14	6	2	1	85	1	2	1	4	1	2
Sweden	*	1	16	5	6	6	6	–	37	*	1	*
Other indus. West	–	–	–	7	*	5	*	–	–	–	1	2
Other indus. East	–	–	–	–	–	–	2	*	29	24	*	–
Third world	–	–	–	15	1	1	3	5	11	2	3	2
Total[b] (incl Viet-Nam)	**294**	**289**	**201**	**488**	**556**	**765**	**957**	**919**	**1 461**	**920**	**1 159**	**957**

[a] The values include licensed production.
[b] Items may not add up to totals owing to rounding.
* < $1 mn.

Source: SIPRI worksheets. Information on individual countries and arms transactions is available on request.

US $ mn, at constant (1973) prices

1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
281	393	284	413	393	367	576	954	962	916	958	885	1 200	1 769
786	329	287	408	608	1 013	892	870	836	1 085	726	1 542	1 540	1 652
95	135	137	203	148	155	225	266	142	300	283	242	481	503
92	148	105	74	107	52	220	131	156	211	269	411	357	477
2	10	9	14	9	9	36	14	28	42	30	3	*	5
–	–	39	7	36	13	4	7	17	81	120	21	80	48
5	12	7	3	6	9	30	17	24	11	10	1	11	5
2	10	20	10	64	3	8	13	1	19	37	2	101	118
*	15	15	5	1	16	51	41	33	32	39	4	106	65
18	1	1	5	9	23	38	2	*	*	–	–	2	–
2	*	9	17	1	–	4	19	7	26	20	30	25	32
–	–	–	–	1	–	–	*	–	–	4	1	5	16
1	2	*	23	18	45	6	8	3	37	10	16	9	10
8	*	–	*	–	1	–	1	–	4	–	13	–	2
8	3	2	3	19	12	7	16	6	11	14	16	211	141
1 302	**1 058**	**914**	**1 192**	**1 553**	**1 885**	**2 059**	**2 126**	**2 247**	**2 835**	**2 673**	**2 909**	**4 070**	**4 843**

Register of arms trade to third world countries, 1975

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
Middle East							
Abu Dhabi	France	18	Dassault Mirage III	Fighter	$18.9 mn; in addition to 14 Mirage 5s delivered 1973–74	Feb 1974	1974–75
		2 000	Aérospatiale AS.11/12	ASM	$23 mn; arming Alouette IIIs	1974	1975
		(3 650)	{Aérospatiale SS.11 / Aérospatiale Harpon}	ATM	$17 mn; arming ACs, jeeps	1974	1975
	UK	2	HS Hunter	Fighter	Refurbished	1975	1975
		12 launchers	BAC Rapier	Towed SAM	$80.5 mn	Dec 1974	. .
		5	Fairey Marine, "Spear"-class	Coastal patrol boat	New construction; in addition to 4 previously delivered; may purchase total of 12	Feb 1974	1974–75
		5	Vosper Thornycroft	Large patrol boat	Displ: 120 t	1973	1975–76
		1	Vosper Thornycroft	Large patrol boat	Displ: 120 t	May 1974	. .
	USA	2	Lockheed C-130 Hercules	Transport	$10 mn	1973	1975
Bahrein	UK	2	Fairey Marine, "Tracker"- class	Coastal patrol boat	Displ: 4.5 t	Sept 1974	1975
	USA	(24)	. .	ATM		1974	. .
Dubai	Italy	4	Aermacchi M.B.326K/L	COIN/trainer	$14 mn; for police air wing	1974	1975
		4	Aermacchi M.B.326	COIN	Repeat order for police air wing	1975	. .
	UK	2	Fairey Marine, "Spear"-class	Coastal patrol boat		1974	1974–75
Egypt	France	22(+22)	Dassault Mirage F-1	Fighter	U.c.: $5.6 mn; firm contract for 22 standard version; letter of intent for 22 F-1Es; arms: Matra Magic AAM	Jan 1975	(1979)
		38	Dassault Mirage III	Fighter-bomber	Ordered and paid for by Saudi Arabia	1974	1974–76
		1	Dassault Falcon 20	Transport	AF received for VIP transp	1975	1975
		42	Aérospatiale SA-341 Gazelle	Light utility hel	First firm order after France lifted embargo 28 Aug 1974	1975	. .
		(100)	Matra R.550 Magic	AAM	Arming Mirage F-1s	Jan 1975	(1979)
		. .	Matra R.530	AAM	Arming Mirage IIIs	1974	1974–76
		. .	Aérospatiale AS.12	ATM	Arming 24 Westland Commando helicopters	Oct 1973	1974–76

	(FR Germany)	6	Sportavia Fournier RF-4	light plane	In use with AF for electronic intelligence and artillery spotting; possibly private sale	. .	1975
	UK	100	HS Hawk	Fighter	Sales proposal; licensed production planned	(1976)	. .
		24	Westland Commando Mk 1/2	Troop transp hel	Ordered and paid for by Saudi Arabia; arms: 2×AS.12	Oct 1973	1974–76
		6	Westland Sea King	ASW helicopter	See above	Jan 1975	1975–76
		4	Westland Commando Mk 2	Assault helicopter	Brings total to 34	Dec 1975	. .
		250	Westland Lynx	Helicopter	Sales proposal; licensed production planned	(1976)	. .
		. .	BAC Rapier	Tracked SAM	Being evaluated	. .	. .
		(10 000)	BAC Swingfire	ATM	$42 mn; initial contracts signed; planning licensed production	1975	. .
		9	Vosper/Brooke Marine	Fast patrol boat	Vosper & Brooke Marine competing for Egyptian order; arms: 4×Exocet ShShM	(1976)	. .
		3	SRN.6	Hovercraft	Ex-UK	1975	1976
	UK/France	30–60	Jaguar International	Long-range strike fighter	Advanced negotiations; planning licensed production of up to 200	. .	. .
	USA	1	Boeing 707	Transport	AF received for VIP long-range transport	1975	1975
	USSR	23	MiG-23	Fighter	Total of 48 to be supplied according to US sources; arms: 4×AA-2-2 Atoll AAM	1973	1975
		. .	AA-2-2 Atoll	AAM	Arming MiG-23s	1973	1975
		(500)	T-62	Tank	According to Israeli intelligence; plus spare parts and artillery	. .	1974–75
Iran	France	4	Dassault Falcon 20	Light jet transport	U.c.: $2.9 mn; total of 7 purchased of which 4 for armed forces	1975	1975
		. .	Aérospatiale AS.12	ASM	Arming 6 AB 212 hel	Jan 1974	1976–77
		. .	Aérospatiale AS.11	ASM	Arming AB 206	Feb 1973	. .
		142	Aérospatiale MM-38 Exocet	ShShM	$4.27 mn; arming Combattante patrol boats	1974	. .
		12	Combattante II	Missile boat	$57.6 mn; displ: 230 t; arms: 4×Exocet ShShM launchers (Harpoon ShShM), Oto Melara cannon	1974	. .
		3	"Agosta/Daphne"-class	Submarine	Order switched from UK to France	(1976)	. .

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
	(FR Germany	1 000	Leopard 2	Tank	Negotiations may be reopened; planning licensed production	1976	1978)
	Italy	91	AB-206 Jet Ranger	Helicopter	Arms: 2 × AS.11; (Hughes TOW)	Feb 1973	. .
		6	AB-212	Helicopter	Arms: AS.11/12	Jan 1974	1976–77
		22	Meridionali CH-47C Chinook	Helicopter	$100 mn; in addition to 20 delivered 1973–74	1974	. .
	UK	(1 000)	BAC Rapier	Towed SAM	Five AF sqds now equipped	1974	1975
		(500+)	BAC Rapier	Tracked SAM	U.c.: $3 mn incl M 548 vehicle (USA) and Marconi Blindfire radar; Iran sharing R&D costs; planning licensed production of missile	Sept 1974	1979
		. .	Short Tigercat	SAM	Follow-up order excl new launchers	1974	(1975)
		300	Fox	Armoured car	$31 mn	1972	(1974–75)
		764	Chieftain Mk 3/5	Tank	$346 mn	1971	1971–75
		1 200	Chieftain Mk 5	Tank	$440 mn; repeat order following breakdown of negotiations with FRG for Leopard; planning licensed production	1975	. .
		4	BH-7 Mk 4, "Wellington"-class	Hovercraft	Arms: ShShM, not incl under present contracts (Harpoon ShShM); last of hovercraft order	1971	1973–75
		2	Yarrow	Logistics support ship	Armed; displ: 2 500 t	1972	1975
		1	. .	Fleet replenishment vessel	Under construction by Swan Hunter; displ: 10 890 t	(1974)	. .
	USA	31	Beech F-33C Bonanza	Transport	$1.6 mn; brings total to 49	1974	1974–75
		202	Bell AH-1J SeaCobra	Gunship hel	U.c.: $1.2 mn; for Army; arms: 8 × TOW ATM	Dec 1972	1974–77
		287	Bell 214A Isfahan	Utility hel	$63 mn; Iran funding R&D; delivery rate 10/month; planning licensed production of a further 400	Dec 1972	1975–77
		2	Bell 214B Big Lifter	Cargo hel		1975	. .
		7	Boeing 707-3J9C	Tanker-transport	In addition to 6 delivered 1974	1975	. .
		10	Boeing E-3A AWACS	Airborne warning & control systems plane	U.c.: $187 mn; US letter of offer	. .	. .

12	Boeing 747–131	Freighter transport	$148.5 mn for 9; purchased ex-TWA and Continental Airlines for conversion to military freighter	1975	1976
5–10	Grumman E-2C Hawkeye	Early-warning and control aircr	U.c.: $26 mn; competing with AWACS	(1976)	. .
80	Grumman F-14 Tomcat	Fighter/interceptor	$1.9 bn; Iranian contribution to R&D funding; arms: Phoenix AAM	July 1974	1976–78
6	Lockheed P-3F Orion	Maritime recce plane	$98 mn; arms: Harpoon ASM; negotiating for 2 more	1972	1975
140	McDonnell-Douglas F-4E Phantom	Fighter	$450 mn	1973	1974–75
(36	McDonnell-Douglas F-4E Phantom	Fighter	$150 mn; similar to latest USAF version; in addition to previous total of 128 F-4Es and 32 F-4Ds; arms: Maverick ASM, Sidewinder AAM, Sparrow AAM	1974	1976–77)
141	Northrop F-5E Tiger II	Fighter	U.c.: $1.16 mn; arms: Sidewinder AAM	1973	1974–76
28	Northrop F-5F	Fighter/combat trainer	Arms: Sidewinder AAM	1975	. .
6	Sikorsky S-65A	Heavy-lift hel	For Navy	1975	1975
2 500+	Hughes Maverick	ASM	$50 mn+; arming F-4Es	1973	1974–75
. .	Hughes AIM-54A Phoenix	AAM	U.c.: $250 000; arming F-14s	1974	1976–78
2 880	Hughes BGM-71A TOW	ATM	Arming AH-1Js	1972	1974–77
. .	McDonnell-Douglas FGM-77A Dragon	ATM	Infantry-portable	1975	. .
222	McDonnell-Douglas AGM-84A Harpoon	ShShM	Arming Orion ASW aircr, Spruance destroyers, missile boats	1974	. .
. .	NWC AIM-9 Sidewinder	AAM	$79 mn for total of 3 462 missiles ordered 1971, 1972, 1974; arming F-4Es, F-5Es, F-14s	1974	1974–76
. .	Raytheon Sparrow III	AAM	$522 mn for total of 2 616 missiles ordered 1971, 1972, 1974; arming F-4Es	1973	1974–75
. .	Rockwell AGM-53A Condor	ASM	Arming F-14s, F-4Es, Orions	1974	(1976)
414	Torpedo Mk 46		$70 mn; arming "Tang"-class submarines	1975	. .
6	DD-963, "Spruance"-class	Destroyer	$700 mn+; displ: 7 800 t; new; arms: Harpoon ShShM	1974	1978–
3	"Tang"-class	Submarine	Built early 1950s, modernized 1960	1975	. .

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
Iraq	Czecho-slovakia	(60)	Aero L-39	Trainer	Delivery delayed	1973	(1976–)
	France	31	Aérospatiale Alouette III	Helicopter	$11 mn for 47 hel; in addition to 15 delivered 1970	1974	. .
		2	Dassault Falcon	Transport		1975	. .
		(54)	Dassault Mirage F-1	Fighter	U.c.: $9 mn; sale of several sqds reportedly concluded	1976	. .
		. .	Aérospatiale AS.11/AS.12	ASM	$19 mn; arming Alouette III	1974	. .
	UK	40	HS Hawk	Fighter	Order postponed for 1 year because of funding problems	(1976)	. .
	USSR	40	MiG-23	Fighter	$268 mn cash; arms 4 × Atoll AAM	1973	1974–75
		. .	AA-2-2 Atoll	AAM	Arming MiG-23s	1973	1974–75
		(81)	"Scud"	SSM	$24 mn; 12 launchers; conventional warheads	1974	1975
		390	T-55/T-62	Main battle tank	$50 mn	1973	1974–75
		(60)	. .	Self-propelled gun	$4 mn	1973	1974–75
Israel	UK	. .	Short Blowpipe	SLAM	4 launchers on each of 3 submarines being built in UK; first foreign buyer	1973	. .
		400	Centurion	Main battle tank	$69 mn; being modernized in Israel: re-engined, fitted with 105-mm guns, radar, electronic tracking, detection devices	1974	1974–75
		3	IKL/Vickers, 500-ton class	Patrol submarine	W. German design, under construction; displ: 420 t	Apr 1972	1976–
	USA	20	Beech Queen Air	Light transport	In addition to 12 delivered 1974	. .	1974–75
		. .	Bell AH-1J SeaCobra	Gunship helicopter	Pilots training in USA; arms: Hughes TOW ATM	1974	1975–
		8	Boeing-Vertol CH-47C Chinook	Helicopter	Ordered before Oct 1973 War; delivery delayed until 1975	1973	1975
		~400	General Dynamics F-16	Air combat fighter	Planning licensed production; arms: 2 × Sparrow AAM or Maverick ASM	1975	1981–
		4	Grumman E-2C Hawkeye	Early-warning and control aircraft	$170 mn; to be used in liaison with F-15s	Jan 1976	1978–
		. .	Grumman OV-1 Mohawk	Observation aircraft	Small number acquired	. .	1975

	50	McDonnell-Douglas F4-E Phantom	Fighter	Total of 250 received since 1969; arms: Maverick ASM, Sidewinder AAM	Sept 1974	1974–75
	36	McDonnell-Douglas A-4 Skyhawk	Fighter	Total of 287 ordered; arms: 2 × Bullpup ASM	Sept 1974	1974–77
	25	McDonnell-Douglas F-15 Eagle	Fighter	U.c.: $7.6 mn; initial batch; may rise to 400 to replace Phantom and Skyhawk	1975	1976–
	8	Sikorsky S-65A	Helicopter	For electronic intelligence	1974	1975
	..	General Dynamics FIM-43A Redeye	SAM	Army operates; infantry-portable	1974	1975
	..	Hughes AGM-65A Maverick	ASM	Arming F-4Es and IAI Kfirs; delivery delayed	1974	1976–
	(1 000)	Hughes TOW	ATM	$46 mn; arming M-113 APCs; delivery delayed	1974	1975–76
	300	LTV MGM-52C Lance	SSM	Initial batch of 109 delivered	Nov 1974	1975–76
	..	Martin AGM-12B Bullpup	ASM	Arming A-4 Skyhawks	Sept 1974	1974–77
	..	McDonnell-Douglas FGM-77A Dragon	ATM	Infantry-portable	1975	..
	100	McDonnell-Douglas Harpoon	ShShM	$13.5 mn	1975	..
	(200)	NWC AGM-45A Shrike	ASM	Arming IAI Kfirs	Sept 1974	(1975)
	..	NWC AIM-9 Sidewinder	AAM	Arming F-4Es	Sept 1974	1974–77
	..	Pershing 1A/2	Long-range SSM	Congressional opposition may have stopped deal	(1976)	(1979)
	..	Raytheon AIM-7F Sparrow	AAM	Among new arms worth $100 mn, supplied Apr–Aug 1975; arming F-4Es	1974	1975
	4	Teledyne Ryan/Philco Ford	Remotely piloted vehicle	$4 mn incl training and support and electronic countermeasure equipment	1974	1975
	..	Rockwell International Condor	ASM		(1975)	..
	600	M-60A1	Main battle tank	Extension of 1974 order for 200; delivery delayed	1974–75	1974, 1976
	..	M-113	APC	Arms: Hughes TOW ATM; delivery delayed	1974	1975–76
	..	Firefish III	Fast patrol boat	Displ: 6 t; under construction; remote controlled	1971	..
	1	"Case Grande"-class	Floating dock ship	Displ: 4 790 t; for use as dock for Saar gunboats	1975	..
..	..	..	Hovercraft	Navy equipped with hovercraft for coastal defence; may be of indigenous design	..	1975

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
Jordan	Iran	36	Northrop F-5A/B Freedom Fighter	Fighter	US approval to transfer to Jordan, Jan 1975	1974	1975
	Spain	4	CASA C.212 Aviocar	Light transport	U.c.: $1 mn	1975	1975–76
	UK	3	Scottish Aviation Bulldog	Trainer	In addition to 5 delivered 1974	1975	1975
		5	Scottish Aviation Bulldog	Trainer	Additional order for Air Academy, Amman	1975	. .
	USA	6	Cessna T-37	Jet trainer	Ex-USAF for training led by USAF and RAF staff	(1975)	1975
		30	Northrop F-5E Tiger II	Fighter	U.c.: $2.7 mn; MAP; arms: Sidewinder AAM	Feb 1974	1975
		300	General Dynamics FIM-43A Redeye	SAM	$5 mn; infantry-portable; delivery delayed; incl in $350 mn air defence package	1974	1976–
		. .	NWC AIM-9 Sidewinder	AAM	Arming 30 F-5Es	Feb 1974	1975
		532 (14 batt)	Raytheon Improved Hawk	SAM	$800 mn, incl spares; for defence only at fixed sites; delivery delayed	1974	1976–79
		(50)	M-60A1	Main battle tank	In addition to 100 delivered 1971–72	1975	1975
		100 (8 batt)	General Electric M-61 A-1 Vulcan	Anti-aircraft cannon	$90 mn, incl in $300 mn air defence package	1974	1976–78
Kuwait	France	20	Aérospatiale SA-341 Gazelle	Helicopter	$37.5 mn incl 10 Puma; arms: Euromissile HOT ATM	1974	1975–76
		10	Aérospatiale SA-330 Puma	Helicopter	See above	1974	1975
		18+2	Dassault Mirage F-1C/B	Fighter	$315 mn; not for Egypt as first reported; arms: Matra Magic AAM, ASM	1973	(1976)
		. .	Aérospatiale Harpon	ATM	$8.5 mn incl SS.11s	1974	1975
		1 200	Aérospatiale SS.11	ATM	See above; arming Panhard ACs and Centurions	1974	1975
		480	Matra Super 530/550 Magic	AAM	$10.5 mn; arming Mirage F-1s	1973	(1976)
	France/FR Germany	. .	Euromissile HOT	ATM	Arming Gazelle helicopters	1974	. .
	Singapore	1	Vosper Thornycroft, 88-ft type	Landing ship	In addition to 2 previously acquired	Oct 1974	. .
	UK	150–300	Centurion	Main battle tank	Incl in $1 bn military expansion programme; arms: SS.11 ATM	(1976)	. .

	USA	36+6	McDonnell-Douglas A-4M Skyhawk/TA-4KU	Fighter	$450 mn incl Hawk SAM; arms: Sidewinder AAM	Nov 1974	1976–
		1 800	Hughes TOW	ATM	$600 mn; arming Land Rovers, trucks	1973	1975–
		240	Raytheon Improved Hawk	SAM	$450 mn incl A-4s; to defend 2 air bases constructed by Yugoslavia	1974	. .
		300	NWC AIM-9H Sidewinder	AAM	$32.3 mn; arming A-4s and possibly also Mirage F-1s	1975	1976–
Lebanon	France	. .	Aérospatiale S.11	ATM		. .	(1975)
	FR Germany	3	. .	Patrol boat	$3 mn	Jan 1974	. .
	UK	6	HS Hunter F.70	Fighter	Refurbished; delivery delayed	1973	1975
		6	Scottish Aviation Bull-dog 126	Trainer		1975	1975
	USA	. .	Hughes TOW	ATM	$10 mn; 18 launchers	1974	1975
Oman	France	. .	Matra R.550 Magic	AAM	Arming Jaguars	1975	1977–
	Jordan	31	HS Hunter	Fighter	Gift; ex-JAF; originally intended for S. Africa	1975	1975
	Netherlands	2	"Wildervank"-class	Patrol boat	Displ: 373 t; ex-minesweeper; refitted	1974	. .
		1		Logistic support ship	Displ: 1 380 t; new	. .	Apr 1975
	UK	12	BAC/Dassault Jaguar International	Strike/fighter	$83 mn; arms: Matra Magic AAM	Sept 1974	1977–
		3	BAC One-Eleven 475	Transport	$10 mn	1973	1974–75
		4	BAC 167 Mk 89 Strike-master	Fighter	In addition to 20 previously delivered	1974	. .
		1	Gates Learjet 25B	Transport	$1.3 mn; sold to Royal Oman Police	(1975)	1975
		6	Short SC.7 Skyvan 3M	STOL transport	$4.7 mn; in addition to 10 previously delivered	1974	(1975)
		. .	BAC Rapier	Towed SAM	$150 mn for 15 launchers	Sept 1974	1977–
		4	Brooke Marine, 35-m type	Fast patrol boat	$14.3 mn; displ: 135 t; in addition to 3 delivered 1973–74	1973	1976
		2	Cheverton "Loadmaster"	Work launch	$513 000; displ: 60 t; incl in expansion programme for Navy	. .	Jan 1975
	USA	180	Hughes BGM-71A TOW	ATM	$8 mn; 10 launchers	Jan 1975	1975
		5	Bell 214A	Heavy-lift hel		1974	1976
Qatar	Brazil/France	20	EE-9 Cascavel	Armed recce vehicle	Being fitted out in France with 90-mm cannon and IR guidance under a $20-mn contract	1974	. .

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
		1	Britten-Norman BN-2 Islander	STOL transport		1975	1975
		4	Westland Commando Mk 2	Assault helicopter	1 VIP and 3 troop transports	1974	1975–76
		7	Fairey Marine, "Spear"-class	Coastal patrol boat		Jan 1974	1974–75
		5	Fairey Marine, "Spear"-class	Coastal patrol boat	Repeat order	Dec 1975	. .
		6	Vosper Thornycroft, 103-ft type	Large patrol boat	Displ: 120 t	1972–73	1975–76
Saudi Arabia	France	8	Aérospatiale Alouette III	Helicopter	In addition to 2 previously acquired; may purchase 22 more	1974	. .
		38	Dassault Mirage III E	Fighter/bomber	$860 mn incl tanks, missiles	Dec 1974	(1975–78)
		48	Dassault Mirage F-1	Fighter	New "arms-for-oil" deal pending	(1976)	. .
		(2 000)	Aérospatiale Harpon	ATM	Arming AMX-30 tanks	Dec 1974	1975–79
		. .	Aérospatiale/MBB Roland	ATM	$19 mn; arming Panhard ACs	1974	. .
		(2 000)	Aérospatiale SS.11	ATM	$19 mn; arming AMX-30 tanks	Dec 1974	1975–79
		. .	Matra-CSF-Thomson Crotale ("Chahinn")	SAM	$860 mn incl Mirage IIIs, tanks; derived from standard Crotale; 6 missiles/AMX-30	Dec 1974	1976–79
		. .	Crotale	ShShM	Naval version to arm fast patrol boats incl in pending "arms-for-oil" deal	(1976)	. .
		. .	Matra R.550 Magic	AAM	$3 mn; arming F-5E/Fs, Mirage IIIs	1973, 1975	1975–
		250	AMX-10	Armoured car	$860 mn incl Mirage IIIs, missiles	Dec 1974	1975–79
		200	AMX-30	Main battle tank	See above	Dec 1974	1975–79
	FR Germany	800	Rheinstahl Marder	APC	$580 mn; advanced negotiations	(1976)	(1977–)
	(Pakistan	8	. .	Warship	$145 mn; under construction in Karachi	1974	. .)
	USA	10	Lockheed C-130H Hercules	Transport	In addition to 16 previously acquired	(1973)	1974–75
		10	Lockheed C-130 Hercules	Transport	$90 mn; in addition to 26 previously acquired	1975	1977–
		70+40	Northrop F-5E/F	Fighter	$756 mn; Saudi R&D funding for special equipment; arms: Matra Magic AAM, Maverick ASM	Jan 1975	1976–79

		. .	Hughes Maverick	ASM	$756 mn incl F-5Es ; arming 4 missiles/plane	Jan 1975	1976–79
		100	McDonnell-Douglas Harpoon	ShShM		1975	. .
		(300)	Raytheon MIM-23B Improved Hawk	SAM	$270 mn	Apr 1974	1976–79
		. .	M-60A1	Main battle tank	$340 mn incl APCs, howitzers	Dec 1974	1976–79
		250	M-113	APC	See above	Dec 1974	1976–79
		~350	. .	105-mm howitzer	See above	Dec 1974	1976–79
		26	. .	Destroyer; missile boat; minesweeper	$500 mn; for large-scale modernization programme	1974	1978–84
Syria	France	15	Aérospatiale Super Frelon	Helicopter	Order may be increased to 40	1975	. .
		2	Dassault Falcon 20	Transport	For VIP use	1975	(1975)
		~2 000	(Aérospatiale SS.11/Harpon)	ATM		1975	. .
	USSR	45	MiG-23	Fighter	Arms: Atoll AAM	1973	1974–75
		65	MiG-21	Fighter	Arms: Atoll AAM	1973	1974–75
		. .	T-62A	Tank		. .	1974–75
		. .	. .	APC		. .	1974–75
		(. .	Sukhoi Su-11	Fighter/interceptor		. .	1975)
		~6 000	AT-3 "Sagger"	ATM	Supplied since Oct 1973 War	1973	1974–75
		(. .	SAM-9	SAM	Latest version with improved ECM systems	1974	1975)
		. .	SS-N-2A "Styx"	ShShM	Arming Osa boats	1973	1974–75
		6	"Osa"-class	Missile boat	Displ: 165 t; Oct 1973 War replacement	1973	1974–75
United Arab Emirates[a]	(Austria	~200		Tank	For Union Defence Force; advanced negotiations	1976	. .)
	Italy	1	AB-212	Helicopter	For police air wing	. .	1975
	(UK)	5	. .	Small patrol boat	Delivered to Ras Al Khaimah	. .	1975
	USA	4	Bell 205 A-1 Iroquois	Helicopter	For Union AF; arms: Hughes TOW ATM	1974	1975
		2	Lockheed C-130 Hercules	Transport	$10 mn; UAE pilots training in USA	1973	1975
		. .	Hughes BGM-71 TOW	ATM	Arming Bell 205s	1975	1975
Yemen	USA	1 sqd	Northrop F-5E Tiger II	Fighter	$100 mn incl tanks; advanced negotiations	(1976)	. .
		. .	. .	Tank	See above; MAP	1975	. .

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
Democratic Yemen	UK	4	BAC 167 Mk 18 Strike-master	Fighter		1974	1975
South Asia							
India	Poland	50	WSK-Mielec TS-11 Iskra	Jet trainer	Purchased instead of Czech trainer	May 1975	1976–
	UK	(100)	Short Seacat	ShShM	Arming Leander frigates; see licensed production register	1972	(1975)
	USSR	4+3	Ilyushin Il-38 "May"	Maritime recce/bomber	For Navy	1975	1976–77
		. .	SS-N-9	ShShM	Arming Nanutchka ships	1975	. .
		. .	SS-N-2 "Styx"	ShShM	Arming Osa ships	1975	. .
		(. .	BMP-76	APC	Unconfirmed reports	1975	. .)
		8	"Nanutchka"-class	Fast missile boat	Arms: SS-N-9 ShShM	1975	. .
		. .	"Osa"-class	Missile boat	Arms: SS-N-2 Styx ShShM	1975	. .
		4	"F"-class	Submarine	Displ: 2 000 t; in addition to 4 previously acquired; 2 more may be purchased	. .	1973–75
		1	"Polnocny"-class	Landing ship	Displ: 780 t; in addition to 2 previously acquired	. .	1975
Nepal	France	2	Aérospatiale/Westland SA-330J Puma	Helicopter	1 for VIP use, 1 for Royal Army air transport wing	1975	1975
	UK	1	HS 748 Series 2A	Transport	Converted to military role	1974	Jan 75
Pakistan	France	3	Breguet Atlantic	ASW fighter	Credit $38.2 mn; ex-French; refurbished	1973	1975–76
		10	Dassault Mirage IIIR	Tactical recce/fighter	Credit $71 mn; sold at 1973 price	July 1975	1977
		. .	Aérospatiale AM.39 Exocet	ASM	Air-launched version; arming 4 of 6 Sea King helicopters	1974	1975
		. .	Aérospatiale AS.11/12	ASM	May arm Saab Supporter	(1975)	. .
		6–12 batt	Matra-CSF-Thomson Crotale	SAM	Purchased under $155 mn credit of 1973	1975	. .
		1	"Daphne"-class	Submarine	See above; in addition to 3 delivered 1970	Dec 1973	. .
	Iran	~50	Northrop F-5A Freedom Fighter	Fighter	Ex-Iran; to be delivered with US approval as Iran receives new F-5Es	1973	. .

		100	M-48	Tank	Being refurbished in Iran; formally owned by Turkey	1975	. .
	Sweden	45	Saab MFI-17 Supporter	Trainer	Five pre-series planes delivered 1974; arms: AS.11/12 ASM (France)	1974	1974–76
	UK	6	Westland Sea King Mk 45	ASW helicopter	Arms: 2 × AM-39 Exocet ASM	Oct 1972	1974–75
		2	"Whitby"-class	Destroyer	Refitted	1974	1975
Sri Lanka	USSR	(. .	SS-N-2 "Styx"	ShShM	Arming Osa ships	. .	1974–75)
		(6	"Osa"-class	Missile boat	Arms: Styx ShShM	. .	1974–75)
		1		Patrol boat	Ex-USSR minesweeper	1974	1975
Far East							
Brunei	Singapore	2	Vosper Thornycroft, 71-ft type, "Perwira"-class	Fast patrol boat	U.c.: $2 mn; in addition to 1 delivered 1974	June 1974	1975
Burma	Italy	. .	SIAI Marchetti SF-260W Warrior	COIN/trainer	Armed	1975	. .
	USA	4	Beech C-45	Transport	AF operates	. .	(1975)
		18	Bell 205-A Iroquois	Helicopter	MAP; for COIN use in the north	. .	1975
Cambodia	China	5	. .	Patrol boat	Military aid	. .	1975
	USA	~70	. .	Small patrol boat/ river patrol boat	MAP; ex-USN	. .	1974–75
Indonesia	Australia	4+2	GAF Nomad	STOL transport	Military aid	1973	1975–76
		6	. .	Small patrol boat	$3 mn; military aid	. .	1975
	Netherlands	8	Fokker-VFW F.27 Friendship Mk 500 M	Transport	For AF	May 1975	. .
		3	. .	Corvette	Navy expansion programme incl 40 new corvettes	1975	1979–80
	Spain	6	CASA C.212 Aviocar	STOL transport	For AF	1975	. .
	USA	2	Beech King Air 100	Transport	$5 mn for Beech package; Ex-Im Bank credit; AF expansion programme incl 27 new planes	1975	. .
		21	Beech Musketeer	Light trainer	See above	1975	. .
		3	Bell 47 G	Helicopter	See above	1975	. .
		2	Bell 206 B	Helicopter	See above	1975	. .
		3	Lockheed C-130B	Transport		. .	April 1975
		16	LTV A-7 Corsair II	Strike/fighter	MAP	1974	(1975–)

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
		16	Rockwell International OV-10F Bronco	STOL transp/COIN	MAP	1974	1976–
		. .	Rockwell International T-2C Buckeye	Armed jet trainer	Order expected	(1975)	. .
		100+	. .	Armoured car/APC	Army to replace obsolete UK vehicles within 2 years	(1976)	(1978)
		3	. .	Destroyer	Ex-USN: refitted	. .	1974–75
Korea, North	USSR	2 sqds	MiG-21	Fighter	Latest version; licensed production to start 1978	. .	Apr 1975
		. .	SS-N-2 "Styx"	ShShM	Arming new missile boat	. .	Apr 1975
		. .	. .	Fast missile boat	New construction; arms: Styx ShShM	. .	Apr 1975
Korea, South	USA	18	McDonnell-Douglas F-4D Phantom	Fighter	In addition to 36 F-4E/Ds previously acquired; arms: Sparrow AAM	Sept 1975	. .
		18	McDonnell-Douglas F-4E Phantom	Fighter	$178 mn; see above; arms: Sidewinder AAM, Maverick ASM	Dec 1975	. .
		72	Northrop F-5E Tiger II	Fighter-bomber	Arms: 2 × Sidewinder AAM, Maverick ASM	Nov 1972	1974–76
		60	Northrop F-5 E/F Tiger II	Fighter-bomber/ trainer	$205 mn; follow-up order to 72 currently being delivered; arms as above	1975	. .
		. .	Hughes AGM-65A Maverick	ASM	Arming F-5Es	Nov 1972	1975–76
		120	McDonnell-Douglas Harpoon	ShShM	$81 mn; incl support equipment, spares, training	1975	. .
		. .	NWC AIM-9 Sidewinder	AAM	Arming 72 F-5Es currently being delivered, and F-4E Phantoms	1974	1975–
		. .	Raytheon AIM-7E Sparrow	AAM	Arming F-4 Phantoms	1975	1976–
		. .	Standard	ShShM	8 launchers; arming PSMM boats	1974	1975
		2+	"CPIC"-class	Fast patrol boat	Under construction	1974	. .
		3	"PSMM"-class	Fast patrol boat	New construction	1974	1975
		2	"Bluebird"-class	Coastal minesweeper	New construction; in addition to 6 previously acquired	1973	1975

Laos	USSR	70	(T-54/55)	Main battle tank	Delivered to coalition government, plus 30 130-mm long-range field guns	. .	1975
		. .	. .	River patrol boat	For patrol duty on the Mekong River	. .	1975
Malaysia	France	4	Aérospatiale Alouette III	Helicopter	$3.3 mn; for AF training school	1974	1975
	Netherlands	2	Fokker-VFW F.28	Transport		1974	1975
	USA	5	Bell 206 JetRanger	Helicopter		1974	(1975)
		(5)	Bell 212 Twin Pac				
		12	Cessna 402B	Light plane	Incl spares; for AF	1974	1975
		6	Lockheed C-130H Hercules	Transport	$47 mn incl spares and support equipment	Oct 1974	1976
		14+2	Northrop F-5E/B Tiger II	Fighter	Arms: Sidewinder AAM, Maverick ASM; 2 F-5Bs delivered 1975 without missiles	July 1972	1975–76
		. .	Hughes AGM-65A Maverick	ASM	Arming 14F-5Es	July 1972	1976
		. .	NWC AIM-9 Sidewinder	AAM	Arming 14 F-5Es	July 1972	1976
Papua/New Guinea	Australia	4	Douglas C-47 Dakota	Transport	Incl in $21.3 mn military aid programme; gift	1975	1975
Philippines	Australia	12	GAF Nomad	STOL transport	$12 mn; 6 for Navy	1974	1975–76
		2	De Havilland type	Fast patrol boat	Military aid; under construction	1974	. .
	FR Germany	5	MBB Bo-105	Helicopter	Delivered prior to licensed production	1974	1975
	UK	(9)	Britten-Norman BN-2A Islander	Transport	9 delivered in addition to licensed production of 100; see licensed production register	1974	1975
	USA	4	Lockheed L 100–20	Transport	U.c.: $5 mn	1973	1975
		6	"Seawart"-type, Mk III	Inshore patrol boat	Displ: 33 t; 2 transferred Apr 1975	1971	1975–
Singapore	Israel	. .	IAI Gabriel	ShShM	Arming 6 fast patrol boats	1972	1975
	USA	40	McDonnell-Douglas A-4S Skyhawk	Fighter	Refurbished by Lockheed, Singapore	1972	1974–76
		3	McDonnell-Douglas TA-4S Skyhawk	Trainer	To supplement 40 A-4S single-seat fighters	1972	1975
		34	McDonnell-Douglas F-4 Phantom	Fighter		1975	. .

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
Taiwan	Israel	. .	Rafael Shafrir	AAM		1973	(1975)
	USA	10	Grumman E-2C Hawkeye	Early-warning and control aircraft		1975	. .
		~30	Northrop T-38 Talon	Supersonic trainer	AF operates; payment disputed as planes not formally transferred ex-USAF	. .	1974–75
		40	Northrop F-5E Tiger II	Fighter	First of initial batch of 40 delivered prior to licensed production of ~100; see licensed production register	1973	1975–
		. .	Hughes AGM-65A Maverick	ASM	Arming F-5Es	1973	1975–
		. .	NWC AIM-9 Sidewinder	AAM	Arming F-5Es	1973	1975–
		. .	Raytheon Improved Hawk	SAM	$90 mn	1975	. .
Thailand	USA	20	Fairchild AU-23A Peacemaker	COIN/fighter	$12 mn incl spares, arms	1974	1975–76
		(30	McDonnell-Douglas A-4 Skyhawk	Fighter	Ex-USN; refurbished; order may be cancelled	May 1973	. .)
		(30	Northrop F-5E Tiger II	Fighter	MAP; arms: Sidewinder AAM	May 1972	. .)
	Israel	. .	IAI Gabriel	ShShM	Advanced negotiations; may arm Lürssen boats	(1976)	. .
	Singapore	3	Lürssen, 45-m type	Missile boat	Displ: 230 t; under construction; (arms: Gabriel ShShM)	June 1973	. .
Viet-Nam, North	USSR	. .	SA-9	SAM	Used in Saigon area before end of war	. .	1975
Africa							
North Africa							
Algeria	Canada	2	Canadair CL-215	Amphibious patrol plane	AF operates for SAR duties	1974	1975
	France	5	Aérospatiale/Westland SA-330 Puma	Helicopter	In addition to 2 previously acquired	1974	1975
	Netherlands	6	Fokker-VFW F.27 Friendship	Transport		1974	1974–75
	(USA)	1	Beech King Air	Transport	AF operates for navaid	. .	1975

Libya	France	38	Dassault Mirage F-1	Fighter	50 more on option; arms: Matra Magic AAM	1975	1976–
		. .	Aérospatiale SS.11/12	ATM	Army operates	1974	1975
		. .	Matra R.550 Magic	AAM	Arming Mirage F-1s	1975	1976–
		10	SFCN PR, 72 type	Fast patrol boat	$186 mn; displ: 475 t; arms: OTOMAT ShShM	1974	. .
		2	. .	Landing ship	New construction by La Seyne	(1974)	1976
	France/Italy	. .	Matra/Oto Melara OTOMAT	ShShM	Arming 10 French and 4 Italian patrol boats under construction	1975	. .
	Italy	4	CNR	Patrol boat	Displ: 500 t; arms: OTOMAT ShShM	1975	. .
	USSR	29	MiG-23B "Flogger"	Fighter	Arms: 4 × Atoll AAM	1974	1975
		12	Mil Mi-8	Helicopter		1975	1975–76
		12	Tupolev Tu-22 "Blinder"	Bomber	Arms: "Kitchen" ASM	1975	. .
		. .	K-13 "Atoll"	AAM	Arming MiG-23s	1974	1975
		. .	"Kitchen"	ASM	Arming Tu-22s	1975	. .
		. .	AT-3 "Sagger"	ATM	Large number being delivered according to US intelligence	1974	1975
		. .	SAM-2, SAM-3, SAM-6	SAM	Total 62 launchers; first displayed in military parade Sept 1974	1974	1974–75
		600	T-55, T-62	Tank	Received by Sept 1975; according to US intelligence, 1 200 tanks will be supplied	1974	1974–75
		. .	. .	APC	Large number being delivered according to US intelligence	1974	1975
		6	. .	Submarine	Old; diesel-powered; crews training in USSR	. .	(1976)
	Yugoslavia	. .	Soko Galeb G-2A-E	Trainer	Selected as future standard AF trainer	1975	1975–
Morocco	France	40	Aérospatiale/Westland SA-330 Puma	Helicopter		1975	1975–76
		~25	Dassault Mirage F-1	Fighter	Probably initial batch; option on 50 more	1975	1977–
		. .	Aérospatiale MM.38 Exocet	ShShM	Arming SFCN patrol boats	1975	. .
		. .	Matra R.550 Magic	AAM	Arming F-1s	1975	1977–
		2	SFCN PR, 72 type	Patrol boat	Displ: 400 t; arms: Exocet ShShM, Bofors 40-mm L 70 cannon, Oto Melara 76-mm guns; 2 more planned	June 1973	1975

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
		2	"Batral"-class	Transp ship	Displ: 750 t; 1 hel platform; 1 more planned	1974	. .
		6	CMN, P-92 type	Fast gunboat	Displ 88 t; first 2 launched 1975; 14 more planned	Feb 1974	1975–76
	USA	6	Beech King Air A 100	Transport	For liaison	1974	1975
		12	Beech T-34C	Trainer	First export sale	1975	1976–
		6	Lockheed C-130A	Transport	U.c.: $4.8 mn	1973	1974–75
		24	Northrop F-5E	Fighter	May order after 2 years of negotiations, instead of further Mirage F1	(1976)	. .
		. .	Hughes BGM-71 TOW	ATM		1975	. .
		334	. .	APC	$142.5 mn incl 80 AA-cannon, trucks; US DoD announced sale 18 March 1975	1975	. .
Tunisia	France	. .	Aérospatiale SS.12M	ShShM	Arming P-48 patrol boats	1973	1975
		1	A-69 type "Aviso"	ASW corvette	Displ: 950 t; under construction	1972	. .
		1	P-48 type	Patrol boat	Displ: 250 t; in addition to 2 previously acquired; arms: SS.12 M ShShM	1973	1975
	Italy	3	Aeritalia G.222	STOL transport	U.c.: $4.7 mn; credit sale	1975	1976
		12	SIAI-Marchetti SF.260W Warrior	Trainer	$2.4 mn incl spares, training, support equipment	1974	1975
	USA	12	Northrop F-5E Tiger II	Fighter	$54 mn incl spares, support equipment; arms: Sidewinder AAM, Maverick ASM	1975	. .
		. .	Hughes AGM-65A Maverick	ASM	Arming F-5Es	1975	. .
		. .	NWC AIM-9 Sidewinder	AAM	Arming F-5Es	1975	. .
Sub-Saharan Africa							
Cameroon	China	(2	"Shanghai"-class	Patrol boat		. .	1975)
	France	1	Aérospatiale/Westland SA-330 Puma	Helicopter		. .	1975
		1	SFCN P-48 type	Large patrol boat	Displ: 250 t; arms: 40-mm guns	Sept 1974	1976
	Ivory Coast	2	LCM type	Patrol boat	Built by Carena, Abidjan	. .	(1975)

Chad	France	1	Douglas DC-4	Transport	Ex-French; for long-range transport	. .	(1975)
		5	Reims-Cessna F.337	Light plane	For liaison and supply	. .	1975
Congo	France	1	Aérospatiale Nord 262 Frégate	Transport		. .	1975
	Netherlands	1	Fokker-VFW F.28 Fellowship	Transport		1974	1975
Equatorial Guinea	China	2	"Shanghai"-class	Patrol boat		1973	1975
Ethiopia	Canada	4	DHC-3 Twin Otter	Light transport	For recently formed naval air arm; SAR and patrol duties	. .	1975
	FR Germany	2	Dornier Do-28D Skyservant	Transport	Under $3 mn military aid programme 1974–76	1974	(1976)
	Iran	1–2 sqds	Northrop F-5A Freedom Fighter	Fighter	Ex-Iranian AF; with US approval	1974	1975–
		. .	Martin Bullpup	ASM	Arming F-5As	1974	1975–
		. .	NWC AIM-9 Sidewinder	AAM	Arming F-5As	1974	1975–
	Sweden	3	Saab-Scania MFI-17 Supporter	Armed trainer/COIN		1975	. .
	USA	12	Cessna A-37 Dragonfly	Strike/trainer	Delivery temporarily suspended	1973	. .
		15	Cessna 310	Light plane	See above	1973	. .
		12	Northrop F-5E Tiger II	Fighter	See above; arms: Sidewinder AAM, Maverick ASM	1973	. .
		. .	Hughes AGM-65A Maverick	ASM	Arming F-5Es	1973	. .
		. .	NWC AIM-9 Sidewinder	AAM	Arming F-5Es	1973	. .
Gabon	France	1	Aérospatiale Alouette III	Helicopter	In addition to 3 previously acquired	. .	1975
		2	Aérospatiale/Westland SA-330 Puma	Helicopter	In addition to 1 previously acquired	. .	1975
		1	Dassault Falcon 20	Transport	U.c.: $2.6 mn	1975	1975
		(6)	Dassault Mirage IIIB	Fighter-bomber/trainer	Agreement signed on French aid to AF	1975	1977
	Netherlands	2	Fokker-VFW F.28 Mk 1000C	Transport	For AF	1975	. .
	USA	1	Grumman Gulfstream II	Transport	In addition to 1 previously acquired; government order	. .	1975
		1	Lockheed L-100-20	Transport	For support operations	1975	Dec 1976
		1	Lockheed L-100-30	Transport	For AF	Sept 1973	May 1975

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Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
Ghana	Fr Germany	1	. .	Patrol boat	Displ: 160 t; new construction	1973	1975
	Netherlands	1	Fokker-VFW F.28 Mk 3000	Transport		. .	Dec 1975
	UK	7	Scottish Aviation Bulldog 122	Basic trainer	In addition to 6 previously acquired	Dec 1974	1975
Ivory Coast	France	. .	Aérospatiale SS.12M	ShShM	Arming 1 missile boat	1975	. .
		1	P-48 type	Patrol boat	Displ: 240 t; arms: SS.12 M	1975	. .
		1	"Francis Garnier"-type	Transport ship		1975	. .
	Netherlands	2	Fokker-VFW F.28	Transport		1975	. .
Kenya	(Iran	10–15	Northrop F-5A Freedom Fighter	Fighter	Ex-Iranian AF; to be financed by US 1-year low-interest loan of $5 mn; Kenya denied order	1975	. .)
	UK	3	Brooke Marine, 32-m type	Large patrol boat	Displ: 120 t; under construction; arms: Bofors 40-mm guns; in addition to 4 previously acquired	May 1973	. .
Nigeria	Netherlands	3	Fokker-VFW F.27 Friendship Mk 500	Transport	In addition to 6 previously acquired	1975	. .
	UK	. .	Scorpion	Light tank		1975	. .
		. .	Fox	Armoured car		1975	. .
		1	Brooke Marine, "Bulldog"-class	Survey ship	$7 mn; displ: 800 t	1973	1976
		2	Brooke Marine, 33-m type	Patrol boat	Displ: 115 t; in addition to 2 previously acquired	Oct 1974	. .
	USA	6	Lockheed C-130H Hercules	Transport	$47 mn incl spares, support equipment, training	Oct 1974	1975–76
	USSR	1 sqd	MiG-21 "Fishbed"	Fighter	Initial batch delivered	. .	1975
		. .	MiG-17	Fighter	Ex-USSR	. .	1975
		. .	K-13 "Atoll"	AAM	Arming MiG-21s	. .	1975
Rhodesia	(New Zealand	20	NZAI CT-4 Airtrainer	Trainer	Unofficial reports	1975	1976)
	South Africa	. .	Aérospatiale/Alouette III	Helicopter	Ex-SAAF	. .	1975
		. .	Aérospatiale/Westland SA-330 Puma	Helicopter	Ex-SAAF	. .	1975

	..	2	Britten-Norman BN-2 Islander	Transport	In service with RhAF after conversion from civilian planes; supplier unknown	..	1975
Rwanda	France	3	Aérospatiale Fouga Magister	Armed trainer	Purchased as alternative to 6 M.B.326s, cancelled owing to lack of funding	1975	(1975)
		2	Douglas C-47	Transport		..	1975
	FR Germany	1	Dornier Do-27	Transport	In addition to 1 previously acquired	..	1975
	Romania	1	Britten-Norman BN-2 Islander	Transport	New; licensed production in Romania	..	1975
Senegal	France	1	SFCN P-48 type	Large patrol boat	Displ: 250 t; in addition to 2 previously acquired	(1975)	..
	Singapore	12	Vosper Thornycroft, 45-ft type	Patrol boat	Under construction	1973	..
Somalia	USSR	30+	(SS-N-2 "Styx")	ShShM		..	1975
		2	("Osa"-class)	Missile boat		..	1975
Sudan	Canada	1	DHC-6 Twin Otter	Transport	Defence Ministry order	1975	1975
Togo	France	5	Aérospatiale Fouga Magister	Jet trainer	Military aid to create AF; incl pilot and technical training	1974	1976
		1	Aérospatiale/Westland SA-330 Puma	Helicopter	See above	1974	1976
		1	Transall C-160	Transport	See above	1974	1976
		2	32-m type	Coastal patrol boat	Military cooperation reinforced Sept 1975	1975	Mid-1976
Uganda	USSR	(8)	MiG-21	Fighter	Assembled by Soviet technicians at Gulu AF base; arms: Atoll AAM	..	1975
		200	AT-3 "Sagger"	ATM	Mounted on BRDM vehicles, displayed in military exercise	..	1974–75
		..	K-13 "Atoll"	AAM	Arming MiG-21s	..	1975
		16	T-54	Tank	Delivered through Kenya	..	Mar 1975
		~100	BRDM	Amphibious APC	Arms: AT-3 "Sagger"	..	1974–75
		..	K-61	Amphibious APC	Delivered through Kenya	..	Mar 1975

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
Zaire	Canada	6	DHC-5D Buffalo	STOL transport		1974	. .
	China	25	T-59	Medium tank	Plus self-propelled gun, artillery; for FNLA in Angola	1974	1975
	France	17	Dassault Mirage 5	Fighter	$10.5 mn, incl training; offered by Pres. Mobutu to create FNLA AF in Angola	1973	1975–76
		. .	Aérospatiale AS.30	ASM	Arming Mirage 5s	1973	1975–76
		190	Panhard AML 60/90	Armoured car	In addition to 60 previously acquired; some given to FNLA in Angola	. .	1974–75
	USA	15	Cessna 310 R	Light plane	For training and liaison	1974	1975
		3	Lockheed C-130H Hercules	Transport	In addition to 3 previously acquired	1974	1975
Zambia	Canada	7	DHC-5D Buffalo	STOL transport		1974	. .
	Italy	25	AB-205	Helicopter	Armed	. .	1973–

South Africa

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
South Africa	Belgium	. .	Swearingen Merlin	Light transport	BAF sale; US design	. .	1975
	Canada	3	Canadair CL-215	Amphibious plane	Government order	1975	. .
	Israel	. .	IAI Gabriel II	ShShM	Arming Israeli patrol boats; licence-built in S. Africa; plus 6 new corvettes	1974	1974–
	France	. .	Airbus Industries A-300 Airbus	Tanker-transport	To support Mirage force	(1976)	(1977)
		16	Dassault Mirage F-1A	Fighter	Delivered prior to licensed production of second batch of 32; arms: Matra Magic AAM	1971	1975
		. .	Aérospatiale AM.39 Exocet	Air-launched ASM	Arming Super Frelon hel	1974	1977
		. .	Aérospatiale AS.11/12	ASM	Arming 40 AM.3Cs delivered 1974 and Impala I/II; see licensed production register	. .	1975–
		. .	Matra R.550 Magic	AAM	Arming Mirage F-1s	1972	1975–
		2	"Agosta"-class	Submarine	U.c.: $28 mn; displ: 1 200 t	1975	Nov 1978

	France/FR Germany	. .	Aérospatiale/MBB Milan	ATM	Delivery delayed owing to W. German opposition to sale to S. Africa	Dec 1973	. .
Central America							
El Salvador	Israel	18	Dassault M.D. 450 Ouragan	Fighter-bomber	Refurbished; package deal incl Arava, Magister	1973	1975
		22	IAI-201 Arava	STOL transport	U.c.: $650 000; see above	1973	1974–
		6	IAI Fouga Magister	Trainer	See above; licensed production in Israel	1973	1975
Jamaica	USA	3	Beech Duke	Light transport		1975	1975
		1	Beech King Air A 100	Transport		1975	1975
		3	Bell 212	Helicopter		1975	1975
		3	Sewart	Patrol boat	Displ: 104 t; new construction	(1972)	1974–76
Mexico	Israel	25	IAI-201 Arava	STOL transport	U.c.: $650 000	1973	1973–
	UK	21	"Azteka"-class	Coast guard vessel	$29 mn; displ: 130 t	1973	1974–75
	USA	20	Beech F.33C Bonanza	Trainer	$1.3 mn	1974	1974–75
		1	Gates Learjet 24D	Transport		. .	Apr 1975
		4	Grumman HU-16A Albatross	Amphibious plane	Refurbished	. .	1975
		13	Hughes Model 500 M	Helicopter	AF operates	. .	(1975)
Nicaragua	Israel	14	IAI-201 Arava	STOL transport	U.c.: $650 000	1973	1974–
Panama	Israel	1	IAI 1123 Westwind	Transport	For AF	. .	1975
	UK	1	Britten-Norman BN-2 Islander	Transport	For AF	. .	1975
	USA	4	Bell UH-1N	Helicopter		. .	1975
South America							
Argentina	France	. .	Aérospatiale MM.38 Exocet	ShShM	Arming 8 Type 21 destroyers; see licensed production register	1974	. .
	Israel	. .	IAI Gabriel	ShShM	Arming 2 new fast patrol boats; see licensed production register	1974	1975
	Italy	3	Aeritalia G.222	Transport	U.c.: $4.7 mn	1974–75	1976–77
		(6	Aermacchi M.B.326	Armed trainer		1974	. .)

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
	Netherlands	5	Fokker-VFW F.28 Mk 1000C	Transport	For AF transp pending arrival of G.222	1974	1975–76
	UK	2	Westland/Aérospatiale Lynx	ASW hel	Arming 2 Type 42 destroyers	1972	(1976)
		. .	BAC Seawolf	SAM	Arming 6 new Type 21 destroyers; see licensed production register	1974	. .
		. .	HSD Sea Dart	SAM	Arming 2 Type 42 destroyers	1975	1975–76
	USA	2	Beech Super King Air 200	Transport	For Navy	1975	(1975)
		1	Boeing 707-320B	Transport	For AF	. .	Feb 1975
		6	Grumman E-2C Hawkeye	Early-warning and control aircraft		1975	. .
		3	Lockheed L-188 Electra	Transport	For Navy; $3.5 mn for Lockheed refurbishing	1973	1974–75
		2	Lockheed C-130H Hercules	Transport	In addition to 6 previously acquired	1974	1975
		16	McDonnell-Douglas A-4C	Fighter-bomber	Refurbished; in addition to 50 previously acquired	1975	1976–
		(20–31	Northrop F-5E Tiger II	Fighter	$50 mn; negotiations reopened after several years' interval	. .	. .)
		4	Piper Navajo	Light plane	For Army	. .	1975
		2	Rockwell Sabreliner	Transport	1 for VIP use; 1 for Army air wing	1975	1975
		2	Sikorsky S-61 NR	Helicopter	For AF SAR duties	1974	1974–75
		. .	NWC AIM-9 Sidewinder	AAM	Arming IA.58 Pucará; see indigenous production register	(1975)	. .
Bolivia	Argentina	18	IA.58 Pucará	COIN/strike	Argentinian design	1975	Dec 1976–
	Brazil	. .	EMB-110 Bandeirante	Transport	Brazilian design	1975	. .
		8–12	Neiva T-25 Universal	Trainer	Brazilian design; advanced negotiations	(1976)	(Mid-1976)
	Israel	6	IAI 201 Arava	STOL transport	$5.5 mn incl training	May 1975	. .
	USA	12	Douglas C-47	Transport	AF operates	. .	(1974–75)
		1	Fairchild Turbo Porter	STOL transport		. .	Oct 1975
		1	Gates Learjet 25B	Transport	For AF	. .	July 1975
		2	Lockheed L-188 Electra	Transport	Refurbished; not C-130 Hercules as first reported	1974	1975
		21		Small patrol boat	To patrol Lake Titicaca	. .	(1974–75)
		1		Transport ship	See above	. .	(1975)

Brazil	Australia	. .	GAF Ikara	ShShM	Arming 4 Niteroi frigates; see licensed production register	Feb 1972	1976–79
	France	20+	Aérospatiale MM.38 Exocet	ShShM	U.c.: $480 000/system: see above	Nov 1972	1976–79
		. .	Aérospatiale AS.11/12	ASM	Arming EMB AT-26 Xavante; see licensed production register	1972	1974–77
		. .	Matra/Oto Melara OTOMAT	ShShM	Arming 4 Niteroi frigates; see licensed production register	May 1972	1976–79
		6–12	. .	Corvette	Displ: 750 t; planned acquisition 1975–80	. .	. .
	France/FR Germany	6 systems	Aérospatiale/MBB Roland II	SAM	For Army; fitted on W. German "Marder" vehicle	1975	1976
	FR Germany	2	"Aratu"-class	Coastal minesweeper	Displ: 230 t; in addition to 4 previously acquired	Dec 1973	1975
	UK	12	HS 748-2A	Transport	U.c.: $1.5 mn	Oct 1973	1974–75
		9	Westland/Aérospatiale Lynx	ASW hel	$24 mn; for Navy; arming Niteroi frigates and SAR duties; arms: BAC Sea Skua ShShM	1975	1977
		. .	BAC Sea Skua	ShShM	Under development in UK	1975	. .
		. .	Short Seacat	ShShM	Arming 6 Niteroi frigates; see licensed production register	July 1972	1976–79
		1	"Oberon"-class	Submarine	Displ: 1 610 t; launched Sept 1975; in addition to 2 previously acquired	1972	(1975)
	USA	14	Bell UH-1H Iroquois	Helicopter	$6 mn; in addition to 22 previously acquired	(1974)	1975
		6	Bell 206 A JetRanger	Transport	For AF VIP and liaison duties	(1974)	1975
		2	Boeing 737-200C	Transport	For AF	1975	1976
		5	Lockheed C-130H Hercules	Transport		1975	. .
		36+6	Northrop F-5E/B Tiger II	Fighter	$115 incl spares and support equipment; delivery rate: 2/month; arms: Sidewinder AAM, Maverick ASM	1973	1975–
		. .	Hughes AGM-65A Maverick	ASM	Arming 36 F-5Es	1973	1975–
		. .	NWC AIM-9 Sidewinder	AAM	See above	1973	1975–
Chile	Brazil	10	Neiva N.621 Universal I	Trainer	U.c.: $70 000; Brazilian design	1974	1975
	France	6	Aérospatiale SA-315 Lama	High-altitude hel	For AF	. .	1975
		~300	Aérospatiale AS.11/12	ASM	Plus rockets	1974	(1975)
		. .	Aérospatiale MM.38 Exocet	ShShM	4 launchers each on 2 Almirante destroyers and two Leander frigates	1973	. .

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
	UK	. .	Short Seacat	ShShM	Arming 2 Leander frigates	1970	1974–75
		2	"Leander"-class	Frigate	$156 mn; displ: 2 550 t; arms: Exocet ShShM, Seacat ShShM	1969	1974–75
		2	"Oberon"-class	Submarine	Both completed 1974 but delivery delayed	1969	. .
	USA	16+18	Cessna A-37B Dragonfly	COIN/ground attack	$11 mn; FMS	1973	1975–78
		15+3	Northrop F-5E/F Tiger II	Fighter	$60 mn incl spares, support equipment, training; arms: Sidewinder AAM, Maverick ASM	Oct 1974	1976
		. .	Hughes AGM-65A Maverick	ASM	Arming 15 F-5Es	Oct 1974	1976
		. .	NWC AIM-9 Sidewinder	AAM	See above	Oct 1974	1976
Ecuador	Canada	2	DHC-5D Buffalo	STOL transport	$10.63 mn incl 3 DHC-6s; Ex-Im Bank loan	1974	. .
		3	DHC-6 Twin Otter	STOL transport	See above	1974	1975
	France	4	Aérospatiale SA-315 Lama	High-altitude hel	$1.25 mn; armed	1974	. .
		2	Aérospatiale/Westland SA-330 Puma	Helicopter		. .	1975
		. .	Aérospatiale MM.38 Exocet	ShShM	Arming 3 "Manta" patrol boats	1974	. .
		. .	Matra R.550 Magic	AAM	Arming 12 Jaguars	1974	. .
		40	AMX-13	Light tank	$27 mn +; 5-year credit	1974	1975–76
		6	AMX-155	Self-propelled howitzer	See above	1974	(1975)
	FR Germany	3	"Manta"-class	Fast patrol boat	Displ: 250 t; new construction by Lürssen; in addition to 3 previously acquired; arms: Exocet ShShM	1972	. .
		2	Type 209	Submarine		1975	. .
	Israel	10+	IAI-201 Arava	STOL transport	Small additional number ordered 1975	1974–75	1974–
	UK	10+2	BAC/Dassault Jaguar International	Strike/trainer	Arms: Matra Magic AAM	Apr 1974	. .
		4	BAC 167 Strikemaster Mk 89	Strike/trainer	$4.8 mn incl spares; in addition to 12 previously acquired; delivery delayed	1974	1975
		2	HS 748 Series 2A	Transport	In addition to 3 previously acquired	1974	1975
	USA	(. .	Beech T-34C	Trainer	Unconfirmed	1975	. .)
		12	Cessna A-37B	COIN/fighter	$20 mn incl spares, training	1975	1976
		2+1	Gates Learjet 25B/D	Transport	For AF	1974	1975

Paraguay	Brazil	20	Aerotec 122 Uirapuru	Trainer	Brazilian design; delivery delayed	March 1973	1975–
		5	Douglas DC-6B	Transport	Military aid; refurbished	1975	1975
		8	Fokker S-11	Trainer	Surplus; interim equipment pending delivery of Uirapuru	1975	1975
		7	NA T-6 Texan	Trainer	Military aid; surplus	1975	1975
Peru	Argentina	. .	M-113	APC	Ex-Argentinian Army	(1975)	1975
	Australia	2	GAF Nomad	STOL transport	May purchase up to 100	1974	(1975)
	France	15	Dassault Mirage 5	Fighter	In addition to 14 previously acquired; arms: AS.30 ASM	1974–75	. .
		. .	Aérospatiale AS.11	ASM	Displayed on helicopters in military parade	1974	1975
		. .	Aérospatiale AS.30	ASM	Arming Mirage 5s	1974–75	. .
		. .	Cadillac Gage Commando	Armoured car	Displayed in military parade	. .	1975
	FR Germany	. .	MBB Bo 810 Cobra 2000	ATM	See above	. .	1975
		. .	Rheinstahl UR 416	Armoured car	See above	. .	1975
		2	Type 209	Submarine	Displ: 1 000 t	May 1972	1975
	Italy	6–8	AB-212	Helicopter	For ASW; arming 4 Lupo frigates	1974	. .
	Italy	~43	Oto Melara/Matra OTOMAT	ShShM	See above	1974	. .
		. .	Selenia Albatros Aspide	SAM	$2.3 mn/system excl missile; arming 4 Lupo frigates	(1975)	. .
		4	"Lupo"-class	Frigate	Arms: OTOMAT ShShM, 1 hel; 2 to be built in Peru	1974	. .
	Netherlands	1	Fokker-VFW F.28	Transport	For AF	June 1975	1976
	Switzerland	6	Pilatus Turbo Porter	STOL transport		1974	1975
	UK	8+3	Canberra B(I)8	Bomber	Refurbished; ex-RAF stocks	1974–75	1975
	USA	24	Cessna A-37	COIN/fighter	U.c.: $750 000	1974	1975
		(40	Cessna Model 172	Light plane		1974	1975)
		~6	Douglas C-47	Transport	For naval air arm; in addition to 4 previously acquired	. .	1975
		9	Grumman S-2A Tracker	ASW fighter	For naval air arm; ex-USN	. .	1975
		(24	Northrop F-5E Tiger II	Fighter	Offer expired without order; Mirage may be chosen instead	. .	. .)
		1	Piper Aztek	Transport	For naval air arm	. .	1975
	USSR	6	Mil Mi-8	Helicopter	Credit sale; in addition to 2 previously acquired	Dec 1974	1975
		14	Mil Mi-8	Helicopter	Credit terms: 3-year grace period, 7-year repayment, barter accepted, low interest rate	(1976)	. .

Recipient	Supplier	No. of items	Item	Description	Comment	Date of order	Date of delivery
Uruguay	Brazil	5	EMB-110 Bandeirante	Transport	$5 mn incl 10 Ipanema agricultural planes	1975	1975–76
		20	Lockheed AT-33A	Trainer	Ex-BAF; refurbished 1974; order not finalized	(1976)	. .
Venezuela	France	6	. .	Coastal patrol boat	Displ: 45 t; new construction	1975	. .
	FR Germany	2	Type 209	Submarine	Displ: 980 t	1973	1975
	Italy	27	Oto Melara/Matra OTOMAT Mk 2	ShShM	Arming 3 Constitucion missile boats	June 1972	1975
		. .	Oto Melara/Matra OTOMAT Mk 2	ShShM	Arming some of 21 new corvettes; see licensed production register	1974	. .
		6	"Lupo"-class	Frigate	$550 mn; missile system not decided; 6 more planned	Dec 1975	(1979)
		21	. .	Corvette	Under construction by INMA; some to be built in Venezuela; see licensed production register	March 1973	. .
	Spain	12	CASA C.212 Aviocar	STOL transport	For AF	1975	. .
	UK	6	Vosper Thornycroft, "Constitucion"-class	Fast patrol boat	$16.7 mn; displ: 150 t; arms: OTOMAT ShShM and Bofors 40-mm cannon on 3 boats; Oto Melara 76-mm guns on 3 boats	Apr 1972	1974–75
	USA	2	Lockheed C-130H Hercules	Transport	In addition to 4 previously acquired	1974	1975
		(14	Northrop F-5E Tiger II	Fighter	$30 mn; FMS; arms: Sidewinder AAM, Maverick ASM	1975	. .)
		12	Rockwell T-2D Buckeye	Trainer	In addition to 12 previously acquired; USN sale	1975	1976
		(. .	Hughes AGM-65A Maverick	ASM	Arming F-5Es	1975	. .)
		(. .	NWC AIM-9 Sidewinder	AAM	See above	1975	. .)
		2	"Guppy II"-class	Submarine	Displ: 1 870 t; refurbished	. .	1975

[a] Abu Dhabi, Ajman, Dubai, Fujairah, Ras Al Khaimah, Sharya and Umm-al-Qaiwain.

7. Sources and methods for world armaments data

Square-bracketed numbers, thus [1], refer to the list of references on page 293.

This chapter describes the sources and methods used in the preparation of the appendices on military expenditure, arms production, arms trade and the chronology of post-war combat aircraft, missiles and fighting ships (appendices 6A, 6B, 6E, 6C, 6F and 6D, respectively). Only the main points are noted here. Further details on the arms production registers are given in the SIPRI Yearbook 1974 and on the arms trade registers in the SIPRI Yearbook 1973. Except for the chronology, the various appendices are updated versions of those which appeared in the SIPRI Yearbook 1975.

I. *Purpose of the data*

Together, the military expenditure tables and the arms production and trade registers form the nucleus of a comprehensive, quantitative survey of world armaments. The purpose of the military expenditure estimates is to provide an indication of the overall volume of military activity in different countries, and of the resources absorbed by this activity. The arms production and trade registers show the origin, flow, costs and main characteristics of major weapons now being acquired in all countries. The chronology gives an overview of some of the main operational weapon systems resulting from the research and development efforts in the four principal arms-producing countries.

Countries and time period covered

The appendices, except for the weapon chronology, cover all countries in the world. For the military expenditure data, countries are arranged alphabetically within the following regional groupings: NATO (North Atlantic Treaty Organization), WTO (Warsaw Treaty Organization), Other Europe, Middle East, South Asia, Far East, Oceania, Africa, Central America and South America. The arms production and arms trade registers have been divided into industrialized countries (NATO, WTO, Other Europe and Other Developed, the latter comprising Australia, China, Japan and New Zealand) and third world countries (rest of the world, by region). This division is not based on any rigid economic criteria but rather on broad differences in the nature and purpose of the trade in armaments in particular. The absence of a country, or an entire region, from one or another of the arms production and trade registers means that no activity of the type indicated has been found for that area.

The arms production registers (appendices 6B and 6E) include only items believed to have been actually in production or under development during the calendar year 1975. The arms trade registers (appendices 6C and 6F) cover items on order or delivered in 1975.

In the case of the military expenditure series it should be noted that in this edition of the *Yearbook* the figure for the most recent year is generally a revised estimate; and the figure for the next preceding year (in the present case, 1974) is, in general, a final figure for actual outlays in that year. The degree of uncertainty relating to figures derives from the fact that contingencies may result in actual expenditures which differ—occasionally very widely—from the budgeted amounts; and government accounting procedures can require a considerable time after the closing of the fiscal year to arrive at a final figure for the total amount paid out during that period.

The military expenditure estimates refer to the calendar year in all cases. For countries where the governmental fiscal year differs from the calendar year, conversion to a calendar-year basis is made on the assumption of an even rate of expenditure throughout the fiscal year.

II. *Sources*

The sources of the data presented in the appendices are of five general types: official national documents; journals; newspapers; books, monographs and annual reference works; and documents issued by international and intergovernmental organizations.

The official national documents include budgets; parliamentary or congressional proceedings, reports and hearings; statistics, white papers, annual reports and other documents issued by governments and agencies; and statements by government officials and spokesmen. These and the journals and newspapers contain information relating to both military expenditure and weapon production and trade. Comparatively few books or monographs are used, since the information in such works is generally too dated. An exception is annual reference works, which contain up-to-date information. The reference books in the list below were used primarily in the preparation of the weapon chronology which is unique to this *Yearbook*. The main official international documents which are used are those containing information relating to military expenditures. There are no surveys published by international or intergovernmental organizations on weapon production or trade.

The following list shows the periodical publications which are perused regularly for relevant data:

Journals

Africa (London)
Africa Diary (New Delhi)
Africa Research Bulletin (Exeter, UK)
Air Actualités (Paris)
Air et Cosmos (Paris)
Air Force Magazine (Washington)
Air International (Bromley, UK)
Arab Report and Record (London)
Armament Data Sheets (London, Aviation Studies Atlantic)
Armed Forces Journal (Washington)
Armies and Weapons (Genoa)
Asian Recorder (New Delhi)
Aviation Week and Space Technology (New York)
China Report (New Delhi)
Congressional Quarterly Weekly Report (Washington)
Current Scene (Hong Kong)
Defense Monitor (Washington)
Defense Nationale (Paris)
Economist (London)
Far Eastern Economic Review (Hong Kong)
Flight International (London)
Flying Review International (London)
Forces Armées Françaises (Paris)
Interavia (Geneva)
Interavia Airletter (Geneva)
Interavia Data (Geneva)
International Affairs (London)
International Defense Business (Washington)
International Defense Review (Geneva)
International Market Report
Keesing's Contemporary Archives (Bristol)
Milavnews (Stapleford, England, Aviation Advisory Services)
Missiles and Rockets (Washington)
National Defense (Washington)
Nato Review (Brussels)
New Times (Moscow)
News Review on China, Mongolia and the Koreas (New Delhi)
News Review on Japan, South East Asia and Australasia (New Delhi)
News Review on South Asia (New Delhi)
News Review on West Asia (New Delhi)
Official Price List (London, Aviation Studies Atlantic)
Peking Review (Peking)
Soldat und Technik (Frankfurt)
Soviet Military Review (Moscow)
US Naval Institute Proceedings (Annapolis, Md.)
Wehrtechnik (Bonn-Duisdorf)
Österreichische Militärische Zeitschrift (Vienna)

Newspapers

Dagens Nyheter (Stockholm)
Daily Telegraph (London)
Financial Times (London)
Guardian (London)
Hindustan Times (New Delhi)
International Herald Tribune (Paris)
Japan Times (Tokyo)
Krasnaja Zvezda (Moscow)
Le Monde (Paris)
Neue Zürcher Zeitung (Zurich)
New York Times (New York)
Pravda (Moscow)
Standard Tanzania (Dar-es-Salaam)
Sunday Times (London)
Svenska Dagbladet (Stockholm)
Times (London)

Annual publications

For data on military expenditure:

AID Economic Data Book: Africa (Washington, United States Agency for International Development)

AID Economic Data Book: Far East (Washington, United States Agency for International Development)

AID Economic Data Book: Latin America (Washington, United States Agency for International Development)

Far Eastern Economic Review Yearbook (Hong Kong, Far Eastern Economic Review)

Military Balance (London, International Institute for Strategic Studies)

"NATO Defence Expenditure", *NATO Review* (Brussels, NATO)

Statesman's Year-Book (London, Macmillan)

Statistical Yearbook (New York, United Nations)[1]

World Military Expenditures and Arms Trade (Washington, United States Arms Control and Disarmament Agency)

For data on gross domestic product or net material product:[2]

Yearbook of National Accounts Statistics (New York, United Nations)[3]

For data on weapon production and trade:

"Forecast and Inventory", *Aviation Week and Space Technology* (New York, McGraw-Hill)

International Air Forces and Military Aircraft Directory (Stapleford, England, Aviation Advisory Services)

Jane's All the World's Aircraft (London, Macdonald & Co.)

Jane's Fighting Ships (London, Macdonald & Co.)

Jane's Weapon Systems (London, Macdonald & Co.)

"Military Aircraft of the World", *Flight International* (London, IPC Transport Press)

Other reference books

Emme, E. M., *The History of Rocket Technology* (Detroit, 1964, Wayne State University Press)

Green, W., *The Observer's Book of Aircraft* (London, 1975, Frederick Warne & Co.)

Green, W. & Swanborough, G., *The Observer's Soviet Aircraft Directory* (London, 1975, Frederick Warne & Co.)

[1] This source also contains information on gross domestic product.

[2] In addition to the source listed, two journals, *International Financial Statistics* and *IMF Survey*, both published by the *International Monetary Fund* (Washington), are used.

[3] This is supplemented by the journal *Monthly Bulletin of Statistics*.

Green, W. & Fricker, J., *The Air Forces of the World* (London, 1958, Macdonald & Co.)
Green, W. & Pollinger, G., *The Aircraft of the World* (London, 1953, Macdonald & Co.)
Green, W. & Punnett, D., *Macdonald World Air Power Guide* (London, 1963, Macdonald & Co.)
Gunstan, G., *Bombers of the West* (London, 1973, Ian Allan)
Lee, A., *The Soviet Air Force* (London, 1961, Gerald Duckworth & Co.)
Lee, A. (ed.), *The Soviet Air and Rocket Forces* (London, 1959, Weidenfeld and Nicolson)
Schwiebert, E. G., *A History of the US Air Force Ballistic Missiles* (New York, 1965, Frederick A. Praeger)
Stockwell, R. E., *Soviet Air Power* (New York, 1956, Pageant Press)
Taylor, J. W. R., *Combat Aircraft of the World* (London, 1969, Ebury Press)
Taylor, M. J. H. & Taylor J. W. R., *Missiles of the World* (London, 1972, Ian Allan)
Ulanoff, S., *Illustrated Guide to US Missiles and Rockets* (New York, 1959)
Wiener, F., *Die Armeen der Warschauer-Pakt-Staaten* (Munich, 1974, J. F. Lehmanns Verlag)

III. *Definitions and restrictions*

The military expenditure estimates are intended to show the amount of money actually spent (outlays) for military purposes. It should be noted that in many countries there are alternative series for funds budgeted, appropriated (set aside) or obligated (committed to be spent). Since our objective is to show the volume of activity, series for actual expenditures have been chosen in preference to these alternatives. Even with this series, there may be some misrepresentation of the volume of activity—particularly for the United States and to a lesser extent for other major arms-producing countries—since payment for arms procurement may lag behind the actual production work. The expenditure series has the advantage, however, of being the only final measure of the actual amount of resources consumed.

Military expenditures are defined to include weapon research and development, to include military aid in the budget of the donor country and to exclude it from the budget of the recipient country, and to exclude war pensions and payments on war debts.

For calculating the ratio of military expenditure to national product, either gross domestic product (GDP) at purchasers' values or net material product (NMP) has been used, following the practice of the individual countries in identifying national product. GDP is defined as "the final expenditure on goods and services, in purchasers' values, less the c.i.f. [cost, insurance, freight] value of imports of goods and services" [1]. NMP is defined as "the net (of depreciation) total amount of goods and productive series produced in a year expressed at realized prices" [2]. The ratio of military expenditure to national product will generally be higher when NMP is used, since this measure excludes a variety of services which are included in GDP.

The four arms production and trade registers all cover what we have referred to as "major weapons"—that is, aircraft, ships, armoured vehicles and missiles. Strictly speaking, all of these except missiles are potential "weapon platforms", while missiles are part of "weapon systems". However, our use of the term "weapon" or "major weapon" by and large conforms with general practice. The great majority of the aircraft, ships and armoured vehicles entered in the registers are armed: as such they constitute either the central component of a weapon system which is generally identified by reference to that platform or a major unitary fighting system. For production of indigenously designed weapons and for licensed production in developed countries (appendix 6B), only armed ships and armoured vehicles are included. However, all aircraft—including unarmed transport and utility planes—are covered. The reason for the different treatment of aircraft is twofold. First, most aircraft can easily be converted to carry armaments and to form effective fighting platforms. This is not equally true of non-armoured vehicles and support ships. Second, the technology required to produce aircraft of any kind is generally more advanced than that required for vehicles and ships which may not differ significantly from widely produced civilian counterparts. The coverage of arms imports by all countries (appendices 6C and 6F) and licensed production in third world countries (appendix 6E) is extended to include unarmed ships and armoured vehicles as well as unarmed aircraft, the criterion for inclusion simply being delivery to the armed forces of the country concerned. This results in the listing of a very small number of items of the type not included in the indigenous production register.

As a result of the exclusion of small arms, ammunition and artillery, the coverage of weapon production and imports by third world countries is estimated to reflect only about one-half of the total procurement of military equipment in this region. In the case of the developed countries, which are generally equipped with more sophisticated weaponry, the proportion is probably considerably higher. The main aspect of the procurement activity in these countries, which is not reflected in any way in the register, is that associated with infrastructure and support equipment, such as land-based radar systems, communication networks, data-processing facilities, and so on. The satellite systems produced by the United States and the Soviet Union for the purposes of reconnaissance, navigation and communication constitute the most advanced and expensive type of support equipment not covered by the registers: funds for the development and production of space systems are estimated to account for about 5 per cent of the annual US budget for procurement of weapons and equipment.

IV. *Military expenditure tables (appendix 6A)*

The estimates of the military expenditures of NATO countries are taken from official NATO data, the figures for Warsaw Treaty Organization countries other than the USSR are from national budgets, and the estimates for the remaining countries in the world are in general taken from the United Nations *Statistical Yearbook*. The figures for the Soviet Union are SIPRI estimates, the methodology of which was explained in appendix 8B of the *SIPRI Yearbook 1974*. For many countries, the estimates for the most recent years are based on budget figures derived from newspapers and journals and other sources described above.

In order to provide time series estimates of total world military expenditure at constant prices, two operations must be performed. First, all national expenditure must be converted into a common currency: the most widely used unit for such a purpose is the US dollar, which SIPRI has also adopted. For this purpose it is necessary to use constant exchange rates, preferably those prevailing in a "normal" year.[4] Second, it is necessary to adjust for the effect of changes in the level of prices.

For most countries we have used the official exchange rate in 1970 or, if this fluctuated during the year, the weighted average rate. For the Warsaw Treaty Organization countries, special purchasing power parities were used because these yielded more reasonable expenditure relationships both within the WTO and between these countries and the rest of the world. For WTO countries other than the USSR, and for Albania, purchasing power parities calculated by Benoit and Lubell were used [3]. For the USSR, SIPRI estimates of the rouble:dollar purchasing power parity have been calculated (see *SIPRI Yearbook 1974*, appendix 8B).

The adjustment for changes in prices was made by applying the consumer price index in each country. In many countries this is the only price index available: as an index of the general movement of prices, it is a reasonable one for showing the trend in the resources absorbed by the military, in constant prices. For further detail on this point, the reader is referred to the *SIPRI Yearbook 1972* [4].

V. *Registers of indigenously designed and licence-produced weapons in development or production (appendices 6B and 6E)*

Arrangement and classification of entries

Within the four broad categories of major weapons (aircraft, missiles, ships and armoured vehicles), the systems produced by each country are arranged by function. Thus aircraft are presented as follows: bombers, fighters, strike,

[4] A year in which most of the major currencies had a fixed parity with the dollar.

other combat aircraft (for example, maritime patrol), reconnaissance aircraft and other electronic equipment platforms, transports, trainers, utility planes, armed helicopters, transport helicopters and utility helicopters. For all these categories, except bombers, other combat aircraft, reconnaissance aircraft and armed helicopters, there is a further subdivision between heavier and lighter types.[5] In the case of missile systems, a set of abbreviated descriptions of the launching platform and target is employed, and entries are listed first by launching platform (fixed land-based, towed, mobile, portable, fixed-wing aircraft, helicopter, ship, submarine) and, within these groups, by target (fixed land-based, tank, missile, fixed-wing aircraft, helicopter, ship, submarine). For ships, the following descriptive categories were evolved on the basis of the nomenclature employed by the majority of countries: strategic submarines (equipped with long-range strategic missiles), hunter-killer (counter-submarine) submarines (fast, nuclear-powered submarines without antiship missiles), antishipping submarines (equipped with antiship missiles), ordinary submarines, coastal submarines, aircraft carriers (over 30 000-tons displacement), cruisers (7 000–25 000 tons), destroyers (3 500–6 999 tons), frigates or escorts (1 350–3 499 tons) corvettes (500–1 300 tons) and patrol boats or missile boats (below 500 tons). In the few cases where national descriptive designations depart radically from this scheme—for example, the French use of "corvette" for a 3 000-ton ship—these standardized descriptions have been inserted in square brackets in place of the official one.

An attempt has been made to place newer systems first and older ones second, within the various functional groupings.

Aircraft, ship and armoured vehicle armaments

No attempt has been made to describe the armaments carried on the combat aircraft since these are generally both too numerous for the space available and variable (that is, most combat aircraft can carry a variety of alternative weapon loads). For armoured vehicles, the main armament is indicated in the first of the columns of standardized data. In the case of ships, symbols indicating the nature and number of all armaments except the limited-capability antisubmarine mortars and rockets launchers are shown directly after the description. The order in which ship armaments are listed is as follows: missiles (ship-to-ship, ship-to-air, ship-to-submarine, submarine-to-submarine, submarine-to-surface), guns, antisubmarine torpedo tubes or torpedo launchers and ordinary torpedo tubes.

[5] In the case of transport aircraft, the following apply: heavy (over 200 000 kg), medium (50 000–200 000 kg), ordinary (10 000–30 000 kg). For fighter and strike aircraft, light types are defined as those weighing less than 11 000 kg. Most unarmed helicopters fall into one of the following categories: heavy lift (over 50 000 kg), medium transport (ca. 20 000 kg), transport (ca. 6 000–7 000 kg), utility (2 000–5 000 kg) or light utility (under 2 000 kg).

System specifications

The data on speed, weight and range are maximum values in all cases except for ship displacement, which is standard. In some cases these values are dependent on a number of variables. For example, in the case of aircraft the figure given for speed is the maximum speed under optimal conditions, which generally means that the aircraft carries no external payload and is flying at or near its maximum altitude.

Programme history

The dates given for design, prototype test and production are initial dates only, except for data pertaining to the Soviet Union, where little official data relating to weapon system developments is published. In the case of the USSR, the dates shown in the prototype test column generally refer to the time when a system was first reported to have been observed. In most cases these dates probably postdate initial prototype tests by one to two years.

Numbers to be produced

An attempt has been made to divide the total planned production number of each system, or the number on order, between units to be manufactured for domestic military acquisition and units manufactured for export. When such data was available, the numbers to be procured for domestic acquisition are shown first, followed by a stroke and then the numbers for export. When a figure for total production was available but it was not known whether any of this production was intended for export, or what proportion was intended for export, a single figure appears.

In the case of the Soviet Union, China and many third world countries, it has been impossible to obtain estimates for total planned production. For these countries, the number of units produced to date, if known, is given.

Financial data

Data on research and development (R&D) costs refer to the total amount of money spent—or planned to be spent—on the development of the system over a period of years. Data on unit prices are average figures for the cost of an equipped item, excluding prorated R&D costs, spares and associated ground equipment.

The financial data should be used with great caution: they are intended to indicate general orders of magnitude only. It has not been possible to obtain standardized information, and in some cases the R&D costs and average unit prices have been calculated on a constant-price basis, with reference to some year in the early 1970s, while in the other cases the figures represent actual funds expended over a period of years, with no allowance made for inflation. Projected costs for systems to be produced later in the 1970s have an even greater element of uncertainty added to the noncomparability arising from the fact that some figures are based on price levels in the early 1970s while others are computed on the basis of projected price levels.

Foreign-designed components

The final column of the register of indigenously designed weapons produced in industrialized countries shows the use of foreign-designed power plants (engines), armaments or electronic components, with the exporting country indicated in brackets. Occasionally a foreign-designed component can be the result of a collaborative effort by two or more countries. Such cases are entered as follows: P(Fr.+UK). Similarly, a weapon system may incorporate electronic components or armaments designed and/or produced in more than one foreign country. Such cases are entered as follows: A(USA, It.) or E(UK, Switz.).

Weapon production in the third world

The foregoing comments apply generally to the four weapon production registers. However, the registers for the third world (appendices 6E and 6F) have a different arrangement from that applying to the industrialized countries. There are two reasons for this. First, the volume of weapon production activity in most third world countries is comparatively small. Second, one of the main points which these registers attempt to illuminate is the degree of self-sufficiency in weapon design and production which individual third world countries have achieved.

For these reasons the third world registers are arranged by region and country rather than by type of major weapon, and for each country all weapon development and/or production activity is listed. This necessitated some changes in the column headings. In addition the column headings have been changed to permit the recording of more details on the degree of indigenization of a given weapon production programme. This information is also used to value the arms trade component of weapons produced under licence.

VI. *Weapon chronology (appendix 6D)*

Purpose and scope

The chronology of aircraft, missiles and ships introduced into operational service in the four major arms-producing countries is new this year. It is intended primarily for reference although it also provides an overview of the volume and direction of post-war weapon development and production. The four countries in the chronology—the USA, the USSR, the UK and France—are responsible for the great bulk of world-wide weapon production and probably account for in excess of 90 per cent of the resources devoted to military R&D since World War II.

Comprehensiveness and accuracy

An attempt has been made to make the chronology as complete as possible. In many cases, particularly for variants of aircraft and missiles, no reference could be found to the actual date of introduction but, by correlating various pieces of information, a probable date could be estimated. When this was done the entry was enclosed in brackets. In cases where operational variants of an aircraft or missile are known to exist but where no reasonable estimate could be made of the date of introduction, the designation of the variant(s) appears in a footnote.

The Soviet Union presents a special problem. If the same standards were adopted as for the other three countries, virtually every Soviet entry would be bracketed. Since this would serve no useful purpose, Soviet entries are bracketed only when they represent a rough guess.

The classifications adopted for the three types of weapon systems are quite straightforward. For ships, only combat vessels are included, ranging in size from aircraft carriers to patrol boats (if equipped with a missile armament). The missile classification is exclusive. For reasons of space all strategic missiles have been listed in one column with a supplementary classification to indicate their range or mode of delivery. For aircraft the major rule adopted was to include only fixed-wing combat aircraft, that is, aircraft designed to fire guns and/or missiles and drop bombs. The only exception to this rule was to include reconnaissance, airborne early warning and electronic-countermeasure aircraft since considerable resources have been invested in this type of aircraft in the past and in particular because of the increasing importance attached to them.

VII. *Arms trade registers (appendices 6C and 6F)*

The descriptive terminology used in appendices 6C and 6F differs slightly from that employed in appendices 6B and 6E, and generally follows the practice used in previous SIPRI registers of the arms trade.

Value of the arms trade

The differences between the SIPRI values for the arms trade and the figures supplied by some of the major arms producers regarding their arms exports require some explanation.

Over the post-war period an enormous variety of weapons has been supplied to the third world. The only meaningful way to provide a single measure of this heterogeneous flow is to put it in monetary terms. This, however, is very difficult and the quality and comprehensiveness of official data is quite inadequate for the task. The principle difficulty, apart from determining the nature and quantity of the armaments involved, is the wide range of financial arrangements that have evolved for arms transactions. The United States, for example, has donated large quantities of armaments to many countries and, in most cases, has valued these grants for its own accounting purposes at one-third of the acquisition cost of the equipment concerned. Depending on the condition of the equipment, this procedure may understate or overstate the true value of the transaction. For some arms transactions, mostly involving the Soviet Union, payment has been made indirectly in the form of raw materials; for example, cotton in the case of Egypt and natural gas in the case of Afghanistan. Sales under credit or at discounted prices are also difficult to evaluate.

The main point is that from a financial point of view, the arms trade is very complex and the available official or semi-official data is far from sufficiently detailed and comprehensive to form the basis of a reliable and consistent assessment of the value of arms trade over time. In addition, of course, some important suppliers release no information whatsoever.

Because of these circumstances SIPRI undertook to value the arms trade independently by constructing a price list (based on prices in 1968) of all the major weapons transferred to the third world, and by using this to value every transaction recorded. The transactions recorded were confined to major weapons—aircraft, missiles, ships and armoured vehicles—because this is the only component of arms trade which, with some confidence, can be documented comprehensively from open sources. This is a serious limitation. For example, in fiscal year 1973, major weapons accounted for 56 per cent of the total value of goods and services provided under the US Foreign Military Sales and Military Assistance programmes. The remaining 44 per cent was composed of ammunition, communications equipment, other equipment, construction, repair and rehabilitation, supply operations, training and other services.

Meaning of the SIPRI values

The SIPRI arms trade values represent an attempt to measure the quantity of resources transferred to the third world in the form of major weapon systems. To the extent that major weapons account for a fairly stable share of the total trade, the SIPRI values can be used also as an index of the trend in the total value of military goods and services transferred to the third world. There is good reason to believe that major weapons have taken up a fairly stable share of the total trade in weapons and related equipment, at least in the past. The comprehensive nature of some of the larger arms deals concluded in recent years, particularly with Middle East countries, suggests that such items as technical assistance, electronic equipment and logistical facilities will account for a growing share of the financial value of the arms trade over the next few years.

Other considerations

Three other considerations must be taken into account in reconciling the SIPRI estimates of the value of arms trade with the third world and the official figures published by, for example, the United States. First, the official figures refer to total arms exports, a large percentage of which is exports to other industrialized countries. Second, the official figures refer to the total value of contracts signed during the year; the weapons and equipment involved may not be actually delivered until several years after the contract has been signed. The SIPRI values are based only on major weapons that have been physically transferred in a given year. As an example, foreign military sales in the USA in fiscal year 1973 amounted to \$3.6 billion but actual deliveries under this programme in that year amounted to less than half this sum, or about \$1.4 billion. When the contract value of a particular deal is made public this information is included in the register but the figures are not used in estimating the annual value of weapons transactions. Finally, the SIPRI values are expressed in constant prices. The original price list, based on 1968, has been inflated to reflect 1973 price levels but it should be kept in mind that this still leaves a two-year gap between the SIPRI values and the current official figures on total arms exports.

References

1. *Statistical Yearbook* (New York, United Nations, 1970) p. XIX.
2. Wilczynski, J., "The Economics of Socialism", in C. Charter, ed., *Studies in Economics,* Number 2 (London, George Allen and Unwin, 1970).
3. Benoit, E. and Lubell, H., "The World Burden of National Defense", in E. Benoit, ed., *Disarmament and World Economic Interdependence* (Oslo, Universitetsförlaget, 1967).
4. *World Armaments and Disarmament, SIPRI Yearbook 1972* (Stockholm, Almqvist & Wiksell, 1972, Stockholm International Peace Research Institute) pp. 78–79.

Part III. Developments in arms control and disarmament

Chapter 8. Disarmament negotiations in 1975

Nuclear-weapon-free zones / Comprehensive ban on nuclear-weapon testing / Prohibition of weapons of mass destruction / Prohibition of environmental means of warfare / Confidence-building measures in Europe / The disarmament negotiating machinery / UN General Assembly resolutions on disarmament and related matters / Draft treaty on the complete and general prohibition of nuclear-weapon tests, submitted on 23 September 1975 by the Soviet Union to the UN General Assembly / Working paper with suggestions as to possible provisions of a treaty banning underground nuclear weapon tests, submitted on 2 September 1971 by Sweden to the Geneva Disarmament Conference / Document on confidence-building measures and certain aspects of security and disarmament, included in the Final Act of the Conference on Security and Cooperation in Europe, 1 August 1975

Chapter 9. The implementation of agreements related to disarmament

The Non-Proliferation Treaty / Other agreements / Final declaration of Review Conference of the parties to the Treaty on the non-proliferation of nuclear weapons, 30 May 1975 / Preliminary list of announced and presumed nuclear explosions in 1975 / Nuclear explosions, 1945–75 (announced and presumed) / Bilateral arms control agreements between the USA and the USSR, as of 31 December 1975 / Multilateral agreements related to disarmament, as of 31 December 1975 / Status of the implementation of the Geneva Protocol of 17 June 1925, for the prohibition of the use in war of asphyxiating, poisonous and other gases, and of bacteriological methods of warfare, as of 31 December 1975 / Notifications of military manoeuvres in Europe, as of February 1976

Chapter 10. Chronology of major events concerning disarmament and related issues

8. Disarmament negotiations in 1975

Square-bracketed numbers, thus [1], refer to the list of references on page 331.

I. *Nuclear-weapon-free zones*

One of the approaches to the nuclear arms-control problem, which has been much discussed since the mid-1950s, is the so-called zonal approach. The idea was conceived with a view to securing the absence of nuclear weapons in certain regions of the world, outside the territories of the nuclear-weapon powers. Several treaties concluded in recent years already reflect this concept. Thus, the Antarctic Treaty of 1959 established a demilitarized régime in the Antarctic, which prohibits the introduction of nuclear weapons into the area. The 1967 Outer Space Treaty contains an undertaking by the parties not to place in orbit around the earth any objects carrying nuclear weapons, nor to install such weapons on celestial bodies. The 1971 Sea-Bed Treaty forbids the emplacement of nuclear weapons on the sea-bed and the ocean floor and in the subsoil thereof, beyond the outer limit of a 12-mile sea-bed zone. The common feature of these treaties is that they concern uninhabited areas where no country exercises national sovereignty, or where, as in the case of Antarctica, claims to territorial sovereignty have not been generally recognized. The only international instrument which has established a nuclear-weapon-free zone in a populated area is the 1967 Treaty of Tlatelolco for Latin America. But since, at the time of its conclusion, no country in the region possessed nuclear weapons and no nuclear weapons were deployed there, the treaty had merely legalized the existing situation. It falls under the same category of preventive measures as the Antarctic Treaty, the Outer Space Treaty and the Sea-Bed Treaty.[1]

Most denuclearization proposals put forward over the years in various international bodies relate to areas where nuclear weapons are already stationed; they imply, therefore, a withdrawal of these weapons. This is the case of Central Europe, the Balkans, the Mediterranean, the Indian Ocean and the South Pacific. Other proposals involve areas where the presence of nuclear weapons is suspected by neighbouring countries, as in the Middle East (Israel), or where the manufacture of nuclear weapons is considered imminent, as in South Asia (India), or Africa (South Africa), or where the introduction of nuclear weapons in case of war remains a possibility, as in Northern Europe.[2] None of these ideas has become the subject of negotia-

[1] For an analysis of the Treaty of Tlatelolco, see *SIPRI Yearbook 1969/70*, pp. 218–56, and *SIPRI Yearbook 1973*, pp. 542–49.
[2] For a discussion of these proposals, see *SIPRI Yearbook 1975*, pp. 438–44.

tions. As a rule, the proposals are deemed disadvantageous or unfair to one side or another. In addition, the great powers are reluctant to accept restrictions on the deployment of their nuclear weapons, which might affect their global strategic interests.

Nonetheless, in 1974, on the initiative of Finland, the UN General Assembly decided that a comprehensive study of the question of nuclear-weapon-free zones "in all of its aspects" should be undertaken. This task was to be carried out by an *ad hoc* group of "qualified governmental experts" under the auspices of the CCD [1]. The group met from 23 June to 18 August 1975. Those participating in its work included representatives of Australia, Belgium, Bulgaria, Czechoslovakia, Ecuador, Egypt, Finland, Ghana, India, Iran, Japan, Mexico, Nigeria, Pakistan, Poland, Romania, Sweden, the USSR, the UK, the USA and Zaire. Experts from Canada, the German Democratic Republic, the Federal Republic of Germany, Hungary, Italy, Mongolia, the Netherlands, New Zealand, Turkey and Yugoslavia attended the meetings as observers.

The report produced by the group [2] describes the concept of nuclear-weapon-free zones; attempts to define the responsibilities of states within the zones and those of other states; suggests verification and control measures; discusses the relationship of nuclear-weapon-free zones with international law, existing treaties and the United Nations; and deals with the peaceful uses of nuclear energy in the context of denuclearization. But consensus was reached on only a few rather trivial, self-evident principles. The rest of the report is a compilation of contradictory views on matters most essential for the realization of the nuclear-weapon-free zone concept.

The principles agreed upon are as follows:

> Obligations relating to the establishment of nuclear-weapon-free zones may be assumed not only by groups of States, including entire continents or large geographical regions, but also by smaller groups of States and even individual countries;
>
> Nuclear-weapon-free zone arrangements must ensure that the zone would be, and would remain, effectively free of all nuclear weapons;
>
> The initiative for the creation of a nuclear-weapon-free zone should come from States within the region concerned, and participation must be voluntary;
>
> Whenever a zone is intended to embrace a region the participation of all militarily significant States, and preferably all States, in that region would enhance the effectiveness of the zone;
>
> The zone arrangements must contain an effective system of verification to ensure full compliance with the agreed obligations;
>
> The arrangements should promote the economic, scientific, and technological development of the members of the zone through international co-operation on all peaceful uses of nuclear energy;
>
> The treaty establishing the zone should be of unlimited duration.

The main points at issue concern (1) the degree of denuclearization, (2) the boundaries of the nuclear-weapon-free zone, (3) verification, and (4) the responsibilities of extra-zonal states.

1. A major controversy arose as to whether an undertaking by zonal states not to acquire nuclear weapons included non-acquisition of nuclear explosive devices for peaceful purposes. The problem was not new. It had been examined in detail during the negotiations which led to the signing of the Non-Proliferation Treaty (NPT) in 1968. It was then concluded that, for the purposes of non-proliferation, nuclear weapons and other nuclear explosive devices are synonymous and must be treated on exactly the same basis, because they contain the same nuclear components and require essentially the same technology. The states not accepting this conclusion have remained outside the treaty.

The Treaty of Tlatelolco settled the question with less finality, leaving an ambiguity. It allows explosions of nuclear devices for peaceful purposes "including explosions which involve devices similar to those used in nuclear weapons", and spells out procedures for carrying them out (Article 18), but it also contains a reservation that such activities must be in accordance with its Articles 1 and 5: Article 1 prohibits the testing, use, manufacture, production or acquisition of nuclear weapons, while Article 5 defines a nuclear weapon as "any device which is capable of releasing nuclear energy in an uncontrolled manner, and which has a group of characteristics that are appropriate for use for warlike purposes". Some countries interpret these provisions as prohibiting the manufacture of nuclear explosive devices for peaceful purposes unless or until nuclear devices are developed which cannot be used as weapons, that is, practically for ever: the attached condition can hardly be fulfilled. Others dispute this view. The important problem of compatibility, or otherwise, of an indigenous development of nuclear explosive devices for peaceful purposes with participation in a nuclear-weapon-free zone agreement has remained unresolved.

2. On the question of the geographical extent of the denuclearized area, objections were raised to a proposal for including in the zone portions of the high seas, straits used for international navigation and international air space. Again, the Treaty of Tlatelolco served as a frame of reference. The treaty defines its zone of application as embracing, upon fulfilment of certain specified requirements,[3] not only the territory, the territorial sea, air space and any other space over which the zonal state exercises sovereignty "in accordance with its own legislation" (some Latin American countries claim territorial waters as broad as 200 nautical miles), but also large areas of the high seas in the Atlantic and Pacific Oceans, hundreds of kilometres off the coasts of signatory states, over which no state at present claims sovereignty. In signing Additional Protocol II of the Treaty of Tlatelolco, France, the UK and the USA made it clear that they would not recognize

[3] These requirements, set out in Article 28, para. 1, are: adherence to the treaty by all states in the region, adherence to Additional Protocols I and II by all states to which they are open for signature, and the conclusion of safeguards agreements with the IAEA by all states party to the treaty and to Additional Protocol I.

any legislation which did not, in their view, comply with the relevant rules of international law, that is, the law of the sea. Their clarification amounts to a rejection of the postulate that the denuclearized status of the entire zone, as defined by the parties, should be respected. Also for the Soviet Union, an attempt to establish a high-sea sector subject to special status is unacceptable. This is one of the reasons why it has refused to join Additional Protocol II of the Treaty of Tlatelolco. Evidently, none of these nuclear powers is prepared to acquiesce in the limitation on the freedom of their navies to move or be stationed in international waters. To be valid, any such extension of the boundaries of a nuclear-weapon-free zone would need universal consent.

There may also be problems with the territories lying within the limits of the zone, for which extra-zonal states are responsible *de jure* or *de facto*. In the case of the Treaty of Tlatelolco, two states—the Netherlands and the United Kingdom—undertook to respect the status of denuclearization of their possessions in Latin America, but the USA and France declined to do so. The United States declared that neither the US Virgin Islands nor Puerto Rico could be included in the nuclear-weapon-free zone because the former were part of the territory of the USA and the latter had a special relationship with the USA [3].[4] France maintains that in matters of defence, one doctrine alone applies to all its territory, and since France is a nuclear-weapon state, no part of its territory could be given nuclear-weapon-free status [5]. Similar problems would arise in some other parts of the world, for instance in the Indian Ocean or in the South Pacific. Even within the undisputed limits of the national territory, there may be difficulties with ensuring the absence of nuclear weapons in military bases of extra-zonal states, which are not covered by the jurisdiction of the states of the zone.

A suggestion has been made that relevant extra-zonal states should agree to establish so-called safety areas adjacent to the zone, which would also be free of nuclear weapons, especially tactical weapons of limited range suitable for attacking targets within the zone. Such a requirement would be especially applicable in the European context. Indeed, if nuclear weapons were allowed to be placed close to a nuclear-weapon-free zone and be trained on it, the populations of the zone would continue to live under the constant threat of nuclear aggression; all possible non-use commitments by the nuclear-weapon powers would be deprived of credibility.

Yet another suggestion was to provide for the creation, in times of severe crisis and through unilateral declarations by a state or group of states, of *ad hoc* nuclear-weapon-free zones similar to demilitarized zones foreseen in the humanitarian laws of war and primarily serving a humanitarian purpose.

[4] The USA stated that the Guantanamo base could be included in the nuclear-weapon-free zone if the government of Cuba were to sign and ratify the Treaty of Tlatelolco, and that the treaty would apply to the Canal Zone upon return of jurisdiction over the zone to Panama [4].

However, the practical value of the proposal is questionable; it is difficult to determine in advance to what extent other states would feel bound by unilateral declarations.

The report assumes that the prohibition of any form of possession of nuclear weapons implies an undertaking not to transport such weapons in vehicles under the jurisdiction or control of the zonal states. But a divergence of views has emerged on the question of transit, that is, transport through the zone by carriers not belonging to a state party to the zonal agreement. It will be noted that the transit of nuclear weapons is not expressly forbidden under the Treaty of Tlatelolco. The Preparatory Commission of that treaty agreed that surface transit should be considered as excluded, while maritime transit, whenever allowed by a riparian state, must be subject to the provisions on the "right of innocent passage" under the 1958 Geneva Convention on the Territorial Sea and the Contiguous Zone. The parties to the Tlatelolco Treaty contend that the nuclear-weapon powers which have undertaken, under Additional Protocol II of the treaty, to refrain from contributing "in any way to the performance of acts involving a violation of the obligations of Article 1 of the Treaty", such as receipt, storage, installation or deployment of nuclear weapons within the zone, are expected to refrain from introducing nuclear weapons in the zone.

Some African states consider that nuclear-weapon powers are already under an obligation not to transit nuclear weapons across Africa, and that "if for some unforeseen reasons that has to be done, such an exercise cannot be undertaken without permission as required by international law" [6]. On the other hand, the sponsors of the UN resolution on the establishment of a nuclear-weapon-free zone in the Middle East decided to remove from their original proposal a recommendation to the countries concerned to refrain from action that would facilitate the transit of nuclear weapons [7]. The USA and France, which hold the view that each party to a nuclear-weapon-free zone agreement should retain exclusive legal competence to grant or deny non-parties transit privileges, made a reservation to this effect upon signing Additional Protocol II of the Treaty of Tlatelolco. Even if their interpretation were accepted by all, it would still be necessary for the geographical scope of the zone to be recognized by the nuclear-weapon powers.

Other states, including the Soviet Union, maintain that all kinds of transit of nuclear weapons through the zone should be barred, including the entry into ports situated in the zone of vessels carrying nuclear weapons. (China has undertaken not to "send its means of transportation and delivery carrying nuclear weapons to cross the territory, territorial sea or air space of Latin American countries".) Their argument is that if nuclear weapons were allowed to transit the zone, even for a short time, the zone could not be considered as effectively denuclearized. No indication, however, was given as to how verification of such a prohibition would be exercised. The experience of Japan, which had for years been visited by US vessels carrying nuclear weapons without the Japanese government being aware, or wanting to be aware, of it, shows the dimensions of the problem.

3. There is a consensus that the obligation not to acquire nuclear weapons through manufacture or otherwise can be effectively verified, and that the central role in the control procedures should be given to the International Atomic Energy Agency (IAEA). But the experts are less specific as to the means of ensuring that the zone is free of nuclear weapons from outside sources. Such control functions would go beyond the statutory duties of the IAEA. An additional verification machinery has, therefore, been suggested. Its terms of reference would include inspecting naval vessels and military aircraft of nuclear-weapon powers within the zone, as well as checking whether nuclear weapons are not transported outside the zone by means of transportation belonging to zonal states. Even if this could be agreed upon, which is unlikely, problems would arise in connection with verification on the high seas, if some areas of the high seas were included in the nuclear-weapon-free zone, and also in connection with the military bases of nuclear-weapon states, if such bases were situated in the zone.

4. While all extra-zonal states would be expected to commit themselves not to carry out any activity endangering the functioning of the zonal arrangements and, in particular, not to provide the states of the zone with any assistance that might lead to the development or production of nuclear weapons, the nuclear-weapon states would have to contract additional obligations, namely, not to deploy or stockpile nuclear weapons in the zone and, if they have already done so, to withdraw them. The undertaking to respect the denuclearized status of the zone should, in the opinion of most experts, include a formal pledge not to use, or threaten to use, nuclear weapons against any state included in the zone. However, the nuclear-weapon powers make such a pledge dependent on the content of each denuclearization agreement and have raised in this context the question of their participation in the negotiation of the zonal arrangements. They refuse to provide an unconditional assurance of non-use, even if all their postulates have been met. The USA and the UK would reserve the right to reconsider their obligations with regard to a nuclear-weapon-free zone state in the event of any act of aggression or armed attack by that party "with the support or assistance" of a nuclear-weapon state. The USSR promises even less. It reserves the right to revoke its non-use commitment if a zonal state has committed aggression or has become an accomplice of aggression (irrespective of support or assistance by a nuclear power).

In view of the divergencies described above, Mexico proposed the acceptance of internationally valid definitions of the concept of a "nuclear-weapon-free zone" and of the principal obligations of nuclear-weapon states [8]. The proposal (with certain modifications) was later incorporated in a UN declaration adopted on 11 December 1975 [9] to the following effect.

Definition of the concept of a nuclear-weapon-free zone

A "nuclear-weapon-free zone" shall, as a general rule, be deemed to be any zone, recognized as such by the United Nations General Assembly, which any group of States, in the free exercise of their sovereignty, has established by virtue of a treaty or convention whereby:

(a) The statute of total absence of nuclear weapons to which the zone shall be subject, including the procedure for the delimitation of the zone, is defined;

(b) An international system of verification and control is established to guarantee compliance with the obligations deriving from that statute.

Definition of the principal obligations of the nuclear-weapon States towards nuclear-weapon-free zones and towards the States included therein

In every case of a nuclear-weapon-free zone that has been recognized as such by the General Assembly, all nuclear-weapon States shall undertake or reaffirm, in a solemn international instrument having full legally binding force, such as a treaty, a convention or a protocol, the following obligations:

(a) To respect in all its parts the statute of total absence of nuclear weapons defined in the treaty or convention which serves as the constitutive instrument of the zone;

(b) To refrain from contributing in any way to the performance in the territories forming part of the zone of acts which involve a violation of the aforesaid treaty or convention;

(c) To refrain from using or threatening to use nuclear weapons against the States included in the zone.

In other words, the countries deciding to conclude a treaty setting up a nuclear-weapon-free zone would themselves determine its provisions, including the extent of the denuclearization, the boundaries of the zone and the verification procedures. Once a nuclear-weapon-free zone has been recognized as such by the UN General Assembly, the nuclear-weapon states would be duty-bound formally to contract or reaffirm their obligations to respect the status of the zone and never to use nuclear weapons against a zonal state. France, the UK, the USA and the USSR were among a few dozen states that did not support the above declaration, and either abstained or voted against it. They argued that third countries cannot commit themselves to any particular undertakings towards a denuclearized zone in advance of negotiation of arrangements for the zone. They also questioned the General Assembly's power to impose upon states obligations that might affect their interests.

According to the UN Charter, UN General Assembly decisions are not mandatory. They carry moral authority but are not legally binding. Experience has shown that General Assembly recommendations which are not unanimous, and which are opposed by states directly involved, are devoid of real significance. No state, and especially no nuclear-weapon power, is likely under the pressure of majority resolutions to alter a strategic doctrine which it perceives as vital for its security.

The summary of governmental positions on nuclear-weapon-free zones, as contained in the experts' report, may be of academic interest, but is of little practical value. If the aim of the sponsors of the study was to establish universally applicable rules or guidelines, then the exercise was futile. The experts themselves have admitted that circumstances in different regions vary so widely that a different approach would need to be adopted in each case. There is even lack of consensus as regards the general advisability of establishing nuclear-weapon-free zones. A few experts have stressed that there must be "appropriate" geographical, political and strategic conditions for zones. In their opinion there are regions where such zones are simply impracticable, or where their creation would decrease rather than increase the security of states. Some nations consider participation in zonal arrangements incompatible with membership in security alliances with nuclear-weapon powers. This is certainly true when the obligations under military pacts imply the use of nuclear weapons against non-nuclear-weapon states committing aggression, and when these pacts provide for stationing nuclear weapons on the territory of non-nuclear-weapon states. In such cases, a choice would have to be made between adherence to a military alliance and adherence to a nuclear-weapon-free zone agreement. Moreover, frequent references have been made to Article 51 of the UN Charter, an article which is usually invoked to prove the legality of initiating the use of nuclear weapons because it proclaims the right of individual or collective self-defence. In and by itself the study has not helped to solve these controversial issues and it is doubtful whether it will actually enhance efforts to establish new zones in crucial areas of the world.

Any group of states, in the free exercise of their sovereignty, can agree on such measures of restraint in the field of armaments as they deem fit. From the legal point of view, recognition by outside states is not indispensable. But in the case of nuclear-weapon-free zones, undertakings not to acquire nuclear weapons and not to let others install these weapons on the territories of a given group of states would not be enough to ensure effective denuclearization. The cooperation of nuclear-weapon states would in most cases be deemed absolutely necessary, especially their pledge not to use or threaten to use nuclear weapons against the states of the zone. If the intention of the sponsors of the study on nuclear-weapon-free zones was to secure such guarantees, then they have again failed. Not only have the nuclear-weapon powers refused to recognize the status of zones established without their consent, or which would not fulfil the requirements they themselves have set for denuclearization, but they have made it clear that their possible non-use commitments could be withdrawn in case of war, whatever the weapons used by the aggressor. Thus, even within a nuclear-weapon-free zone a local conflict could assume nuclear proportions.

A nuclear-weapon-free zone arrangement is intended to be wider in scope than the NPT, because in addition to prohibiting the manufacture of nuclear weapons or their acquisition by other means, as provided by the NPT, the presence of foreign nuclear forces in a given geographical region would be proscribed as well. But it is difficult to see where in the foreseeable future such an arrangement could be concluded. Many proposals for nuclear-weapon-free zones concern regions where countries have not yet renounced a nuclear-weapon option and have not joined the NPT; it would be unrealistic to expect them to do so under a more comprehensive arrangement. The element of "discrimination", about which they usually complain when referring to the NPT, would not disappear in a nuclear-weapon-free zone treaty. Besides, zonal agreements presuppose intergovernmental negotiations. It is difficult to envisage such negotiations where governments are unable or unwilling to communicate with each other. The establishment of a nuclear-weapon-free zone can hardly be a starting-point for peaceful relations among hitherto hostile nations. The reverse could perhaps prove true: the establishment of peaceful relations may be conducive to denuclearization. One could, of course, conceive of a nuclear-weapon-free zone as a constituent part of an overall package settlement of regional political problems, but in most cases such a solution is unlikely. Step-by-step confidence building appears to be a more promising approach. If and when countries in conflict areas decide to renounce the nuclear-weapon option, it will be easier for them to do so directly, through a unilateral act of adherence to the NPT and acceptance of IAEA nuclear safeguards, rather than through negotiations with states which have divergent interests in the region and which may put forward some onerous conditions by insisting, for example, on reciprocal control of compliance in addition to international verification.[5]

India has refused to participate in any consultations that might take place in respect of Pakistan's proposal for the establishment of a nuclear-weapon-free zone in South Asia [10]. And Egypt, one of the promoters of a nuclear-weapon-free zone in the Middle East, has rejected a proposal for direct talks among the states in the region [11]. Since it has been recognized by many that nuclear-weapon-free zones are to supplement the worldwide non-proliferation régime, it would be logical to insist primarily on universal adherence to the NPT which has established the régime. The prohibition of foreign nuclear presence, though important, is less urgent. It could come at a later stage as a separate arrangement complementing the non-proliferation obligations.

As far as the security assurances are concerned, it would be more equitable if, irrespective of any formal zonal arrangements, a guarantee of no use of nuclear weapons, under any circumstances, were given to all non-

[5] Article 16 of the Treaty of Tlatelolco provides for special inspections not only by the IAEA but also by the Council of the Agency for the Prohibition of Nuclear Weapons in Latin America whenever so requested by a party which suspects that some activity prohibited by the treaty has been carried out or is about to be carried out, either on the territory of another party or in any other place on the latter party's behalf. The contracting parties are obliged to grant the inspectors full and free access to all places and all information which may be necessary for the performance of their duties.

nuclear-weapon states party to the NPT, which have no nuclear weapons stationed on their territory, and no first use guarantee to other parties.

The thirtieth UN General Assembly again adopted resolutions exhorting states to continue efforts to establish nuclear-weapon-free zones in Africa [12], in the region of the Middle East [13], in South Asia [14] and in the South Pacific [15], as well as a zone of peace in the Indian Ocean [16]. But if the experts' study is given a wide distribution, as requested by the General Assembly [17], it will reveal to public opinion the whole complexity of, and perhaps dispel certain illusions about, the idea of zonal denuclearization. Further fruitless consideration of the subject may even detract attention from the need to ensure the universality of the NPT and provide an excuse for certain countries to postpone indefinitely a decision on the renunciation of a nuclear-weapon option, as well as an alibi for the nuclear-weapon powers to eschew, also indefinitely, an undertaking not to use nuclear weapons against non-nuclear-weapon states.

II. *Comprehensive ban on nuclear-weapon testing*

In September 1975 the Soviet Union submitted for consideration by the UN General Assembly [18] a draft treaty on "the complete and general prohibition of nuclear weapon tests" (see appendix 8B). This was the first time, since the conclusion of the Partial Test Ban Treaty, that a nuclear-weapon power proposed a full text, in treaty language, of a ban covering underground nuclear-weapon tests. The only other draft of a comprehensive agreement to be officially placed on the disarmament agenda since 1963 was that included in the Swedish working paper [19] presented to the CCD in 1971 (see appendix 8C).

Three main problems have been plaguing the negotiations on a comprehensive test ban: (1) verification, (2) nuclear explosions for peaceful purposes and (3) participation of China and France. None of them has, as yet, been solved.

1. As regards verification, the Soviet draft provides that "Control over compliance with this Treaty shall be conducted by the States Parties through their own national technical means of control . . ." (Article II.1). In the context of a nuclear test ban, "national technical means" may consist of seismic monitoring, satellite observation or electronic eavesdropping, but seismic monitoring is generally considered to be the most effective method. Consequently, the parties would watch the observance of the treaty prohibitions mainly by recording and evaluating seismic signals originating in the territories of other countries. The draft also envisages an international exchange of seismic data and stipulates that states "shall cooperate" in such an exchange (Article II.2), but it does not impose a legal obligation to make

available, on a continuous basis, the data related to the objective of the treaty. No indication is given as to whether and, if so, when (before or after the entry into force of the treaty) the envisaged exchange would be institutionalized.[6] And it seems that no organization would be entrusted with the final say in assessing the seismic data if doubts arose concerning compliance with the treaty.

The parties "shall, when necessary, consult one another, make inquiries and receive appropriate information in connection with such inquiries" (Article II.3). But consultations, though useful, could be only a complement to, rather than a substitute for, mandatory provision of relevant seismological data. Countries having no, or insufficient, means of seismological detection, and not possessing complete seismic data from other sources, would not be in a position actively to participate in the verification process. They might have nothing to consult about, and would not even be able formally to complain about violations of obligations by others, because a complaint, according to the draft, "must contain all possible evidence confirming its validity" (Article II.4). Indeed, the UN Security Council, a body with which the complaint is to be lodged, would need such evidence for a meaningful consideration of allegations; as distinct from certain other arms control agreements, it would apparently have no authority to carry out investigations. (It might be mentioned here that during the past few years the role of the UN Security Council in the so-called complaints procedure has been subject to increased criticism. Many countries deem it intolerable that the permanent members of the Council, which enjoy the right of veto, should be given the power to block examination of charges directed against themselves, as well as against their allies, not to speak about incriminating conclusions.) If no international investigatory machinery were to be set up, there should at least be a procedure by which an accused country would be given an opportunity to prove its innocence, for example, by inviting inspection on its territory. Otherwise, a mere charge of violation, which has not been disproved, could serve as an excuse for the accusing country, or for another country, to withdraw from the treaty. And each party would be allowed to do so under Article VII of the draft whenever "extraordinary circumstances", connected with the subject-matter of the treaty, have jeopardized what it considers to be its "supreme interests".

2. A comprehensive nuclear test-ban treaty must deal not only with weapon tests but also with explosions for peaceful purposes, because there is no distinction between military and peaceful explosives. In the absence of restraints on explosions declared peaceful, states hitherto non-nuclear would be free to acquire a nuclear-weapon capability and the non-proliferation

[6] It will be noted, by way of analogy, that nuclear safeguards agreements under the Non-Proliferation Treaty (NPT) were concluded after the entry into force of the NPT, but the parties had undertaken to sign these agreements within a specified period of time.

effect of the treaty would be defeated. This has been recognized in the Soviet draft which stipulates (Article III.2(a)) that in the case of non-nuclear-weapon states, nuclear explosions for peaceful purposes shall be conducted only "in conformity with the provisions of article V of the Treaty on the Non-Proliferation of Nuclear Weapons", that is, under appropriate international observation and through appropriate international procedures.

The question is more complex when it comes to nuclear-weapon states. If under a comprehensive test-ban treaty these states were allowed to conduct peaceful nuclear explosions without restrictions, be it on the territory under their own jurisdiction or on the territories of other states (in accordance with the NPT), they would be able to obtain weapon-related benefits which were no longer available in weapon-testing activities, and, thereby, continue refining their nuclear-weapon arsenals. Weapon-related benefits could include testing a new weapon design, checking the performance of a stockpiled warhead or studying weapon effects. Here again, the Soviet draft seems to acknowledge the existence of a problem, for it envisages "a procedure to be established under a special agreement concerning which the nuclear weapon States will conduct negotiations with due regard for the IAEA recommendations on the subject" (Article III.2(b)). And since it also stipulates that the provisions of the treaty "shall not affect" obligations under other international agreements (Article IV), it appears to assume that any peaceful nuclear explosions would have to satisfy the constraints imposed by the Partial Test Ban Treaty which prohibits underground explosions causing radioactivity to be present outside the territorial limits of a state conducting them. However, there is nothing in the text to indicate that the envisaged "special agreement" would provide for an adequate control system to ensure against abuse of ostensibly peaceful explosions. A time-limit for reaching the agreement has not been set either. The provision that it "will be concluded as speedily as possible" does not imply that it must necessarily be concluded before the signing or the entry into force of the test-ban treaty. As a matter of fact, the Soviet Union maintains that upon reaching agreement on a comprehensive test ban, "it will then also be possible to settle the question of the feasibility of carrying out nuclear explosions for peaceful purposes" [20].

Considering the capital importance of the peaceful explosions issue for nuclear-arms control, it is doubtful whether a test-ban treaty would be signed and, even more doubtful, whether it could enter into force before a solution has been found to the problem of verifying explosions claimed to be peaceful. It will be recalled that also the 1974 US–Soviet Treaty on the limitation of underground nuclear weapon tests (the Threshold Test Ban Treaty) provided that underground nuclear explosions for peaceful purposes "shall be governed by an agreement which is to be negotiated and concluded by the Parties at the earliest possible time", but the parties were then agreed that the treaty would not be ratified unless an agreement for handling peaceful nuclear explosions was actually reached [21]. And yet, with a threshold treaty the incentive for seeking military benefits from peaceful explosions is considerably weaker than with a treaty banning all nuclear-weapon tests. One should also bear in mind that no control measures, however stringent they might be, could prevent nuclear-weapon powers *bona fide* engaged in peaceful nuclear explosion programmes from acquiring at least some information and experience valuable from the military point of view; research, testing and other facilities, which are essentially identical to those used for weapon purposes, would certainly be maintained. It may be extremely difficult to devise a formula which would, in a satisfactory manner, reconcile peaceful nuclear explosions with a prohibition on weapon testing. Possible advantages expected from one of these activities would have to be carefully balanced against the risks inherent in the other.

3. According to the Soviet draft, the treaty would enter into force upon the deposit of the instruments of ratification by governments the number of which remains to be specified, "including the Governments of all nuclear weapon States". Since it would be completely unrealistic to expect China and France, which have not even signed the Partial Test Ban Treaty, to join a comprehensive ban worked out by the remaining nuclear-weapon powers, the USSR proposed that the United Nations should take note of its draft treaty, call upon all nuclear-weapon states to enter into negotiations not later than 31 March 1976,[7] with a view to reaching agreement, and invite 25–30 non-nuclear-weapon states to participate in these negotiations. A resolution to this effect was adopted by the UN General Assembly on 11 December 1975 [22]; France, the United Kingdom and the USA abstained, while China voted against the resolution.

The UK [23] and the USA [24] found the Soviet draft defective in that it did not provide for adequate verification and did not deal adequately with the question of peaceful nuclear explosions. France [25] expressed the opinion that a prohibition of nuclear tests would not put an end to the production of nuclear weapons and therefore would not affect the substance of the nuclear disarmament problem. Subsequently, France made it clear that the sponsors of the above-mentioned resolution should not count on its participation in the contemplated test-ban talks. China [26] went further in its criticism by characterizing the Soviet draft as a proposal "solely aimed at preserving the nuclear monopoly of the super-powers". It stated that it would never enter into the suggested negotiations and would not be bound in any way by their results. It is clear that in view of the positions of China and France the UN resolution will not be implemented.

A question arises why an agreement by the USA, the UK and the USSR to stop their nuclear-weapon tests should await the participation of all nuclear-weapon states. The USSR contends [27] that if there was no simultaneous

[7] On this date, the prohibitions under the 1974 Threshold Test Ban Treaty were to enter into force.

cessation of nuclear-weapon explosions by all, some states might get "one-sided advantages" to the detriment of the interests of others and that, consequently, the security of the latter states would be jeopardized; it is, therefore, not prepared to renounce testing, unless China and France undertake the same commitment.

It will be recalled that for the Partial Test Ban Treaty and the NPT to become effective, ratification by three nuclear powers was considered sufficient. It is true that under the first of these treaties the parties reserved their right to continue testing in the underground environment, and that the second treaty imposed obligations mainly on non-nuclear-weapon states, while a comprehensive test ban would, for the first time, require some "sacrifices" from the nuclear-weapon powers. But, as was pointed out at the 1975 NPT Review Conference [28] "the extent of the lead in nuclear war technology and the enormity of the nuclear arsenals of the USSR and the United States of America are such that, even if they were to suspend all nuclear weapon tests for half a century, it is absolutely certain that they would continue to maintain an indisputable superiority". Indeed, by the end of 1975, France and China, taken together, had conducted no more than 13 per cent of the total number of US nuclear explosions and about 23 per cent of the total number of Soviet explosions. Nevertheless, to allay the fear that the "secondary" nuclear-weapon powers, by continuing their tests, might eventually overtake the present "superpowers" which would stop testing, an escape clause could be devised. For example the test-ban treaty might provide that it would lapse, if after a specified period of time (say, ten years) the non-signatory nuclear-weapon states were still declining to accede to it. However, even a more modest proposal—that for an agreed suspension of nuclear-weapon tests, subject to review, as an interim step towards the conclusion of a formal and comprehensive test ban agreement [29]—failed to receive the support of the powers concerned. Under these circumstances, it is not likely that the CCD, which was urged by the United Nations to give "the highest priority" to the conclusion of a comprehensive test-ban agreement, will have much to report to the next session of the General Assembly.

Under the 1974 Threshold Test Ban Treaty, the USA and the USSR had pledged to restrict the number of their tests to a "minimum". Also in the UK–Soviet statement of 17 February 1975 [30], both sides agreed to work towards a limitation of the number of tests to a "minimum". This term may be subject to different interpretations, but if the rate of testing does not decrease, then even this promise will prove to be broken. (For the lists of nuclear explosions, see appendices 9B and 9C.)

III. *Prohibition of weapons of mass destruction*

In a speech made in Moscow on 13 June 1975, the General Secretary of the Central Committee of the Communist Party of the USSR drew attention to a "serious danger that still more frightful weapons than even nuclear ones may be developed". He said: "Reason and the conscience of mankind dictate the need for raising an insurmountable barrier against the development of such weapons" [31]. Accordingly, the Soviet delegation to the thirtieth session of the UN General Assembly suggested the inclusion of a new item in the agenda of the session, entitled "Prohibition of the development and manufacture of new types of weapons of mass destruction and of new systems of such weapons" [32], and submitted a draft agreement on such a prohibition [33].

The key article of the draft (Article I) provided that "Each State Party to this Agreement undertakes not to develop or manufacture new types of weapons of mass destruction or new systems of such weapons, including those utilizing the latest achievements of modern science and technology." The types of weapons and the systems of weapons subject to prohibition would have to be specified as a result of negotiations. A possibility to extend the prohibition to cover additional types and systems of weapons after the entry into force of the agreement was also envisaged. Compliance with the obligations would be checked by each party through measures undertaken "in accordance with its constitutional procedures" (Article II). Other provisions of the draft were almost identical to those included in arms control treaties signed in recent years.

The first question which arises in connection with the Soviet proposal is what should be considered a weapon of mass destruction. In arms control parlance, these are weapons capable of a high order of destruction and/or capable of being used in such a manner as to kill large numbers of people. The means of transporting or propelling the weapon, where such means is a separable part of it, is not included in the term.[8] At different times also other characteristics of weapons of mass destruction were given, such as, affecting large areas; directed specifically against civilians or most threatening to civilians; and indiscriminate, unpredictable and uncontrollable as regards the consequences.

The problem of definition came up early in the post-war disarmament debate in the United Nations. On 8 September 1947, the USA submitted a draft resolution according to which weapons of mass destruction included "atomic explosive weapons, radioactive material weapons, lethal chemical and biological weapons, and any weapons developed in the

[8] Compare Article 5 of the Treaty of Tlatelolco which, in defining a nuclear weapon, states: "An instrument that may be used for the transport or propulsion of the device is not included in this definition if it is separable from the device and not an indivisible part thereof."

future which have characteristics comparable in destructive effect to those of the atomic bomb or other weapons mentioned above" [34].[9] The resolution was adopted by the working committee of the UN Commission for Conventional Armaments [35–36] and subsequently, on 12 August 1948, by the Commission itself, with the USSR voting against [37].

The discussion in the late 1940s revealed a variety of opinions on the subject of weapons of mass destruction. The Soviet Union criticized the US definition as too restrictive and referred to conventional bombs and rockets used in World War II as weapons with mass destructive effects. The Ukraine defined weapons of mass destruction as weapons directed primarily against peaceful populations. The UK suggested that weapons of mass destruction should include only atomic, chemical and biological weapons. It also expressed the view that the "V" weapons dropped on England by the Germans during World War II did not fall within the category of weapons of mass destruction, because their destructive effect, statistically considered, had not been large.[10] A controversy arose with regard to chemical and biological weapons. The USA insisted on making a distinction between deadly weapons and those which were not deadly, such as tear gas or smoke screen, while Australia preferred that the requirement of lethality should be removed from the definition. Since that time, no attempt had been made to evolve a generally acceptable formula. The term "weapons of mass destruction" was employed in the Outer Space Treaty and in the Sea-Bed Treaty, without its meaning being clarified in the text of the treaty; but it was then generally understood to cover chemical and biological weapons in addition to nuclear weapons which were specifically mentioned. If, however, weapons of mass destruction other than nuclear, chemical or biological were to be prohibited, as suggested by the USSR, a comprehensive definition would be indispensable.

Indeed, the Soviet draft deals with "new" types of weapons, but it does not elaborate on what should be considered as new: whether a new weapon is one requiring scientific and technological applications as yet not achieved in the field of armaments, or whether substantial improvement of an existing weapon would be enough to make it a "new weapon" subject to a ban.

Asked to identify what specific types of weapon the USSR had in mind, the Soviet representative to the United Nations quoted Western newspaper reports about the possibility to develop explosive devices "from an element even heavier than uranium",[11] or to isolate "for instance, protons, neutrons

[9] This was a revised version of a US draft resolution submitted on 5 September 1947.
[10] It is noteworthy that 22 years later, on 21 October 1969, the British delegate at the CCD said: "Nobody who was in southeast England during the V-bomb attacks in the last war would, at that time at any rate, have had any hesitation, I think, in describing them as weapons of mass destruction."
[11] This was, presumably, a reference to transuranic elements, which do not exist in nature and would have to be created artificially.

or quarks" to produce even more destructive new weapons. But he admitted that some press speculations about new weapons rested on purely fantastic assumptions [38].

In addition to a ban on the development and manufacture of new weapons of mass destruction, the agreement would prohibit new systems for existing weapons of mass destruction. Another question therefore arises, namely, what should be considered a weapon system. In military literature, it is described as a system comprising a weapon, a means of locating and identifying a target, a means of delivering the weapon to the target and means of controlling both the engagement as a whole and at least a part of the sequence of operations that brings the weapon to the target. Furthermore, these components must be so ordered and interrelated as to form a distinct and substantially autonomous system. And, finally, the application of the term is restricted to systems whose target-location or weapon-control functions are largely performed by inanimate apparatus [39]. Assuming that the above description were accepted, one would still have to define the meaning of a "new system": whether all or only certain components of the system would need to be improved to make it new and, thereby, subject to prohibition.

As examples of new weapon systems, the Soviet representative mentioned binary chemical weapons, "gene engineering" as a biological weapon, environmental modification techniques, and some unspecified systems of strategic armaments, as well as precision-guided bombs, called smart bombs [38]. It will be noted, however, that: binary weapons are already being dealt with in the context of a comprehensive ban on chemical weapons; possible new biological means of warfare would be best discussed within the framework of the Biological Convention which has been in force since March 1975, and which provides for a review of scientific and technological developments relevant to the convention; environmental modification techniques for hostile purposes are expected to be covered by a separate convention (see section IV, below); new systems of strategic armaments, such as cruise missiles or modern types of nuclear-weapon-carrying submarines and bombers, constitute the topics of the current US-Soviet Strategic Arms Limitation Talks; and a ban on "smart bombs" would in all likelihood have to be discussed jointly with other measures of conventional disarmament, unless the definition of weapons of mass destruction has been broadened to include conventional explosives. The prevalent impression in the UN General Assembly was that the sponsors of the draft agreement were not quite sure as to what, specifically, they intended to ban, unless they had decided not to reveal the details of their proposal before negotiations had begun.

The UN General Assembly requested the CCD to proceed, with the assistance of "qualified" government experts, to work out the text of an agreement prohibiting new types of weapons and new systems of weapons of mass destruction, and to submit a report on the results achieved [40]. The Assembly also took note of the Soviet draft, but since the draft had not described in clear language the subject of the prohibition, it could serve as an outline rather than as a basis for a possible agreement.

The idea of preventing the appearance of ever new instruments of war appeals to many nations, even if these instruments are no more frightful than nuclear weapons. But to outlaw the development of "new" weapons in one sweeping move, through an omnibus arms control treaty, does not seem to be a very realistic proposition. Each weapon or weapon system, or category of weapons having the same characteristics, would probably have to be tackled separately, with due account being taken of their peculiarities. Different weapons may also require different means of verification; self-verification, as proposed by the USSR, would hardly prove sufficient.

It would seem that a ban on weapons which have not yet been invented should not be given priority over the prohibition of those in existence, especially nuclear weapons, the mass destructive power of which is subject to no doubt. In any event, a substantial reduction of existing nuclear arsenals would provide stronger incentives for controlling new weapon technology than those which exist today.

IV. *Prohibition of environmental means of warfare*

On 21 August 1975, after a series of secret bilateral talks, the USA and the USSR simultaneously submitted to the Conference of the Committee on Disarmament (CCD) identical draft conventions "on the prohibition of military or any other hostile use of environmental modification techniques" [41–42].[12]

The convention would prohibit military or any other hostile use (but not the threat of use) of "environmental modification techniques". The latter term was defined as 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. As explained by the sponsors, "military or any other hostile use" referred to the use of the techniques in question in armed conflict or in initiating such conflict, as well as their use for the specific purpose of causing destruction, damage or injury to another state (no indication as to the nature of the damage or injury was given), even if no other weapons were em-

[12] For a review of the debate preceding the submission of these draft conventions, see *SIPRI Yearbook 1975*, pp. 433–36.

ployed or no other military operation was taking place [24, 43]. In light of this explanation, the use of the term "hostile" alone would seem sufficient.

Harmful effects caused to other states as a result of legitimate activities for strictly peaceful purposes were not covered. But it should be recalled that the 1972 Declaration of the UN Conference on the Human Environment (principle 21) stipulated that states have the responsibility to ensure that activities within their jurisdiction or control "do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction". For the purpose of the contemplated convention, it would perhaps be desirable to make it clear that the ban applied also to activities carried out in areas outside national jurisdiction.

The draft convention listed the effects which could be caused by the use of the prohibited techniques. These were: earthquakes and tsunamis, an upset in the ecological balance of a region, or changes in weather patterns (clouds, precipitation, cyclones of various types and tornadic storms), in the state of the ozone layer or ionosphere, in climate patterns, or in ocean currents. The list was illustrative but the choice of examples seemed haphazard.

To estimate the feasibility of influencing the environment in such a way as to produce the mentioned effects, Canada submitted a working paper identifying the conceivable techniques [44]. It grouped 19 environmental modification techniques within three main categories: atmospheric modification, including the high atmosphere and ionosphere, modification of the oceans, and modification of land masses and water systems associated with them. They were as follows: (1) fog and cloud dispersion; (2) fog and cloud generation; (3) hailstone production; (4) release of material which might alter the electrical properties of the atmosphere; (5) introduction of electromagnetic fields into the atmosphere; (6) generating and directing destructive storms; (7) rain- and snow-making; (8) control of lightning; (9) climate modifications; (10) disruption of the ionized or ozone layers; (11) change of the physical, chemical and electrical parameters of the seas and oceans; (12) addition of radioactive material into the oceans and seas; (13) generation of large tidal waves (tsunamis); (14) stimulation of earthquakes/tsunamis; (15) large-scale burning of vegetation; (16) generation of avalanches and landslides; (17) surface modification in permafrost areas; (18) river diversion; and (19) stimulation of volcanoes.

The list includes most environmental modification techniques referred to in the scientific literature. It could be expanded by adding, for example, the destruction of nuclear industry facilities, or dams on rivers, or of oil wells on the sea-bed, but it would probably be impossible to make an exhaustive list.

Research and development in the environmental modification field is still at the stage of infancy; many experiments conducted heretofore have proved inconclusive. Therefore, opinions about the feasibility and practicability of various means differ. During meetings at the CCD, US experts contended that the result of all purposeful weather modification was always within the range of expectation for natural weather for a given time and region. They had been unable, as yet, to evaluate the results of their hail suppression experiments, and they also emphasized that there was neither theoretical nor experimental evidence to lead to the belief that the track of a hurricane could be affected by existing techniques. Soviet experts, on the other hand, considered that under favourable conditions precipitation could be definitely and considerably increased.[13] They also claimed important achievements in hail suppression, and did not rule out the possibility of changing the direction of hurricanes with some known methods. Be that as it may, it can be argued that what is impossible or impractical now, may become possible and usable in the future as a result of scientific and technical advances in environmental fields. But from the point of view of arms control, only those techniques which are applicable for "military or any other hostile" purposes would be of interest. The criterion of probability to achieve the phenomenon sought must then be supplemented by such criteria as the danger to the environment and the value as a means of warfare. By applying all the three factors, Sweden suggested that nine methods enumerated in the Canadian list should be discarded, leaving ten: directing destructive storms; generation of avalanches and landslides; modification of permafrost areas; diversion and pollution of rivers as well as destruction of dams; rain- and snow-making; burning of vegetation; generation of fog and cloud; production of hailstone; modification of climate; and control of lightning [46].

The energy contained in hurricanes, typhoons or cyclones, if harnessed, could be applied on battlefields, or to destroy airfields, ports and fleets.

Precipitation of a snow avalanche or large earth slides could be used to close mountain passes, stop river shipping and block other communication routes.

Changes in the surface of areas underlain by permafrost could lead to instability and accelerated erosion, causing destruction of roads, railways and foundations as well as alteration of stream sources.

A major change of water flow in a river could flood low-lying areas, wash out bridges and generate currents, making navigation hazardous; it could also impede navigation by making the rivers too shallow, and reduce water availability for power generators, public water supplies and irrigation.

Deliberate pollution of rivers and lakes could make the use of water difficult and could destroy biological life.

Increased precipitation could affect the mechanical properties of the soil, making it unable to support normal loads, or could bring about land slippage; increased rainfall may augment streams to a size where bridges would be

[13] Also the US National Academy of Sciences study group concluded in 1973 that "in the longest randomized cloud-seeding research project in the United States involving cold orographic winter clouds, it has been demonstrated that precipitation can be increased by substantial amounts and on a determinant basis" [45].

washed out, while increased snowfall could block transportation routes, directly or by avalanche.[14]

Prevention of normal precipitation could cause droughts destroying vegetation and animal life.

Burning of vegetation on a large scale could remove natural cover, destroy houses and crops, disrupt communications and supplies, and, by increasing land erosion, lead to land slippage and blocking of routes.

Generation of fog or low-lying cloud over a target area could provide either protection from attack depending on visual methods, or cover for launching an attack; it could also impede shipping and air traffic.

Production of hailstones, especially of a large size, would have effect on certain vehicles, aircraft and weapons, as well as on light shelter, antennae and power and communications lines.

Modification of climate resulting in a sustained annual increase or decrease of precipitation, a change in mean seasonal temperatures or in the number of hours of sunshine or in the length of the frost-free season, could result in large-scale disruption of food production, increased erosion and possible destruction of forests.

An increase in frequency and intensity of lightning might be employed to damage communications facilities which use antennae, and as an incendiary weapon.

However, not all these techniques could be used in such a way as to inflict damage or injury on a specific target; some techniques, although potentially destructive, may prove unattractive as a method of warfare because of control and command problems. For example, climate modification, causing indiscriminate and possibly catastrophic and irreversible effects, would be of highly questionable military value to the user. In certain cases, the attacker might suffer from the changes that he himself had brought about. It is probably these considerations that have prompted the USA to declare that it would not use climate modification techniques for hostile purposes even should such techniques come to be developed in the future.

The stated purpose of the draft convention was to "limit the potential danger to mankind from means of warfare involving the use of environmental modification techniques". The aim was not to eliminate the danger altogether by banning *all* environmental modification techniques for military or other hostile purposes. Only those which have "widespread, long-lasting or severe effects" would be prohibited. Since the presence of one of these properties

[14] The first known use of this technique as a weapon of war was during the hostilities in Viet-Nam. From March 1967 to July 1972, the US Air Force, in 2602 sorties, injected 47409 canisters containing seeding agents into clouds to increase rainfall and inhibit the logistical operations of the adversary. Evidence presented by the US Department of Defense in 1974 indicated that the effects had been minimal. For example, in much of the area the rainfall during the monsoon season averages about 21 inches; the induced rainfall is said to have been an additional two or three inches [47]

would be enough for the technique to be outlawed, the scope of the draft convention was ostensibly broader than that of Article 33, paragraph 3, of the Draft Additional Protocol to the 1949 Geneva Conventions for the protection of war victims, considered by the Diplomatic Conference on the reaffirmation and development of international humanitarian law applicable in armed conflicts, where the presence of all the three effects is required. But the protocol has a wider sphere of application. It forbids the employment of any methods or means of warfare "which are intended or may be expected" to cause damage to the natural environment, so as to mitigate the consequences of wars conducted with all possible weapons, while the draft convention would only prohibit the environmental modification techniques "as weapons", leaving aside the environmental impact of other weapons.

What is not explicitly prohibited may be taken as implicitly permitted. Consequently, techniques which do not have widespread, long-lasting or severe effects would be exempted from the ban. Moreover, the meaning of "widespread, long-lasting or severe", qualifying the prohibition and reducing its scope, was not explained. It was not clear what area would have to be destroyed or damaged for a given technique to be considered as having widespread effects; how long the effects would have to prevail for the technique to be deemed to leave long-lasting effects; or what number of humans, animals or plants would have to be injured for the technique to be found to produce severe effects.

The provisions of the draft convention could be interpreted as not covering, for example, fog and cloud generation and dispersal, hailstone production, rain- and snow-making, or increasing the intensity of lightning discharges, because of the limited effects they may have. And yet, these techniques are the most feasible methods to influence the environment for hostile purposes.

As regards other techniques, it would be possible to determine the extent of damage caused by their use only after the damage had actually occurred. And even then, it would be difficult to decide whether a particular phenomenon would be long-lasting. For example, to describe the climate of a region, meteorologists use a 30-year period of record. In addition, an aggressor could always claim that the effects which occurred, though proscribed, were incidental. The declared intention of the defaulting state cannot be ignored as long as the convention is based on the criterion of purpose; it is the intended use (military or other hostile) of a modification activity that was a determining factor under the draft ban, not the type of activity.

Thus, in addition to legitimizing the use of certain modification techniques, the qualifications "widespread, long-lasting or severe", attached to the ban, would create possibilities to circumvent the prohibition on the use of other techniques as well. Such loopholes would disappear if *all* techniques for modifying the environment for military or other hostile purposes were outlawed; no enumeration of the prohibited activities would then be needed.

An exemption, however, could be made for techniques which, while used for military purposes, do not produce effects beyond the borders of the state applying them. For example, the generation or dispersal of fog over one's own airfields and ports would remain permitted.

The ban should not be limited to nations party to the convention, as was the case in the US–Soviet draft. Because of the very nature of environmental modification, it may be very difficult to circumscribe its effects geographically. No nation could feel immune to large-scale changes in the environment, wherever they happen to take place.

Another gap in the draft convention was the lack of prohibition on research and development of environmental modification techniques for warlike purposes. The reason the sponsors gave [24, 43] for this omission was that verification would be difficult because of the "dual applicability to civilian and military ends of much research and development in this field". But not all peaceful modification activities overlap with military; it would be difficult, for example, to envisage the generation of tsunamis for peaceful purposes. Furthermore, research and development in the environmental field could be placed under strict civilian control, thus minimizing the possibility of abuse by the military. Also an open, wide and institutionalized exchange of relevant scientific information, including an obligation to register and place under international observation all major peaceful experimentation with environmental modification techniques, might help to increase confidence among the parties that the obligations are being observed. And, finally, not all prohibitions necessarily require thorough international verification of compliance. It is symptomatic that in its 1973 resolution proposing a treaty to prohibit the use of environmental or geophysical modification activity as a weapon of war, the US Senate envisaged a ban on research or experimentation directed to the development of such activity, without any control [48].

The US–Soviet draft convention is a proposal for non-use of certain methods of warfare. It cannot be considered as a disarmament or arms control measure because it does not envisage elimination of a specific weapon from the arsenals of states or prevention of its acquisition. Experience has shown that a non-use commitment, contracted in time of peace, may not resist the pressure of expediency generated in time of war. A ban on the very possession of a given weapon or warfare technique, including research, or at least development, can provide a more reliable guarantee of non-use.

The draft convention stipulated that its provisions shall not hinder the use of environmental modification techniques for peaceful purposes by states party to it or international economic and scientific cooperation in the utilization, preservation and improvement of the environment for peaceful purposes.

A review of possible environmental modification techniques shows that several have peaceful applications. Thus, for example, fog and cloud dispersal can be applied at civilian airports, seaports or other major civilian enterprises that are inhibited by extensive fog.

Fog and cloud generation could be useful to limit heat loss from crops subject to frost damage.

Suppression of conditions that could lead to hailstone precipitation helps to reduce damage to crops.

Manipulation of storms could be used to moderate the intensity of, or to disperse or redirect, hurricanes.

Rainmaking could be employed for the relief of drought and for water-storage purposes.

Forest burning is used to relieve conditions that might lead to uncontrolled fires.

Stimulation of weak earthquakes could be applied to relieve stress conditions that otherwise might lead to destructive natural earthquakes.

The technique of precipitating a snow avalanche is used for controlled avalanche release.

River diversion is commonly used for irrigation, for navigation or for power-generating purposes.

Also climate modification might, under certain circumstances, have beneficial effects, but serious hazards are involved in large-scale experimentation.

The incentive to develop these techniques is great. It has been estimated that in the USA alone, the average annual costs from damage that could be directly identified with hurricanes, tornadoes, hail, lightning and fog exceed $2 billion, not to speak of agricultural losses due to drought, which could be enormous. In the field of peaceful application of environmental modification, much is already being done on the national level. As regards international activities, the World Meteorological Organization (WMO) has been conducting studies of artificial weather modification, including the enhancement of precipitation, hail suppression, fog dispersal and reduction of wind speed in tropical cyclones. It should be added that the WMO is responsible for the international planning and coordination of the world weather monitoring system which could be an essential part of any system for monitoring large-scale weather- and climate-modification operations. Also the United Nations Environment Program (UNEP) is involved in environmental modification problems. Further internationalization of research and development in the field of environmental modification for peaceful purposes would, apart from obvious scientific, economic and technological advantages, provide some reassurance that substantial resources were not diverted to military ends.

According to the draft convention, the parties would have to take necessary measures, in accordance with their constitutional processes, to prohibit and prevent any activity in violation of the provisions of the convention, anywhere under their jurisdiction or control. If the taking of "necessary measures" means passing appropriate laws, then the requirement is self-evident and, therefore, superfluous: internal legislation must always be brought into harmony with the state's obligations contracted through international treaties. If, on the other hand, this type of self-control is meant to ensure the observance of the convention, then it is insufficient: no activities producing widespread, long-lasting or severe effects and directed against another country could be conducted by a national agency or group of individuals without approval by, or direct order from, a central state authority.

If the development of environmental modification techniques for military purposes were not to be prohibited, the only obligation to be verified would be the non-use undertaking. Unlike other weapons, except perhaps biological warfare agents, certain environmental modification activities could be carried out clandestinely and go undetected for a long time; the affected country may not even know that it has been attacked. But should a suspicion of violation arise, it would have to be determined whether changes in the environment or climate which had harmed a particular country were the result of human activity in another country; floods and droughts, destructive storms and earthquakes which occur naturally in many areas of the world may not be readily distinguishable from man-made events. The effects of these changes would then have to be assessed in light of the qualifications specified in the convention in order to establish whether they were widespread, long-lasting or severe. And, finally, a judgement would have to be made as to whether they were caused deliberately, with hostile intent, or were simply an accidental consequence of peaceful uses of environmental modification techniques, the boundary between legitimate and illegitimate uses being difficult to delineate.

To solve problems in relation to the objectives of or in applying the provisions of the convention, the sponsors of the draft envisaged consultations among the parties, as well as consultations through "appropriate international procedures" within the framework of the United Nations without, however, spelling out the exact nature of these procedures. If conducted in a spirit of cooperation, as required by the draft, consultations would certainly be helpful in dispelling suspicions of breaches, based on misunderstandings. However, a crucial stage would come when a party acquired what it considered to be convincing proof that a violation of the convention had actually been committed. Under the draft, any state which finds that another state is acting in breach of obligations deriving from the provisions of the convention would have the right to turn to the UN Security Council and lodge a complaint. The complaint should include all possible evidence "confirming its validity". The Security Council would determine whether the allegation was properly substantiated and deserved consideration. Possible investigations could be initiated only by the Security Council, which would also be the sole body authorized to evaluate their results and decide whether a party had been "harmed or is likely to be harmed" as a result of violation of the convention. The provision of assistance to the victim "which so requests" would depend on these findings. It was not clear whether such assistance would be optional or obligatory, that is, whether it could be refused without incurring the charge of non-compliance.

The draft required that the complaints procedure should be carried out "in accordance with the provisions of the Charter of the United Nations". Since the Charter provides that Security Council decisions on substantive matters should be made by an affirmative vote of nine of the 15 members of the Council, including the concurring votes of its permanent members—China, France, the UK, the USA and the USSR—each important step in the process of verifying allegations of breaches of the convention could be blocked by a negative vote of the great powers. There can be no doubt that this right of veto would be taken advantage of whenever an accusation were directed against any of these powers or their allies. Considering that at the present time, and probably in the foreseeable future, the most likely offenders are precisely the great powers, or some of their allies, which are the only states engaged in large-scale research and development of environmental modification techniques, the verification provisions, as formulated in the draft, were devoid of practical significance.

No treaty can change the prerogatives of the permanent members of the Security Council as long as the UN Charter remains unchanged. But there is, perhaps, no need to involve the Security Council in the implementation of a convention concluded outside the framework of the UN. If, nevertheless, it is thought advisable to make use of the UN machinery and to resort to the services of the Security Council in view of its responsibility for the maintenance of international peace and security, there appears to be no reason why a single body, whatever its standing, should combine the power of conducting investigations with that of determining the guilt or innocence of states with regard to the observance of a treaty. Separating the fact-finding duties from political judgement could render the verification provisions more plausible.

Constraints on new weapons before they have been fully developed, and especially on warfare techniques which are inherently indiscriminate and unpredictable in their effects, could, as preventive measures, contribute to the circumscription of the arms race. But to be effective, the constraints must be comprehensive and contain no loopholes. The US–Soviet draft convention on the prohibition of environmental modification techniques did not meet the above requirements. It would ban the use of these techniques, without banning their development. Moreover, even the non-use commitment was qualified. It was limited to those techniques which produce widespread, long-lasting or severe effects, and which, because they are of uncertain effectiveness, unpredictable and double-edged, that is, potentially hazardous to the user himself, can hardly be conceived as weapons of war. On the other hand, the techniques which do not produce widespread, long-lasting or severe effects, but which could be important in tactical military operations because of their ability to hit more precisely a selected area, would escape the ban. Another important drawback was the lack of an impartial machinery to establish facts of violation. The proposed complaints procedure depending entirely on the good-will of the permanent members of the Security Council seems to be of little value. Elimination of these, as well as other shortcomings described above, could make the contemplated agreement really meaningful.

The thirtieth session of the UN General Assembly requested the CCD to continue negotiations on the text of a convention on the prohibition of military or other hostile use of environmental modification techniques, and to submit a special report on the results achieved for consideration by the General Assembly at its thirty-first session [49].

V. *Confidence-building measures in Europe*

On 3 July 1973, a conference on security and cooperation in Europe (CSCE) opened in Helsinki. It continued at Geneva from 18 September 1973 to 21 July 1975 and was concluded, again at Helsinki, on 1 August 1975. All European states, except Albania, participated in the conference: Austria, Belgium, Bulgaria, 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 USSR, the UK and Yugoslavia. Canada and the United States participated as well.

The Conference adopted a Final Act which consists of the following main parts: questions relating to security in Europe; cooperation in the field of economics, of science and technology and of the environment; questions relating to security and cooperation in the Mediterranean; cooperation in humanitarian and other fields; and follow-up to the Conference.

The first part, dealing with security questions in Europe, contains a "document on confidence-building measures and certain aspects of security and disarmament". This chapter of the Final Act—the only one directly related to military issues—consists of a preamble and the following sections: prior notification of major military manoeuvres; prior notification of other military manoeuvres; exchange of observers; prior notification of major military movements; other confidence-building measures; questions relating to disarmament; and general considerations.

The rationale for considering these matters at the CSCE was formulated in the following way: "to contribute to reducing the dangers of armed conflict and of misunderstanding or miscalculation of military activities which could give rise to apprehension, particularly in a situation where the participating States lack clear and timely information about the nature of such activities". The document was the result of the work of a special military committee of the Conference, which devoted as many as 246 formal and innumerable informal meetings to reaching a compromise. The text which emerged is in many places formulated in rather cryptic language and is difficult to understand without a knowledge of the negotiating history (for the full text, see appendix 8D).

Prior notification of major military manoeuvres

Notification will be given through the "usual diplomatic channels" to "all" states participating in the CSCE, and not merely to states having a common frontier with the country responsible for the manoeuvres, as was proposed by some delegations at the early stages of negotiations.

Although notification is to be given only for major military manoeuvres, the term "major" has not been defined. Nevertheless, it follows from the text that it means a manoeuvre involving at least 25 000 troops (a compromise between 12 000 and some 45 000 troops, originally suggested by the Western countries and the Soviet Union, respectively). These include land forces and, in this context, also amphibious and airborne forces, engaged in independent exercises or in combined exercises with any possible air and naval components. Notification "can" also be given in the case of combined manoeuvres which do not reach the above total, but which involve land forces together with "significant numbers" of either amphibious or airborne troops, or both. The idea behind the latter provision is that manoeuvres with fewer than 25 000 troops could be considered as "major" if they involved troops especially trained for invasion purposes. Manoeuvres of naval and air forces, conducted independently or combined with each other, are not covered, presumably because such forces alone are not suitable for occupying territory.

Manoeuvres taking place within Europe (that is, anywhere in Europe, not just within a specified distance from the border of the neighbouring states, as was first proposed by the Soviet Union) and in the adjoining sea and air space are subject to notification. The territories of the USA, Canada and of the Asian part of the USSR are not covered. While the geographical limits of the European territory did not give rise to particular controversies (the USSR agreed to include Georgia and Armenia, and Turkey agreed to include Anatolia), the term "adjoining" used in conjunction with sea and air space was discussed at length and finally left in the text without its meaning being clarified. In the understanding of many participants it includes the Mediterranean.

A separate formula has been devised for states whose territories extend beyond Europe (the Soviet Union and Turkey). Prior notification by the state in question needs to be given only of manoeuvres which take place in an area "within 250 kilometres from its frontier facing or shared with any other European participating State". A proposal to count this distance from the frontier of the "other participating state", instead of counting it from the frontier of the state whose territory extends beyond Europe, was found unacceptable, because in the case of sea borders (such as between Sweden and the USSR), a good part of the area covered by notification would include international waters.

An exception to an undertaking to notify has been made for those cases where the area specified above is also "contiguous" to the state's frontier facing or shared with a non-European non-participating state. In practice, this means that Turkey does not have to give notification of its military manoeuvres conducted in areas close to the borders of Syria, Iran and Iraq, even if these areas lie within 250 km from the Turkish border facing Cyprus or the Soviet Union.

Notification is to be given 21 days or more in advance of the start of the manoeuvres (a compromise between five and 60 days, originally requested by the USSR and the UK, respectively) or, in the case of a manoeuvre arranged at shorter notice, at the earliest possible opportunity prior to its starting date. It is clear that, from the point of view of confidence-building, the longer the period the better. It is unlikely that "major" manoeuvres are arranged at very short notice.

As regards the content of the notification, the document requires the following information to be provided: the designation, if any, the general purpose of and the states involved in the manoeuvre, the type or types and numerical strength of the forces engaged, and the area and estimated time-frame of its conduct. "If possible", the states will also give additional information, particularly that related to the components of the forces engaged and the period of involvement of the troops, which is a larger notion than the time-frame of the manoeuvres themselves.

It is not clear which state is to provide notification of manoeuvres conducted jointly by more than one country and in more than one country. It seems that this is primarily the responsibility of the state or states on the territory of which the manoeuvres take place. If, however, manoeuvres are conducted in "adjoining" international air space or international waters, one can presume that notification will be the responsibility of all the states participating in the manoeuvres.

Prior notification of other military manoeuvres

The participants in the conference recognized that notification of "smaller scale" military manoeuvres could also contribute to strengthening confidence. Indeed, in certain areas of Europe, manoeuvres of troops even considerably below the 25 000 level may cause alarm, in particular when they are conducted in the vicinity of other countries. Special emphasis has, therefore, been placed on the advisability of notifying states which lie near the area of such manoeuvres.

Another paragraph recognizing that states "may notify other military manoeuvres conducted by them" can be interpreted as indicating the desirability of notifying, for example, independent naval and/or air force manoeuvres.

Exchange of observers

The participating states will, if they choose, invite observers to attend military manoeuvres. This stipulation is not linked with the provision on notification of major military manoeuvres. Thus, also other manoeuvres could be observed. Invitations would be issued on a "bilateral basis" and "in a spirit of reciprocity", that is, not necessarily to all states.

While it would be up to the invited state to designate its observers, the number of observers as well as the procedures and conditions of participation would in each case be determined by the inviting state.

Prior notification of major military movements

Under this heading the document declares that states "may, at their own discretion", give notification of their major military movements. (Again, the term "major" has not been defined.) It contains a promise that further consideration will be given to the question of such notification, "bearing in mind, in particular, the experience gained by the implementation of the measures which are set forth in this document". A scant treatment accorded to major military movements is not surprising: some states contend that their security would be adversely affected, if they undertook to give notification of such activities. But it is certainly regrettable, because transfers of combat-ready army, naval and air force units outside their permanent garrison or base areas, with the purpose of redeployment, may cause greater concern than manoeuvres.

Other confidence-building measures

Another measure on which the participants agreed is the promotion of exchanges "by invitation" among their military personnel, including visits by military delegations, a practice which has existed for years among nations maintaining normal relations.

The participants have also undertaken to take into account and respect the objective of confidence-building when conducting their military activities in the area covered by the provisions for the prior notification of major military manoeuvres. This is a weak reflection of the proposal made by nonaligned countries that states should refrain from any activities by their armed forces which are liable to cause misunderstanding and tension (a euphemism for provocations with a view to exerting political pressure and intimidating neighbouring states).

Sweden submitted a proposal for greater openness in the presentation by the participants in the CSCE of statistics concerning defence expenditures. The initiative was intended to allay misconceptions about military efforts of states and, thereby, contribute to confidence-building. It was not accepted under the pretence that the Conference had no mandate to consider questions which were of a global rather than regional nature.

The document again recognizes that "the experience gained by the implementation of the provisions set forth above, together with further efforts", could lead to developing and enlarging measures aimed at strengthening confidence—a topic to be taken up at the follow-up meetings envisaged in the Final Act of the CSCE.

Questions relating to disarmament

While recognizing the interest of all the participating states in "lessening military confrontation and promoting disarmament", the document contains no concrete proposals for arms control in Europe. Neither does it give an indication as to what kind of measures would be necessary in the first place. It uses the same phraseology about the need to achieve general and complete disarmament as is contained in UN resolutions adopted yearly since the late 1950s.

General considerations

In this concluding section, three points are worth mentioning: *first,* the recognition of the relationship between security in Europe and security in the Mediterranean area (this was due to the contributions received, and statements heard at the Conference, from Algeria, Egypt, Israel, Morocco, Syria and Tunisia.[15]); *second,* the importance attached to the provision of information about developments, progress and results achieved in negotiating fora; and *third,* the acknowledgement of the justified interest of states not participating in these fora to have their views considered. It remains to be seen whether the latter two points will result in rendering the bloc-to-bloc talks on reductions of forces in Europe less esoteric than heretofore, and in reducing the secretiveness surrounding them.

As can be seen from the above exposition, most provisions of the document on confidence-building in Europe are so vague and non-committal that it may be difficult to ascertain whether they are actually being fulfilled. The only provision which is couched in concrete terms is that concerning notification

[15] In the part of the Final Act dealing with questions relating to security and cooperation in the Mediterranean, the participating states declared their intention of maintaining and amplifying the contacts and dialogue as initiated by the CSCE with the non-participating Mediterranean states to include all the states of the Mediterranean, "with the purpose of contributing to peace, reducing armed forces in the region, strengthening security, lessening tensions in the region, and widening the scope of cooperation".

of major military manoeuvres. In assessing it one should bear in mind that this is not a legally binding commitment; as stated in the preamble, the measure envisaged "rests upon a voluntary basis". Nevertheless, it is a declaration of intention solemnly adopted by the representatives of the participating states at the highest possible level. And since the parties expressed their conviction of the political importance of prior notification of major military manoeuvres for the "promotion of mutual understanding and the strengthening of confidence, stability and security", and accepted the "responsibility of each of them" to implement this measure, the document carries a potential for exerting pressure on non-observing states. Indeed, persistent failure to comply with the undertaking to give notification of military manoeuvres and, for that matter, with other undertakings contained in the Final Act of the CSCE, would unavoidably give rise to resentment and reproof with the resulting distrust undermining the very objective sought by the Conference.

In the last analysis, inter-state commitments freely entered into are usually observed only to the extent they serve the interests of the parties. One can assume, for example, that in a crisis situation in Europe, certain states would surely cease to provide notifications of their manoeuvres, even if they had contracted a legal obligation to do so under an agreement duly signed and ratified. Given the present world order, no sanctions in case of non-compliance are conceivable other than moral censure as well as depriving the offender state of the advantages it had intended to enjoy under an international instrument, be it a treaty or a declaration.

It seems paradoxical that a conference convened with a view to strengthening security in Europe devoted relatively little attention to military matters, in spite of the fact that the participants had admitted the "complementary nature of the political and military aspects of security". They chose to pay only lip service to the need for disarmament, when it is obvious that without arms control détente will be deprived of real substance.

Advance notification of manoeuvres is not an arms control measure, because it does not involve any restriction on military activities. The concept of such notification had been introduced into the international debate at the beginning of the 1960s as part of a programme to reduce the risk of war by accident, miscalculation, failure of communications or surprise attack. It was then discussed along with the proposed establishment of observation posts, mobile observation teams and exchange of military missions [50–52], or in conjunction with a proposed prohibition on certain types of military exercises [53–54]. Isolated from the above-mentioned measures, notification can hardly fulfil the original role allotted to it, that of a warning signal, especially at a time when the means of electronic and satellite photography surveillance are considered sufficiently reliable to monitor military activities of major proportions in any part of the world. Notification could perhaps contribute to minimizing the danger that detection of such activities might give rise to misunderstanding, provoke a rapid, possibly disproportionate, military response and thus initiate unpremeditated hostilities. But it would have to cover all major military movements, not only manoeuvres, on an obligatory basis. In the absence of such provisions, detection of non-notified movements might be mistaken for preparations for a hostile action. The effect would be to undermine confidence rather than build it.

In spite of these deficiencies, the undertaking to notify can, if scrupulously implemented, signify a modest first step towards openness in military affairs and help to disperse the myth that secrecy is necessarily an asset for the security of states. (For the status of the implementation of the undertaking to notify major military manoeuvres in Europe, see chapter 9.)

VI. *The disarmament negotiating machinery*

In the introduction to his 1975 Report on the Work of the Organization [55], the UN Secretary-General said that "the rôle which the United Nations is playing in disarmament is far from adequate". Indeed, in spite of the fact that disarmament is one of the major UN objectives, the function of the organization in this field has been reduced to providing merely a forum for a debate during the annual sessions of the General Assembly. UN resolutions invite, request, urge and appeal to nations to continue their efforts towards disarmament, and *ad hoc* groups are established to study selected subjects, but the impact of these activities on the behaviour of states is insignificant. General Assembly declarations and recommendations are not legally binding; as a rule, they remain unfulfilled. Negotiating bodies for disarmament, that is, bodies where specific agreements are discussed in detail, are either unrelated to the United Nations, as in the case of the Strategic Arms Limitation Talks, or only loosely linked with it (mainly through reporting), as in the case of the CCD.

The Secretary-General suggested that action should be taken "in practical and realistic terms, to strengthen the role of the United Nations in such a way that the necessary progress can be achieved". The idea of improving the UN infrastructure to deal with disarmament was taken up by Sweden at the thirtieth General Assembly [27, 56–57]. Some countries, including the USA and the USSR [58], expressed apprehension lest a discussion of organizational matters should divert attention from the substance of the problem of disarmament, but a majority of states were in favour of studying the subject. As a result, the Assembly decided to set up an *ad hoc* committee to review the role of the United Nations in the field of disarmament and recommended that the following objectives should be pursued in the first place: (*a*) possible new approaches for achieving more effective procedures and organization of work in the field of disarmament, thereby enabling the United Nations to exercise its full role in multilateral disarmament efforts; (*b*) ways and means of improving existing United Nations facilities for collection, compilation and dissemination of information on disarmament issues, in order to keep all governments, as well as world public opinion, properly informed on progress achieved in the field of disarmament; (*c*) ways and means to enable the UN Secretariat to assist, on request, states parties to multilateral disarmament agreements in their duty to ensure the effective functioning of such agreements, including appropriate periodical reviews. Governments were invited to communicate their views and suggestions to the Secretary-General [59].

The first meeting of the *ad hoc* committee was held in January 1976. There, a group of countries consisting of Austria, Grenada, New Zealand, the Philippines, Romania, Sri Lanka, Sweden, Tunisia and Venezuela suggested the following guidelines for the review of the role of the United Nations in disarmament [60]:

1. New approaches for achieving more effective procedures and organization of work:
(a) Improved methods of work of the First Committee of the General Assembly in disarmament matters;
(b) The relationship between the General Assembly and other UN bodies in the field of disarmament;
(c) The role of the UN Disarmament Commission;[16]
(d) The role of the United Nations in providing assistance, on request, in multilateral and regional disarmament negotiations;
(e) The relationship between the General Assembly and the CCD in the field of disarmament, in particular a review of appropriate arrangements for entrusting tasks by the General Assembly to the CCD and for the format of reports by the CCD to the General Assembly, taking into account the discussion of CCD procedures to be carried out by the CCD;
(f) Studies: UN Secretariat facilities for in-depth studies of relevant disarmament matters, including possibilities of appointing special expert groups and of soliciting assistance from other sources inside and outside the UN system.

[16] The first General Assembly resolution, adopted in 1946, established an Atomic Energy Commission with the task of making proposals for the elimination from national armaments of atomic weapons and of all other major weapons adaptable to mass destruction. The Commission was composed of one representative from each of the states represented on the Security Council, and Canada when that state was not a member of the Council. Another group—the Commission for Conventional Armaments—was established in 1947, with the same composition as the Council, to submit proposals for the general regulation of armaments and armed forces and for safeguards in connection with such regulation and reduction. Both commissions were dissolved in 1952 to be replaced by a single Disarmament Commission with the same membership. The Disarmament Commission was later expanded to include all the members of the United Nations. This commission has not played a prominent role in the disarmament negotiations. It held only two sessions in 1960 and in 1965.

2. Information:
(a) UN Secretariat information facilities in the field of disarmament—preparation of a programme of action;
(b) The role of non-governmental organizations.

3. Effective functioning of multilateral disarmament agreements:
(a) UN involvement in the implementation of disarmament agreements;
(b) Annual UN reports on the status of disarmament agreements;
(c) Review conferences;
(d) Coordination of ratification procedures.

The committee's report including findings and proposals is to be submitted to the thirty-first session of the UN General Assembly, the understanding being that the review should not interfere with the on-going negotiations or prejudge decisions on a world disarmament conference (WDC). At any rate, the prospect of convening a world conference in the foreseeable future is slim in view of the unchanged negative positions of China and the USA. And among those who favour a WDC there is no agreement as to its objectives: some states see the need for discussing at the conference actual measures of disarmament, while others conceive of it as a forum to review progress in disarmament, propose guidelines and review the negotiation machinery [61]. In this situation, a number of countries consider it advisable to call a special session of the UN General Assembly devoted to disarmament issues. Such a session could fulfil many of the functions originally earmarked for a WDC.

While not decisive for the success of disarmament negotiations, the organizational set-up is of importance. Adequate procedures may help orderly discussion and facilitate agreement. Under the UN Charter, the General Assembly is entrusted with considering the principles governing disarmament and the regulation of armaments, while the Security Council is responsible for formulating plans for the establishment of a system for the regulation of armaments. In practice, the UN machinery has functioned very unsatisfactorily and needs to be improved. This does not mean that all the fora dealing with disarmament must be brought under direct UN authority. There is room for both UN disarmament bodies and non-UN bodies—bilateral, multilateral or regional. What is needed is a competent coordinating centre, and the United Nations could be equipped to perform the role of such a centre. The negotiating machinery should be so streamlined as to give each state an opportunity to contribute to international disarmament efforts. Moreover, in drafting arms control treaties, states should assign to the United Nations specific duties related to the implementation of these treaties.

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61. UN document A/10028.

Appendix 8A

UN General Assembly resolutions on disarmament and related matters

I. *Member states of the United Nations as of 31 December 1975*

Total membership: 144

Member	Date of admission
Afghanistan	19 Nov 1946
Albania	14 Dec 1955
Algeria	8 Oct 1962
Argentina	24 Oct 1945
Australia	1 Nov 1945
Austria	14 Dec 1955
Bahamas	18 Sep 1973
Bahrain	21 Sep 1971
Bangladesh	17 Sep 1974
Barbados	9 Dec 1966
Belgium	27 Dec 1945
Benin[a]	20 Sep 1960
Bhutan	21 Sep 1971
Bolivia	14 Nov 1945
Botswana	17 Oct 1966
Brazil	24 Oct 1945
Bulgaria	14 Dec 1955
Burma	19 Apr 1948
Burundi	18 Sep 1962
Byelorussia	24 Oct 1945
Cambodia[b]	14 Dec 1955
Canada	9 Nov 1945
Cape Verde	16 Sep 1975
Central African Republic	20 Sep 1960
Chad	20 Sep 1960
Chile	24 Oct 1945
China	24 Oct 1945
Colombia	5 Nov 1945
Comoros	12 Nov 1975
Congo	20 Sep 1960
Costa Rica	2 Nov 1945

Cuba	24 Oct	1945
Cyprus	20 Sep	1960
Czechoslovakia	24 Oct	1945
Democratic Yemen[c]	14 Dec	1967
Denmark	24 Oct	1945
Dominican Republic	24 Oct	1945
Ecuador	21 Dec	1945
Egypt[d]	24 Oct	1945
El Salvador	24 Oct	1945
Equatorial Guinea	12 Nov	1968
Ethiopia	13 Nov	1945
Fiji	13 Oct	1970
Finland	14 Dec	1955
France	24 Oct	1945
Gabon	20 Sep	1960
Gambia	21 Sep	1965
German Democratic Republic	18 Sep	1973
Germany, Federal Republic of	18 Sep	1973
Ghana	8 Mar	1957
Greece	25 Oct	1945
Grenada	17 Sep	1974
Guatemala	21 Nov	1945
Guinea	12 Dec	1958
Guinea-Bissau	17 Sep	1974
Guyana	20 Sep	1966
Haiti	24 Oct	1945
Honduras	17 Dec	1945
Hungary	14 Dec	1955
Iceland	19 Nov	1946
India	30 Oct	1945
Indonesia[e]	28 Sep	1950
Iran	24 Oct	1945
Iraq	21 Dec	1945
Ireland	14 Dec	1955
Israel	11 May	1949
Italy	14 Dec	1955
Ivory Coast	20 Sep	1960
Jamaica	18 Sep	1962
Japan	18 Dec	1956
Jordan	14 Dec	1955
Kenya	16 Dec	1963
Kuwait	14 May	1963
Laos	14 Dec	1955
Lebanon	24 Oct	1945

Lesotho	17 Oct 1966
Liberia	2 Nov 1945
Libya	14 Dec 1955
Luxembourg	24 Oct 1945
Madagascar	20 Sep 1960
Malawi	1 Dec 1964
Malaysia[f]	17 Sep 1957
Maldives	21 Sep 1965
Mali	28 Sep 1960
Malta	1 Dec 1964
Mauritania	27 Oct 1961
Mauritius	24 Apr 1968
Mexico	7 Nov 1945
Mongolia	27 Oct 1961
Morocco	12 Nov 1956
Mozambique	16 Sep 1975
Nepal	14 Dec 1955
Netherlands	10 Dec 1945
New Zealand	24 Oct 1945
Nicaragua	24 Oct 1945
Niger	20 Sep 1960
Nigeria	7 Oct 1960
Norway	27 Nov 1945
Oman	7 Oct 1971
Pakistan	30 Sep 1947
Panama	13 Nov 1945
Papua New Guinea	10 Oct 1975
Paraguay	24 Oct 1945
Peru	31 Oct 1945
Philippines	24 Oct 1945
Poland	24 Oct 1945
Portugal	14 Dec 1955
Qatar	21 Sep 1971
Romania	14 Dec 1955
Rwanda	18 Sep 1962
São Tomé and Principe	16 Sep 1975
Saudi Arabia	24 Oct 1945
Senegal	28 Sep 1960
Sierra Leone	27 Sep 1961
Singapore	21 Sep 1965
Somalia	20 Sep 1960
South Africa	7 Nov 1945
Spain	14 Dec 1955
Sri Lanka[g]	14 Dec 1955

Sudan	12 Nov 1956
Surinam	4 Dec 1975
Swaziland	24 Sep 1968
Sweden	19 Nov 1946
Syria[d]	24 Oct 1945
	(resumed 13 Oct 1961)
Thailand	16 Dec 1946
Togo	20 Sep 1960
Trinidad and Tobago	18 Sep 1962
Tunisia	12 Nov 1956
Turkey	24 Oct 1945
Uganda	25 Oct 1962
Ukraine	24 Oct 1945
Union of Soviet Socialist Republics	24 Oct 1945
United Arab Emirates	9 Dec 1971
United Kingdom	24 Oct 1945
United Republic of Cameroon	20 Sep 1960
United Republic of Tanzania[h]	14 Dec 1961
United States	24 Oct 1945
Upper Volta	20 Sep 1960
Uruguay	18 Dec 1945
Venezuela	15 Nov 1945
Yemen	30 Sep 1947
Yugoslavia	24 Oct 1945
Zaire	20 Sep 1960
Zambia	1 Dec 1964

[a] Formerly listed as Dahomey.
[b] Formerly listed as Khmer Republic.
[c] Formerly listed as People's Democratic Republic of Yemen.
[d] Egypt and Syria were original members of the United Nations from 24 October 1945. Following a plebiscite on 21 February 1958, the United Arab Republic was established by a union of Egypt and Syria and continued as a single member. On 13 October 1961, Syria, having resumed its status as an independent state, resumed its separate membership in the United Nations. On 2 December 1971, the United Arab Republic changed its name to the Arab Republic of Egypt.
[e] By letter of 20 January 1965, Indonesia announced its decision to withdraw from the United Nations "at this stage and under the present circumstances". By telegram of 19 September 1966, it announced its decision "to resume full co-operation with the United Nations and to resume participation in its activities". On 28 September 1966, the General Assembly took note of this decision and the president invited representatives of Indonesia to take seats in the Assembly.
[f] The Federation of Malaya joined the United Nations on 17 September 1957. On 16 September 1963, its name changed to Malaysia, following the admission to the new federation of Singapore, Sabah (North Borneo) and Sarawak. Singapore became an independent state on 9 August 1965 and a member of the United Nations on 21 September 1965.
[g] Formerly Ceylon.
[h] Tanganyika was a member of the United Nations from 14 December 1961 and Zanzibar was a member from 16 December 1963. Following the ratification on 26 April 1964, of Articles of Union between Tanganyika and Zanzibar, the United Republic of Tanganyika and Zanzibar continued as a single member, changing its name to the United Republic of Tanzania on 1 November 1964.

II. *List of UN General Assembly resolutions adopted in 1975*

The list includes resolutions exclusively concerning disarmament, as well as those dealing with other questions but referring to disarmament matters. In the latter case, the negative votes or abstentions do not necessarily reflect the positions of states on the disarmament paragraphs of the relevant resolutions.

Only the essential parts of each resolution are given here. The text has been abridged, but the wording is close to that of the resolution.

The resolutions are grouped according to subjects, irrespective of the agenda items under which they were discussed.

Resolution no. and date of adoption	Subject and contents of resolution	Voting results
	Strategic arms limitation	
3484 C (XXX) 12 December 1975	Regrets the absence of positive results during the last two years of the bilateral negotiations between the governments of the USSR and the USA on the limitation of their strategic nuclear-weapon systems; expresses concern for the very high ceilings of nuclear arms set for themselves by both states, for the total absence of qualitative limitations of such arms, for the protracted time-table contemplated for the negotiation of further limitations and possible reductions of the nuclear arsenals, and for the situation thus created; urges anew the USSR and the USA to broaden the scope and accelerate the pace of their strategic nuclear arms limitation talks, and stresses once again the necessity and urgency of reaching agreement on important qualitative limitations and substantial reductions of their strategic nuclear-weapon systems as a positive step towards nuclear disarmament; and reiterates the invitation to both governments to keep the General Assembly informed in good time of the progress and results of their negotiations.	*In favour* 102 *Against* 10: Bulgaria, Byelorussia, Czechoslovakia, German Democratic Republic, Hungary, Mongolia, Poland, Ukraine, USSR, United States *Abstentions* 12: Belgium, Cuba, France, Germany (Federal Republic of), Greece, Italy, Japan, Luxembourg, Mozambique, Turkey, United Kingdom, United Republic of Tanzania *Absent or not participating in the vote:* Albania, Bahamas, Benin, Cambodia, Cape Verde, Central African Republic, China, Comoros, Congo, Gabon, Guyana, Ivory Coast, Maldives, Morocco, Nicaragua, São Tomé and Principe, South Africa, Surinam, Yemen, Zambia
	Non-proliferation of nuclear weapons	
3386 (XXX) 12 November 1975	Recognizing that in the course of 1975 it was made abundantly clear that further measures should be taken towards the full realization of the goal of an international non-proliferation policy,	Adopted without vote

notes with satisfaction the intensification of work of the IAEA in the fields of reactor safety and reliability, the disposal of radioactive waste, the safeguarding and physical protection of nuclear facilities and materials, and the comprehensive studies of fuel cycle facilities, including the possibility of establishing regional fuel cycle services; and commends the IAEA for establishing the *Ad Hoc* Advisory Group on Nuclear Explosions for Peaceful Purposes to identify possible applications of peaceful nuclear explosions and to study safety, environmental and economic aspects as well as the legal implications and the procedures for assistance in carrying out peaceful explosion projects.

Peaceful nuclear explosions

3484 A (XXX)
12 December 1975

Invites the USSR and the USA to provide information on such consultations as they may have entered into or may intend to enter into for the conclusion of the special basic international agreement on nuclear explosions for peaceful purposes as envisaged in Article V of the Treaty on the Non-Proliferation of Nuclear Weapons to the General Assembly, at its thirty-first session through the Secretary-General; requests the IAEA, within its sphere of competence, to continue its present examination of the aspects of the peaceful application of nuclear explosions, and to report on progress in all these areas to the General Assembly at its thirty-first session; requests the CCD to keep under review, in its consideration of an elaboration of a comprehensive test ban treaty, the arms control implications of nuclear explosions for peaceful purposes, including the possibility that such explosions could be misused to circumvent any ban on the testing of nuclear weapons; and stresses the need to ensure, particularly in the context of a comprehensive test ban, that any testing or application of nuclear explosions for peaceful purposes does not contribute to the testing or refinement of the nuclear-weapon arsenals of nuclear-weapon states or to the acquisition of nuclear explosive capability by other states.

In favour 97
Against 5: Albania, Bhutan, China, India, Malawi
Abstentions 24: Argentina, Brazil, Bulgaria, Burma, Byelorussia, Cuba, Czechoslovakia, France, German Democratic Republic, Hungary, Madagascar, Mauritania, Mongolia, Mozambique, Poland, Spain, Sri Lanka, Uganda, Ukraine, USSR, United Republic of Cameroon, United Republic of Tanzania, United States, Yugoslavia
Absent or not participating in the vote: Bahamas, Benin, Cambodia, Cape Verde, Central African Republic, Comoros, Congo, Gabon, Guyana, Maldives, Morocco, Nicaragua, São Tomé and Principe, South Africa, Surinam, Togo, Yemen, Zambia

Nuclear-weapon tests

3466 (XXX)
11 December 1975

Condemns all nuclear weapon tests, in whatever environment they may be conducted; deplores the continued lack of progress towards a comprehensive test ban agreement; emphasizes the urgency of reaching agreement on the conclusion of an effective

In favour 106
Against 2: Albania, China
Abstentions 24: Algeria, Belgium, Bulgaria, Burundi, Byelorussia, Cuba, Czechoslovakia, France, German Democratic

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	comprehensive test ban; calls upon all nuclear-weapon states to bring to a halt all nuclear-weapon tests through an agreed suspension subject to review after a specified period, as an interim step towards the conclusion of a formal and comprehensive test ban agreement; emphasizes the particular responsibility of the nuclear-weapon states which are party to international agreements in which they have declared their intention to achieve at the earliest possible date the cessation of the nuclear arms race; calls upon all states not yet parties to the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water to adhere to it forthwith; and urges the CCD to give the highest priority to the conclusion of a comprehensive test ban agreement.	Republic, Germany (Federal Republic of), Greece, Hungary, Italy, Luxembourg, Madagascar, Mauritania, Mongolia, Morocco, Mozambique, Poland, Ukraine, USSR, United Kingdom, United States *Absent or not participating in the vote:* Bahamas, Cambodia, Cape Verde, Central African Republic, Ecuador, Gambia, Guinea-Bissau, Maldives, São Tomé and Principe, South Africa, Surinam, Yemen
3478 (XXX) 11 December 1975	Takes note of the draft treaty on the complete and general prohibition of nuclear-weapon tests submitted to the General Assembly by the USSR; and calls upon all nuclear-weapon states to enter into negotiations, not later than 31 March 1976, with a view to reaching agreement on the complete and general prohibition of nuclear-weapon tests, and invites 25–30 non-nuclear-weapon states, to be appointed by the President of the General Assembly after consultations with all regional groups, to participate in those negotiations.	*In favour* 94[a] *Against* 2: Albania, China *Abstentions* 34: Australia, Belgium, Benin, Bhutan, Brazil, Burma, Burundi, Canada, Chile, Denmark, France, Germany (Federal Republic of), Greece, Ireland, Israel, Italy, Japan, Kenya, Luxembourg, Madagascar, Malawi, Mauritania, Morocco, Netherlands, New Zealand, Norway, Paraguay, Portugal, Spain, Sweden, Turkey, Uganda, United Kingdom, United States *Absent or not participating in the vote:* Bahamas, Cambodia, Cape Verde, Central African Republic, Comoros, Gambia, Guinea-Bissau, Maldives, Mozambique, Papua New Guinea, São Tomé and Principe, South Africa, Surinam, Yemen
3433 (XXX) 8 December 1975 (Resolution on the question of the New Hebrides, Pitcairn and Tuvalu[b])	Reiterates deep concern at the continued testing of nuclear weapons in the South Pacific, despite the strong opposition expressed by the peoples of the South Pacific, including those of the non-self-governing territories in the region.	*In favour* 121 *Against* 1: France *Abstentions* 11: Belgium, Denmark, Germany (Federal Republic of), Greece, Ireland, Israel, Italy, Luxembourg, Netherlands, United Kingdom, United States *Absent or not participating in the vote:* Cape Verde, Guatemala, Lebanon, Maldives, Malta, Mongolia, São Tomé and Principe, South Africa, Surinam, Tunisia, Yemen

Atomic radiation

3410 (XXX)
28 November 1975

Requests the UN Scientific Committee on the Effects of Atomic Radiation to continue its work, including its important coordination activities, to increase knowledge of the levels and effects of atomic radiation from all sources.

Adopted without objection

Study of nuclear-weapon-free zones

3472 A (XXX)
11 December 1975

Takes note of the special report of the CCD containing the comprehensive study of the question of nuclear-weapon-free zones in all its aspects; invites all governments, the International Atomic Energy Agency and other international organizations concerned to transmit to the Secretary-General before 30 June 1976 such views, observations and suggestions on the special report as they may deem appropriate; requests the Secretary-General to prepare a report based on information received and to submit it to the General Assembly at its thirty-first session; requests the Secretary-General to arrange for the reproduction of the special report as a UN publication and to give it the widest possible publicity in as many languages as is considered desirable and practicable; and recommends that all governments give a wide distribution to the special report, so as to acquaint public opinion with its contents, and invites relevant international organizations to use their facilities to make the special report widely known.

In favour 126
Against 0
Abstentions 2: Greece,[c] Uganda
Absent or not participating in the vote: Albania, Bahamas, Cambodia, Cape Verde, Central African Republic, China, Democratic Yemen, Ecuador, Gambia, Guinea-Bissau, Libya, Maldives, São Tomé and Principe, South Africa, Surinam, Yemen

Definition of a nuclear-weapon-free zone and obligations of nuclear powers

3472 B (XXX)
11 December 1975

Solemnly adopts the following declaration:
A "nuclear-weapon-free zone" shall, as a general rule, be deemed to be any zone, recognized as such by the United Nations General Assembly, which any group of states, in the free exercise of their sovereignty, has established by virtue of a treaty or convention whereby: (*a*) the statute of total absence of nuclear weapons to which the zone shall be subject, including the procedure for the delimitation of the zone, is defined; and (*b*) an international system of verification and control is established to guarantee compliance with the obligations deriving from that statute.
In every case of a nuclear-weapon-free zone that has been recognized as such by the General Assembly, all nuclear-weapon states shall undertake or reaffirm, in a solemn international instrument having full legally binding force, such as a treaty, a convention or a protocol, the following obligations: (*a*) to respect in all its parts the statute of total absence of nuclear weapons

In favour 82
Against 10: Belgium, Denmark, France, Germany (Federal Republic of), Ireland, Italy, Luxembourg, Netherlands, United Kingdom, United States
Abstentions 36: Australia, Bhutan, Bulgaria, Byelorussia, Canada, Colombia, Cuba, Czechoslovakia, Egypt, German Democratic Republic, Greece, Hungary, Iceland, India, Indonesia, Iraq, Israel, Japan, Kuwait, Laos, Liberia, Malawi, Mongolia, Mozambique, New Zealand, Norway, Poland, Portugal, Singapore, Spain, Sweden, Turkey, Ukraine, USSR, United Arab Emirates, United Republic of Tanzania
Absent or not participating in the vote: Albania, Bahamas, Cambodia, Cape Verde, Central African Republic, Democratic Yemen, Ecuador, Gambia, Guinea-Bissau, Libya, Maldives, Malta, São Tomé and Principe, South Africa, Surinam, Yemen

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	defined in the treaty or convention which serves as the constitutive instrument of the zone; (*b*) to refrain from contributing in any way to the performance in the territories forming part of the zone of acts which involve a violation of the aforesaid treaty or convention; and (*c*) to refrain from using or threatening to use nuclear weapons against the states included in the zone. The above definitions in no way impair the resolutions which the General Assembly has adopted or may adopt with regard to specific cases of nuclear-weapon-free zones nor the rights emanating for the member states from such resolutions.	
	Latin American nuclear-weapon-free zone	
3473 (XXX) 11 December 1975	Again urges France and the USA to sign and ratify Additional Protocol I of the Treaty for the Prohibition of Nuclear Weapons in Latin America (Treaty of Tlatelolco) as soon as possible, in order that the peoples of the territories in question may receive the benefits which derive from the treaty and which consist mainly in removing the danger of nuclear attack and sparing the squandering of resources on the production of nuclear weapons.	*In favour* 113 *Against* 0 *Abstentions* 16: Argentina, Bulgaria, Byelorussia, Chad, Cuba, Czechoslovakia, Democratic Yemen, France, German, Democratic Republic, Hungary, Mongolia, Poland, Uganda, Ukraine, USSR, United States *Absent or not participating in the vote:* Albania, Bahamas, Cambodia, Cape Verde, Central African Republic, Ecuador, Gambia, Guinea-Bissau, Guyana, Maldives, Mozambique, São Tomé and Principe, South Africa, Surinam, Yemen
3467 (XXX) 11 December 1975	Again urges the Union of Soviet Socialist Republics to sign and ratify Additional Protocol II of the Treaty of Tlatelolco.	*In favour* 115 *Against* 0 *Abstentions* 12: Bulgaria, Cuba, Czechoslovakia, Democratic Yemen, German Democratic Republic, Hungary, Mongolia, Poland, Senegal, Uganda, Ukraine, USSR *Absent or not participating in the vote:* Albania, Bahamas, Byelorussia, Cambodia, Cape Verde, Central African Republic, Ecuador, Gambia, Guinea-Bissau, Guyana, Maldives, Mozambique, Papua New Guinea, São Tomé and Principe, South Africa, Surinam, Yemen

African nuclear-weapon-free zone

3471 (XXX)
11 December 1975

Reaffirms the call upon all states to respect and abide by the Declaration of the Assembly of Heads of State and Government of the Organization of African Unity on the Denuclearization of Africa; reaffirms further the call upon all states to consider and respect the continent of Africa, including the continental African States, Madagascar and other islands surrounding Africa, as a nuclear-weapon-free zone; and reiterates the call upon all states to refrain from testing, manufacturing, deploying, transporting, storing, using or threatening to use nuclear weapons on the African continent.

In favour 131
Against 0
Abstentions 0
Absent or not participating in the vote: Albania, Bahamas, Cambodia, Cape Verde, Central African Republic, Ecuador, Gambia, Guinea-Bissau, Maldives, São Tomé and Principe, South Africa, Surinam, Yemen

South Asian nuclear-weapon-free zone

3476 A (XXX)
11 December 1975

Decides to give due consideration to any proposal for the creation of a nuclear-weapon-free zone in an appropriate region of Asia, after it has been developed and matured among the interested states within the region concerned.

Adopted without vote

3476 B (XXX)
11 December 1975

Urges the states of South Asia to continue their efforts to establish a nuclear-weapon-free zone in South Asia, and to refrain from any action contrary to the objective of establishing such a zone.

Adopted without vote

Middle East nuclear-weapon-free zone

3474 (XXX)
11 December 1975

Expresses the opinion that the member states with which the Secretary-General has consulted through his *notes verbales* of 10 March 1975 and 13 June 1975 should exert efforts towards the realization of the objective of establishing a nuclear-weapon-free zone in the Middle East; urges all parties directly concerned to adhere to the Treaty on the Non-Proliferation of Nuclear Weapons as a means of promoting this objective; recommends that the member states referred to above, pending the establishment of the nuclear-weapon-free zone under an effective system of safeguards: (*a*) proclaim solemnly and immediately their intention to refrain, on a reciprocal basis, from producing, acquiring or in any other way possessing nuclear weapons and nuclear explosive devices, and from permitting the stationing of nuclear weapons, in their territory or the territory under their control by any third party, and (*b*) refrain, on a reciprocal basis, from any other action that would facilitate the acquisition, testing or use of

In favour 125
Against 0
Abstentions 2: Israel, United Republic of Cameroon
Absent or not participating in the vote: Albania, Bahamas, Burma, Cambodia, Cape Verde, Central African Republic, Ecuador, Gambia, Guinea-Bissau, Libya, Maldives, Malta, São Tomé and Principe, Somalia, South Africa, Surinam, Yemen

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	such weapons, or would be in any other way detrimental to the objective of the establishment of a nuclear-weapon-free zone in the region under an effective system of safeguards; and recommends to the nuclear-weapon states to refrain from any action contrary to the purpose of the present resolution and the objective of establishing, in the region of the Middle East, a nuclear-weapon-free zone under an effective system of safeguards and to extend their co-operation to the states of the region in their efforts to promote this objective.	
	South Pacific nuclear-weapon-free zone	
3477 (XXX) 11 December 1975	Endorses the idea of the establishment of a nuclear-weapon-free zone in the South Pacific; invites the countries concerned to carry forward consultations about ways and means of realizing this objective; expresses the hope that all states, in particular the nuclear-weapon states, will co-operate fully in achieving the objectives of the present resolution; requests the Secretary-General to render all necessary assistance to the states of the region in giving effect to the purpose of the present resolution.	*In favour* 110 *Against* 0 *Abstentions* 20: Belgium, Bulgaria, Byelorussia, Congo, Cuba, Czechoslovakia, Egypt, France, German Democratic Republic, Germany (Federal Republic of), Greece, Hungary, Italy, Luxembourg, Mongolia, Poland, Ukraine, USSR, United Kingdom, United States *Absent or not participating in the vote:* Albania, Bahamas, Cambodia, Cape Verde, Central African Republic, Comoros, Gambia, Guinea-Bissau, Libya, Maldives, São Tomé and Principe, South Africa, Surinam, Yemen
	Indian Ocean as a zone of peace	
3468 (XXX) 11 December 1975	Notes that, as a result of consultations, an agreement in principle on the convening of a conference on the Indian Ocean has emerged, and requests the littoral and hinterland states of the Indian Ocean to continue their consultations to this end, with particular attention to the following points: purposes of a conference on the Indian Ocean; date and duration; venue; provisional agenda; participation; and level of participation.	*In favour* 106 *Against* 0 *Abstentions* 25: Austria, Belgium, Bulgaria, Byelorussia, Canada, Cuba, Czechoslovakia, Denmark, France, German Democratic Republic, Germany (Federal Republic of), Greece, Hungary, Ireland, Israel, Italy, Luxembourg, Mongolia, Netherlands, Norway, Poland, Ukraine, USSR, United Kingdom, United States *Absent or not participating in the vote:* Albania, Bahamas, Cambodia, Cape Verde, Central African Republic, Ecuador, Gambia, Guinea-Bissau, Maldives, São Tomé and Principe, South Africa, Surinam, Yemen

Chemical and biological weapons

3465 (XXX) 11 December 1975	Urges all states to make every effort to facilitate early agreement on the effective prohibition of the development, production and stockpiling of all chemical weapons and on their destruction; requests the CCD to continue negotiations as a matter of high priority, taking into account the existing proposals; invites all states that have not yet done so to accede to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction; and invites all states that have not yet done so to accede to the Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, signed at Geneva on 17 June 1925, or to ratify it, and calls again for strict observance by all states of the principles and objectives of that protocol.	Adopted without vote

Weapons of mass destruction

3479 (XXX) 11 December 1975	Takes note of the draft agreement on the prohibition of the development and manufacture of new types of weapons of mass destruction and of new systems of such weapons, submitted to the General Assembly by the USSR, as well as the points of view and suggestions put forward during the discussion of this question; and requests the CCD to proceed as soon as possible, with the assistance of qualified governmental experts, to work out the text of such an agreement and to submit a report on the results achieved for consideration by the General Assembly at its thirty-first session.	*In favour* 112 *Against* 1: Albania *Abstentions* 15: Belgium, Denmark, France, Germany (Federal Republic of), Ireland, Israel, Italy, Luxembourg, Malawi, Mauritania, Morocco, Netherlands, Uganda, United Kingdom, United States *Absent or not participating in the vote:* Bahamas, Cambodia, Cape Verde, Central African Republic, China, Comoros, El Salvador, Gambia, Guinea-Bissau, Maldives, Mozambique, São Tomé and Principe, South Africa, Surinam, Trinidad and Tobago, Yemen

Environmental means of warfare

3475 (XXX) 11 December 1975	Noting that the delegations of the USSR and the USA submitted at the CCD identical drafts of a convention on the prohibition of military or any other hostile use of environmental modification techniques and that other delegations offered suggestions and preliminary observations regarding those drafts, requests the CCD to continue negotiations, bearing in mind existing proposals and suggestions as well as relevant discussion by the General Assembly, with a view to reaching early agreement, if possible during the Committee's 1976 session, on the text of a convention, and to submit a special report on the results achieved for consideration by the General Assembly at its thirty-first session.	Adopted without vote

Resolution no. and date of adoption	Subject and contents of resolution	Voting results
	Outer space	
3388 (XXX) 18 November 1975	Invites states which have not yet become parties to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, the Convention on International Liability for Damage Caused by Space Objects and the Convention on Registration of Objects Launched into Outer Space to give early consideration to signing and ratifying or acceding to those international agreements.	Adopted unanimously
	Sea-Bed Treaty review conference	
3484 E (XXX) 12 December 1975	Bearing in mind that the Treaty on the Prohibition of the Emplacement of Nuclear and Other Weapons of Mass Destruction on the Sea-Bed and the Ocean Floor and in the Subsoil Thereof will have been in force for five years on 18 May 1977 and expecting that the review conference called for in the treaty will take place soon after that date, notes that after appropriate consultation a preparatory committee of parties to the treaty is to be arranged; and recalls its expressed hope for the widest possible adherence to the treaty.	*In favour* 126 *Against* 0 *Abstentions* 2: Cuba, France *Absent or not participating in the vote:* Albania, Bahamas, Cambodia, Cape Verde, Central African Republic, China, Comoros, Congo, Gabon, Guyana, Maldives, Morocco, São Tomé and Principe, South Africa, Surinam, Yemen
	Economic and social consequences of the arms race	
3462 (XXX) 11 December 1975	Calls upon all states, as well as the organs concerned with disarmament issues, to place at the centre of their preoccupations the adoption of effective measures for the cessation of the arms race, especially in the nuclear field, and for the reduction of the military budgets, particularly of the heavily armed countries, and to make sustained efforts with a view to achieving progress towards general and complete disarmament; and requests the Secretary-General to update, with the assistance of qualified consultant experts appointed by him, the report entitled *Economic and Social Consequences of the Arms Race and of Military Expenditures,* and to transmit it to the General Assembly in time to permit its consideration at the thirty-second session.	Adopted without vote

Reduction of military budgets

3463 (XXX)
11 December 1975

Appeals to all states, in particular the permanent members of the Security Council, as well as any other state with comparable military expenditures, to strive to reach agreed reductions of their military budgets; urges the two states with the highest levels of military expenditure, in absolute terms, pending such agreement, to carry out reductions of their military budgets; and requests the Secretary-General, assisted by a group of qualified experts, to prepare a report which shall give emphasis particularly to the following matters: (*a*) the definition and scope of the military sector and of military expenditures, as well as the classifications and structuring of expenditures within the military budgets, with the over-all aim of achieving generally acceptable and universally applicable delimitations and definitions and a standardized accounting system, so as to permit effective comparisons of the military budgets; (*b*) the valuation of resources in the military sector, considering different economic systems and different structures of production within the military sector, with the purpose of examining methods concerning the relationships between resources and military output; (*c*) the deflation for price change in military production in different countries, with the aim of examining methods of measuring real expenditure trends over time, taking into account differences between countries in the rate of price change; and (*d*) the international value comparison and exchange rates relevant to military production, with the purpose of examining methods for accurate currency comparison of military expenditures.

In favour 108
Against 2: Albania, China
Abstentions 21: Belgium, Bulgaria, Byelorussia, Canada, Cuba, Czechoslovakia, France, German Democratic Republic, Germany (Federal Republic of), Hungary, Italy, Luxembourg, Mauritania, Mongolia, Netherlands, Poland, Uganda, Ukraine, USSR, United Kingdom, United States
Absent or not participating in the vote: Bahamas, Cambodia, Cape Verde, Central African Republic, Ecuador, Gambia, Guinea-Bissau, Guyana, Maldives, São Tomé and Principe, South Africa, Surinam, Yemen

Military bases in colonial territories

3481 (XXX)
11 December 1975
(Resolution on the implementation of the Declaration on the granting of independence to colonial countries)

Calls upon the colonial powers to withdraw immediately and unconditionally their military bases and installations from colonial territories and to refrain from establishing new ones.

In favour 108
Against 3: Israel, Nicaragua, United States
Abstentions 15: Bahamas, Barbados, Belgium, Costa Rica, El Salvador, France, Germany (Federal Republic of), Guatemala, Luxembourg, Malawi, Netherlands, Paraguay, Spain, United Kingdom, Uruguay
Absent or not participating in the vote: Afghanistan, Burundi, Cambodia, Cape Verde, Central African Republic, Gambia, Haiti, Honduras, Lebanon, Liberia, Maldives, Mauritania, Morocco, Oman, São Tomé and Principe, South Africa, Surinam, Yemen

Resolution no. and date of adoption	Subject and contents of resolution	Voting results
	Removal of material remnants of wars	
3435 (XXX) 9 December 1975 (Resolution on the UN Environment Programme)	Recognizes that the development of certain developing countries has been impeded by the material remnants of wars, the most important of which are mines, which continue to be present in their territories; condemns the colonialist powers which have neglected to remove the remnants of wars, particularly mines, and considers them to be responsible for any material and moral damage suffered by the countries in which such mines were placed; calls upon states which took part in those wars to make available forthwith to the affected state all information on the areas in which such mines were placed, including maps indicating the position of those areas, and on the types of mines; calls upon those states which created this situation to compensate forthwith the countries in which mines were placed for any material and moral damage suffered by them as a result, and to take speedy measures to provide technical assistance for the removal of such mines; requests the Governing Council of the United Nations Environment Programme to undertake a study of the problem of the material remnants of wars, particularly mines, and their effect on the environment, and to submit a report on the subject to the General Assembly at its thirty-first session.	*In favour* 100 *Against* 0 *Abstentions* 21 (States are not specified, because the votes were not recorded)
	World disarmament conference	
3469 (XXX) 11 December 1975	Renews the mandate of the *Ad Hoc* Committee on the World Disarmament Conference and requests it to submit a report on its work to the General Assembly at its thirty-first session.	Adopted without vote
3519 (XXX) 15 December 1975 (Resolution on women's participation in the strengthening of international peace and security)	Urges all governments to take effective measures towards bringing about general and complete disarmament and convening the World Disarmament Conference as soon as possible.	*In favour* 90[d] *Against* 21: Albania, Australia, Belgium, Canada, Chile, China, Denmark, France, Germany (Federal Republic of), Haiti, Iceland, Ireland, Israel, Italy, Liberia, Luxembourg, Netherlands, Nicaragua, Norway, United Kingdom, United States *Abstentions* 22: Austria, Bahamas, Barbados, Bolivia, Central African Republic, Costa Rica, Ethiopia, Finland, Greece, Hon-

		duras, Japan, Malawi, New Zealand, Pakistan, Paraguay, Portugal, Sierra Leone, Singapore, Spain, Sweden, Thailand, Uruguay *Absent or not participating in the vote:* Benin, Cambodia, Cape Verde, Comoros, Gambia, Guatemala, Guinea-Bissau, Maldives, São Tomé and Principe, South Africa, Surinam
3389 (XXX) 18 November 1975 (Resolution on the implementation of the Declaration on the strengthening of international security)	Recommends urgent measures to stop the arms race and promote disarmament, including the convening of the World Disarmament Conference, the dismantling of foreign military bases, the creation of zones of peace, the encouragement of general and complete disarmament and the strengthening of the United Nations, in order to eliminate the causes of international tensions and ensure international peace, security and cooperation.	*In favour* 109 *Against* 0 *Abstentions* 19: Belgium, Canada, Denmark, France Germany (Federal Republic of), Guatemala, Haiti, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, Netherlands, Norway, Paraguay, Turkey, United Kingdom, United States *Absent or not participating in the vote:* Albania, Bahamas, Bangladesh,[c] Burma, Cambodia, China, Gabon, Gambia, Grenada, Jamaica, Jordan, South Africa, Syria, United Republic of Tanzania, Upper Volta
	United Nations role in disarmament	
3484 B (XXX) 12 December 1975	Invites all states to communicate to the Secretary-General, not later than 1 May 1976, their views and suggestions on the strengthening of the role of the United Nations in the field of disarmament; decides to establish an *ad hoc* committee of the General Assembly, open to the participation of all member states, to carry out a basic review of the role of the United Nations in the disarmament field; decides that the review should, *inter alia,* focus on the following objectives: (*a*) possible new approaches for achieving more effective procedures and organization of work in the field of disarmament, thereby enabling the United Nations to exercise its full role in multilateral disarmament efforts; (*b*) ways and means of improving existing UN facilities for collection, compilation and dissemination of information on disarmament issues, in order to keep all governments, as well as world public opinion, properly informed on progress achieved in the field of disarmament; (*c*) ways and means to enable the UN Secretariat to assist, on request, states parties to multilateral disarmament agreements in their duty to ensure the effective functioning of such agreements, including appropriate periodical reviews; and requests the *Ad Hoc* Committee to submit its report including findings and proposals, to the General Assembly at its thirty-first session.	*In favour* 108 *Against* 2: Poland,[e] USSR[e] *Abstentions* 14: Bulgaria, Cuba, Czechoslovakia, German Democratic Republic, Germany (Federal Republic of), Hungary, Luxembourg,[c] Malawi, Mongolia, Mozambique, Pakistan, Ukraine, United Kingdom, United States *Absent or not participating in the vote:* Albania, Bahamas, Benin, Byelorussia, Cambodia, Cape Verde, Central African Republic, China, Comoros, Congo, Gabon, Guyana, Maldives, Morocco, Nicaragua, São Tomé and Principe, South Africa, Surinam, Yemen, Zambia

Resolution no. and date of adoption	Subject and contents of resolution	Voting results
3484 D (XXX) 12 December 1975	Requests the Secretary-General to take appropriate steps for the strengthening of the Disarmament Affairs Division, including the addition of staff necessary for the effective carrying out of its increased responsibilities.	*In favour* 115 *Against* 0 *Abstentions* 13: Belgium, Canada, Denmark, France, Germany (Federal Republic of), Ireland, Japan, Luxembourg, Netherlands, New Zealand, Nicaragua, United Kingdom, United States *Absent or not participating in the vote:* Albania, Bahamas, Cambodia, Cape Verde, Central African Republic, China, Comoros, Congo, Gabon, Guyana, Maldives, Morocco, São Tomé and Principe, South Africa, Surinam, Yemen
	Disarmament and development	
3470 (XXX) 11 December 1975	Deplores the wastage of resources in expenditures on armaments, particularly nuclear armaments; calls upon member states and the Secretary-General to intensify their efforts in support of the link between disarmament and development, so as to promote disarmament negotiations and to ensure that the human and material resources freed by disarmament are used to promote economic and social development, particularly in the developing countries; invites the CCD to review the work done in the implementation of the purposes and objectives of the Disarmament Decade and in this light to reappraise its tasks and duties, as necessary, in order to accelerate the pace of its efforts to negotiate truly effective disarmament and arms limitation agreements.	Adopted without vote
	Human rights in armed conflicts	
3464 (XXX) 11 December 1975	Invites the Diplomatic Conference on the Reaffirmation and Development of International Humanitarian Law Applicable in Armed Conflicts to continue its consideration of the use of specific conventional weapons, including any which may be deemed to be excessively injurious or to have indiscriminate effects, and its search for agreement for humanitarian reasons on possible rules prohibiting or restricting the use of such weapons.	Adopted without vote

3500 (XXX) 15 December 1975	Calls upon all parties to armed conflicts to acknowledge and to comply with their obligations under the humanitarian instruments and to observe the international humanitarian rules which are applicable, in particular the Hague Conventions of 1899 and 1907, the Geneva Protocol of 1925 and the Geneva Conventions of 1949; calls the attention of the Diplomatic Conference on the Reaffirmation and Development of International Humanitarian Law Applicable in Armed Conflicts, and the governments and organizations participating in it, to the need for measures to promote on a universal basis the dissemination of and instruction in the rules of international humanitarian law applicable in armed conflicts; and urges all participants in the Diplomatic Conference to do their utmost to reach agreement on additional rules which may help to alleviate the suffering brought about by armed conflicts and to respect and protect non-combatants and civilian objects in such conflicts.	Adopted by consensus
	Peace-keeping operations	
3457 (XXX) 10 December 1975	Conscious that there is a need for agreed guidelines which would govern United Nations peace-keeping operations and strengthen the capability of the United Nations to respond to future peace-keeping needs in an effective and economical manner, requests the Special Committee on Peace-keeping Operations to renew efforts towards the completion of agreed guidelines for carrying out peace-keeping operations in conformity with the Charter of the United Nations for submission to the General Assembly at its thirty-first session.	Adopted without vote

[a] Iceland, which voted in favour, later advised the Secretariat it had intended to abstain.
[b] Formerly the Ellice Islands.
[c] Later advised the Secretariat it had intended to vote in favour.
[d] Swaziland, which voted in favour, later advised the Secretariat it had intended to abstain.
[e] Later advised the Secretariat it had intended to abstain.

III. *Record of the nuclear-weapon powers' votes on the main resolutions concerning disarmament at the UN General Assembly in 1975*

Subject	Resolution no.	China	France	USSR	UK	USA
Strategic arms limitation	3484 C	Not voting	Abstaining	No	Abstaining	No
Peaceful nuclear explosions	3484 A	No	Abstaining	Abstaining	Yes	Abstaining
Nuclear weapon tests	3466	No	Abstaining	Abstaining	Abstaining	Abstaining
	3478	No	Abstaining	Yes	Abstaining	Abstaining
Definition of a nuclear-weapon-free zone and obligations of nuclear powers	3472 B	Yes	No	Abstaining	No	No
Latin American nuclear-weapon-free zone	3473	Yes	Abstaining	Abstaining	Yes	Abstaining
	3467	Yes	Yes	Abstaining	Yes	Yes
African nuclear-weapon-free zone	3471	Yes	Yes	Yes	Yes	Yes
Middle East nuclear-weapon-free zone	3474	Yes	Yes	Yes	Yes	Yes
South Pacific nuclear-weapon-free zone	3477	Yes	Abstaining	Abstaining	Abstaining	Abstaining
Indian Ocean as a zone of peace	3468	Yes	Abstaining	Abstaining	Abstaining	Abstaining
Weapons of mass destruction	3479	Not voting	Abstaining	Yes	Abstaining	Abstaining
Reduction of military budgets	3463	No	Abstaining	Abstaining	Abstaining	Abstaining

Appendix 8B

Draft treaty on the complete and general prohibition of nuclear-weapon tests, submitted on 23 September 1975 by the Soviet Union to the UN General Assembly

The States Parties to this Treaty,

Proclaiming their intention to bring about, as speedily as possible, the cessation of the nuclear arms race, the adoption of effective measures towards nuclear disarmament and the conclusion of an agreement on general and complete disarmament under strict and effective international control,

Taking into account the appeals by the United Nations General Assembly, to put an end to nuclear weapon tests in all environments,

Noting that the prohibition of all nuclear weapon tests would be in the interests of strengthening peace and slowing the arms race and would be a contribution to the process of international détente,

Reaffirming that the potential benefits of any peaceful application of nuclear explosions should be available to nuclear as well as non-nuclear States in conformity with the provisions of the Treaty on the Non-Proliferation of Nuclear Weapons and of this Treaty,

Noting the great positive significance of the 1963 Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water,

Stressing the importance of strict compliance with the above-mentioned Treaty up to the time of the entry into force of this Treaty,

Seeking to achieve the permanent cessation of all test explosions of nuclear weapons by all States,

Have agreed as follows:

ARTICLE I

1. Each State Party to this Treaty undertakes to prohibit, to prevent and to refrain from carrying out any test explosions of nuclear weapons anywhere under its jurisdiction or control in all environments—in the atmosphere, in outer space, under water and underground.

2. Each State Party to this Treaty undertakes to refrain from encouraging, inciting or in any way participating in the carrying out of nuclear explosions prohibited by paragraph 1 of this article.

ARTICLE II

1. Control over compliance with this Treaty shall be conducted by the States Parties through their own national technical means of control in accordance with the generally recognized rules of international law.

2. In order to promote the objectives of and ensure compliance with the

provisions of this Treaty, the Parties to the Treaty shall co-operate in an international exchange of seismic data.

3. In order to promote the objectives of and ensure compliance with the provisions of this Treaty, the Parties shall, when necessary, consult one another, make inquiries and receive appropriate information in connexion with such inquiries.

4. Any State Party to the Treaty which ascertains that any other State Party is acting in violation of obligations deriving from the provisions of the Treaty may lodge a complaint with the United Nations Security Council. Such a complaint must contain all possible evidence confirming its validity and a request for its consideration by the Security Council. The Council shall inform the States Parties to the Treaty of the results of its consideration.

ARTICLE III

1. The provisions of article I shall not apply to any underground nuclear explosions conducted by nuclear weapon States for peaceful purposes on the territory under their jurisdiction and in compliance with the agreements under which, in accordance with article V of the Treaty on the Non-Proliferation of Nuclear Weapons, non-nuclear weapon States are to benefit from any peaceful applications of nuclear explosions.

2. The explosions referred to in paragraph 1 of this article shall be conducted as follows:

(a) In the case of non-nuclear weapon States, in conformity with the provisions of article V of the Treaty on the Non-Proliferation of Nuclear Weapons;

(b) In the case of nuclear weapon States, in conformity with a procedure to be established under a special agreement concerning which the nuclear weapon States will conduct negotiations with due regard for the IAEA recommendations on the subject and which will be concluded as speedily as possible.

ARTICLE IV

The provisions of this Treaty shall not affect obligations assumed by the States Parties to the Treaty under other international agreements.

ARTICLE V

1. Any Party to the Treaty may propose amendments to the Treaty. The text of any proposed amendment shall be submitted to the Depositary Governments, which shall circulate it to all Parties to the Treaty. Thereupon, if requested to do so by one third or more of the Parties to the Treaty, the Depositary Governments shall convene a conference, to which they shall invite all the Parties to the Treaty, for the purpose of considering such amendment.

2. Any amendment to this Treaty must be approved by a majority of the votes of all the Parties to the Treaty, including the votes of all nuclear weapon

States Parties to the Treaty. The amendment shall enter into force for each Party depositing its instrument of ratification of the amendment upon the deposit of such instruments of ratification by a majority of all the Parties, including the nuclear weapon States Parties to the Treaty. Thereafter, it shall enter into force for any other Party upon the deposit of its instrument of ratification of the amendment.

ARTICLE VI

1. This Treaty shall be open to all States for signature. Any State which does not sign the Treaty before its entry into force in accordance with paragraph 3 of this article may accede to it at any time.

2. This Treaty shall be subject to ratification by signatory States. Instruments of ratification and accession shall be deposited with the Governments of .... which are hereby designated the Depositary Governments.

3. This Treaty shall enter into force upon the deposit of the instruments of ratification by .... Governments, including the Governments of all nuclear weapon States.

4. For States whose instruments of ratification or accession are deposited subsequent to the entry into force of this Treaty, the latter shall enter into force on the date of the deposit of their instruments of ratification or accession.

5. The Depositary Governments shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification or accession, the date of the entry into force of this Treaty, and the date of receipt of any requests for convening a conference of Parties to the Treaty or of other notifications.

6. This Treaty shall be registered by the Depositary Governments pursuant to Article 102 of the Charter of the United Nations.

ARTICLE VII

This Treaty shall be of unlimited duration.

Each State Party shall, in the exercise of its national sovereignty, have the right to withdraw from the Treaty if it decides that extraordinary circumstances, connected with the subject-matter of this Treaty, have jeopardized its supreme interests. It shall give three months' notice of such withdrawal to all other Parties to the Treaty and to the United Nations Security Council. Such notice shall include a statement of the extraordinary circumstances which it regards as having jeopardized its supreme interests.

ARTICLE VIII

This Treaty, the Chinese, English, French, Russian and Spanish texts of which are equally authentic, shall be deposited in the archives of the Depositary Governments. Duly certified copies of this Treaty shall be transmitted by the Depositary Governments to the Governments of the signatory and acceding States.

Appendix 8C

Working paper with suggestions as to possible provisions of a treaty banning underground nuclear weapon tests, submitted on 2 September 1971 by Sweden to the Geneva Disarmament Conference

The States concluding this Treaty, hereinafter referred to as the "Parties to the Treaty",

Declaring their intention to achieve at the earliest possible date the cessation of the nuclear arms race and to undertake effective measures in the direction of nuclear disarmament,

Urging the co-operation of all States in the attainment of this objective,

Recalling the determination expressed by the Parties to the 1963 Treaty banning nuclear weapon tests in the atmosphere, in outer space and under water in its preamble to seek to achieve the discontinuance of all test explosions of nuclear weapons for all time and to continue negotiations to this end,

Convinced that a continued testing of nuclear explosives brings about unforeseeable consequences in regard to imbalance and mistrust between States,

Heeding the appeals of the General Assembly of the United Nations for the suspension of nuclear weapon tests in all environments,

Affirming the principle that the benefits of peaceful applications of nuclear technology, including any technological by-products which may be derived by nuclear-weapon States from the development of nuclear explosive devices, should be available for peaceful purposes to all Parties to the Treaty, whether nuclear-weapon or non-nuclear-weapon States,

Affirming also the principle that a substantial portion of the savings derived from measures in the field of disarmament, should be devoted to promoting economic and social development, particularly in the developing countries,

Have agreed as follows:

ARTICLE I

1. Each State Party to this Treaty undertakes to prohibit, to prevent and not to carry out any underground nuclear weapon test explosion, or any other underground nuclear explosion, at any place under its jurisdiction or control. This obligation is subject to the provisions contained in paragraph 2 of this article and in article II.

2. For each nuclear-weapon State this Treaty shall be fully operative after a period of ... months from the entry into force of the Treaty, during which

period any nuclear weapon test explosion shall be phased out in accordance with the provisions laid down in Protocol I annexed to this Treaty.

3. Each State Party to this Treaty undertakes, furthermore, to refrain from causing, encouraging or in any way participating in the carrying out of any nuclear weapon test explosion, or any other nuclear explosion prohibited under this Treaty.

ARTICLE II

The provisions of article I of this Treaty do not apply to nuclear explosions which are carried out for construction or other peaceful purposes and which take place in conformity with the separate Protocol II annexed to this Treaty.

ARTICLE III

1. Each State Party to this Treaty undertakes to co-operate in good faith to ensure the full observance and implementation of this Treaty.

2. Each State Party to this Treaty undertakes to co-operate in good faith in an effective international exchange of seismological data in order to facilitate the detection, identification and location of underground events.

3. Each State Party to this Treaty undertakes to co-operate in good faith for the clarification of all events pertaining to the subject matter of this Treaty. In accordance with this provision, each State Party to the Treaty is entitled

(a) to make inquiries and to receive information as a result of such inquiries,

(b) to invite inspection on its territory or territory under its jurisdiction, such inspection to be carried out in the manner prescribed by the inviting Party,

(c) to make proposals, if it deems the information available or made available to it under all or any of the preceding provisions inadequate, as to suitable methods of clarification.

4. Each State Party to this Treaty may bring to the attention of the Security Council of the United Nations and of the other Parties to the Treaty, that it deems another Party to have failed to co-operate to the fullest extent for the clarification of a particular event.

5. Provisions for the seismological data exchange referred to in paragraph 2 of this article are laid down in the separate Protocol III, annexed to this Treaty. Special provisions for the seismological data exchange during the phasing-out period and for the explosions for peaceful purposes referred to in articles I and II are laid down in the Protocols I and II respectively.

ARTICLE IV

Any State Party may propose amendments to this Treaty. Amendments shall enter into force for each State Party accepting the amendments upon their acceptance by a majority of the States Parties to the Treaty and thereafter for each remaining State Party on the date of acceptance by it.

ARTICLE V

... years after the entry into force of this Treaty, a conference of Parties to the Treaty shall be held in Geneva, Switzerland, in order to review the operation of this Treaty with a view to assuring that the purposes of the preamble and the provisions of the Treaty are being realized. The review conference shall determine in accordance with the views of a majority of those Parties attending whether and when an additional review conference shall be convened.

ARTICLE VI

1. This Treaty shall be open for signature to all States. Any State which does not sign the Treaty before its original entry into force in accordance with paragraph 3 of this article may accede to it at any time.

2. This Treaty shall be subject to ratification by signatory States. Instruments of ratification and of accession shall be deposited with the Government of ... which are hereby designated the Depositary Governments.

3. This Treaty shall enter into force after the deposit of instruments of ratification by ... Governments, including the Governments designated as Depositary Governments of this Treaty.

4. For States whose instruments of ratification or accession are deposited after the original entry into force of this Treaty, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

5. The Depositary Governments shall promptly inform the Governments of all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification or of accession, the date of the entry into force of this Treaty, and the receipt of other notices.

6. This Treaty shall be registered by the Depositary Governments pursuant to article 102 of the Charter of the United Nations.

ARTICLE VII

This Treaty shall be of unlimited duration. Each Party shall in exercising its national sovereignty have the right to withdraw from the Treaty, if it decides that extraordinary events, related to the subject matter of this Treaty, have jeopardized the supreme interests of its country. It shall give notice of such withdrawal to all other Parties to the Treaty and to the United Nations Security Council three months in advance. Such notice shall include a statement of the extraordinary events it regards as having jeopardized its supreme interests.

ARTICLE VIII

This Treaty, the Chinese, English, French, Russian and Spanish texts of which are equally authentic, shall be deposited in the archives of the Depositary Governments. Duly certified copies of this Treaty shall be transmitted by the Depositary Governments to the Governments of the States signatory and acceding thereto.

Appendix 8D

Document on confidence-building measures and certain aspects of security and disarmament, included in the Final Act of the Conference on Security and Cooperation in Europe, 1 August 1975

The participating States,

Desirous of eliminating the causes of tension that may exist among them and thus of contributing to the strengthening of peace and security in the world;

Determined to strengthen confidence among them and thus to contribute to increasing stability and security in Europe;

Determined further to refrain in their mutual relations, as well as in their international relations in general, from the threat or use of force against the territorial integrity or political independence of any State, or in any other manner inconsistent with the purposes of the United Nations and with the Declaration on Principles Guiding Relations between Participating States as adopted in this Final Act;

Recognizing the need to contribute to reducing the dangers of armed conflict and of misunderstanding or miscalculation of military activities which could give rise to apprehension, particularly in a situation where the participating States lack clear and timely information about the nature of such activities;

Taking into account considerations relevant to efforts aimed at lessening tension and promoting disarmament;

Recognizing that the exchange of observers by invitation at military manœuvres will help to promote contacts and mutual understanding;

Having studied the question of prior notification of major military movements in the context of confidence-building;

Recognizing that there are other ways in which individual States can contribute further to their common objectives;

Convinced of the political importance of prior notification of major military manœuvres for the promotion of mutual understanding and the strengthening of confidence, stability and security;

Accepting the responsibility of each of them to promote these objectives and to implement this measure, in accordance with the accepted criteria and modalities, as essentials for the realization of these objectives;

Recognizing that this measure deriving from political decision rests upon a voluntary basis;

Have adopted the following:

I

Prior notification of major military manœuvres

They will notify their major military manœuvres to all other participating States through usual diplomatic channels in accordance with the following provisions:

Notification will be given of major military manœuvres exceeding a total of 25,000 troops, independently or combined with any possible air or naval components (in this context the word "troops" includes amphibious and airborne troops). In the case of independent manœuvres of amphibious or airborne troops, or of combined manœuvres involving them, these troops will be included in this total. Furthermore, in the case of combined manœuvres which do not reach the above total but which involve land forces together with significant numbers of either amphibious or airborne troops, or both, notification can also be given.

Notification will be given of major military manœuvres which take place on the territory, in Europe, of any participating State as well as, if applicable, in the adjoining sea area and air space.

In the case of a participating State whose territory extends beyond Europe, prior notification need be given only of manœuvres which take place in an area within 250 kilometres from its frontier facing or shared with any other European participating State; the participating State need not, however, give notification in cases in which that area is also contiguous to the participating State's frontier facing or shared with a non-European non-participating State.

Notification will be given 21 days or more in advance of the start of the manœuvre or in the case of a manœuvre arranged at shorter notice at the earliest possible opportunity prior to its starting date.

Notification will contain information of the designation, if any, the general purpose of and the States involved in the manœuvre, the type or types and numerical strength of the forces engaged, the area and estimated time-frame of its conduct. The participating States will also, if possible, provide additional relevant information, particularly that related to the components of the forces engaged and the period of involvement of these forces.

Prior notification of other military manœuvres

The participating States recognize that they can contribute further to strengthening confidence and increasing security and stability, and to this end may also notify smaller-scale military manœuvres to other participating States, with special regard for those near the area of such manœuvres.

To the same end, the participating States also recognize that they may notify other military manœuvres conducted by them.

Exchange of observers

The participating States will invite other participating States, voluntarily and on a bilateral basis, in a spirit of reciprocity and goodwill towards all participating States, to send observers to attend military manœuvres.

The inviting State will determine in each case the number of observers, the procedures and conditions of their participation, and give other information which it may consider useful. It will provide appropriate facilities and hospitality.

The invitation will be given as far ahead as is conveniently possible through usual diplomatic channels.

Prior notification of major military movements

In accordance with the Final Recommendations of the Helsinki Consultations the participating States studied the question of prior notification of major military movements as a measure to strengthen confidence.

Accordingly, the participating States recognize that they may, at their own discretion and with a view to contributing to confidence-building, notify their major military movements.

In the same spirit, further consideration will be given by the States participating in the Conference on Security and Co-operation in Europe to the question of prior notification of major military movements, bearing in mind, in particular, the experience gained by the implementation of the measures which are set forth in this document.

Other confidence-building measures

The participating States recognize that there are other means by which their common objectives can be promoted.

In particular, they will, with due regard to reciprocity and with a view to better mutual understanding, promote exchanges by invitation among their military personnel, including visits by military delegations.

In order to make a fuller contribution to their common objective of confidence-building, the participating States, when conducting their military activities in the area covered by the provisions for the prior notification of major military manœuvres, will duly take into account and respect this objective.

They also recognize that the experience gained by the implementation of the provisions set forth above, together with further efforts, could lead to developing and enlarging measures aimed at strengthening confidence.

II

Questions relating to disarmament

The participating States recognize the interest of all of them in efforts aimed at lessening military confrontation and promoting disarmament which are designed to complement political détente in Europe and to strengthen their security. They are convinced of the necessity to take effective measures in these fields which by their scope and by their nature constitute steps towards the ultimate achievement of general and complete disarmament under strict and effective international control, and which should result in strengthening peace and security throughout the world.

III

General considerations

Having considered the views expressed on various subjects related to the strengthening of security in Europe through joint efforts aimed at promoting détente and disarmament, the participating States, when engaged in such efforts, will in this context, proceed, in particular, from the following essential considerations:

The complementary nature of the political and military aspects of security;

The interrelation between the security of each participating State and security in Europe as a whole and the relationship which exists, in the broader context of world security, between security in Europe and security in the Mediterranean area;

Respect for the security interests of all States participating in the Conference of Security and Co-operation in Europe inherent in their sovereign equality;

The importance that participants in negotiating fora see to it that information about relevant developments, progress and results is provided on an appropriate basis to other States participating in the Conference on Security and Co-operation in Europe and, in return, the justified interest of any of those States in having their views considered.

9. The implementation of agreements related to disarmament

Square-bracketed numbers, thus [1], refer to the list of references on page 400.

I. *The Non-Proliferation Treaty*

Introduction

On 5–30 May 1975, five years after the entry into force of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), a conference was held in Geneva to review the operation of the treaty. The Review Conference was preceded by three sessions of a preparatory committee composed of parties to the NPT serving on the Board of Governors of the International Atomic Energy Agency (IAEA) or represented at the Conference of the Committee on Disarmament (CCD). The committee prepared a provisional agenda for the conference [1], drafted its rules of procedure [2] and made arrangements for meeting the costs [3]. It also issued working papers pertaining to the implementation of various provisions of the treaty, which had been submitted by the United Nations Secretariat [4–7], the IAEA [8–12] and the Agency for the Prohibition of Nuclear Weapons in Latin America (OPANAL) [13].

Although the NPT is generally considered to be the most important multilateral arms-control treaty concluded so far, attendance at the Review Conference was poor. Of a total of 96 states party to the NPT at the time of the Conference, only 58 or 60 per cent of them attended: Australia, Austria, Belgium, Bolivia, Bulgaria, Canada, Cyprus, Czechoslovakia, Denmark, Ecuador, Ethiopia, Finland, Gabon, the German Democratic Republic, the Federal Republic of Germany, Ghana, Greece, the Holy See, Honduras, Hungary, Iceland, Iran, Iraq (which, although a party to the treaty, attended the conference as an observer at its own request), Ireland, Italy, Jamaica, Jordan, Lebanon, Liberia, Luxembourg, Mauritius, Mexico, Mongolia, Morocco, Nepal, the Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Peru, the Philippines, Poland, the Republic of Korea, Romania, San Marino, Senegal, Sudan, Sweden, Syria, Thailand, Tunisia, the USSR, the United Kingdom, the United States, Uruguay, Yugoslavia and Zaire. Seven of the 15 states which had signed but not ratified the NPT participated in the Conference without taking part in its decisions: Egypt, Japan, Panama, Switzerland, Trinidad and Tobago, Turkey and Venezuela. Seven additional states which had neither signed nor ratified the treaty applied for and were accorded observer status: Algeria, Argentina, Brazil, Cuba, Israel, South Africa and Spain. Two regional organizations, OPANAL and the League of Arab States, were granted observer agency status. In addition, representatives of the United Nations and the IAEA participated in the Conference, while several non-governmental organizations attended the meetings and were entitled to receive the documents.

The Review Conference concluded its work with the adoption, by consensus (without a vote being taken), of a Final Declaration [14] based on a draft prepared by the president of the Conference, after a drafting committee had failed to produce an acceptable text. (For the text of the declaration, see Appendix 9A.) However, in spite of the formal acceptance of the declaration, a number of delegations expressed dissatisfaction about the outcome of the conference, made interpretative statements contradicting the consensus, or objected outright to various formulations. Proposals for additional protocols to the NPT, as well as resolutions dealing with various matters related to the implementation of the NPT, were submitted by several participants but did not obtain sufficient support. On the insistence of the sponsors, they were included in the Final Document of the Conference for subsequent consideration by the governments of states party to the NPT.

The Conference reaffirmed the role of the NPT in international efforts to avert further proliferation of nuclear weapons, to achieve the cessation of the nuclear arms race and to undertake effective measures in the direction of nuclear disarmament, as well as to promote cooperation in the peaceful uses of nuclear energy under adequate safeguards. But the practical results of the Conference can be properly evaluated only in the light of its task, as formulated in Article VIII of the NPT, to ensure that "the purposes of the Preamble and the provisions of the Treaty are being realized".

Non-transfer and non-acquisition of nuclear weapons

The first two articles of the NPT contain the essence of the non-proliferation undertakings. Under Article I the nuclear-weapon states are committed not to transfer, while under Article II the non-nuclear-weapon states are under the obligation not to receive, manufacture or otherwise acquire, nuclear weapons or other nuclear explosive devices, or control over them.

The Review Conference declaration contends that these articles have been observed by all parties. Indeed, no complaints have been made about the transfer of nuclear weapons or other nuclear explosive devices, or of control over them, by the nuclear-weapon powers; neither has any non-nuclear-weapon party to the NPT been accused of manufacturing these weapons or devices or of acquiring them by other means. In the absence of such complaints or accusations, one can assume that the Conference's contention is correct. Nevertheless, it would be wrong to conclude that the very purpose of the NPT has been achieved. Since the treaty has not been universally subscribed to, its observance by the parties alone cannot guarantee a halt to nuclear-weapon proliferation. In fact, the number of states known to possess nuclear weapons or other nuclear explosive devices, which the NPT was intended to restrict to five, increased when India carried out a nuclear explosion. The plutonium for the Indian explosive device was obtained in the Canadian-supplied reactor "Cirus", and Canada maintains that the Indian commitment, undertaken some time ago under a bilateral agreement, to use the reactor only for peaceful purposes was violated. But India cannot be charged with a breach of the NPT which it never signed. If anyone is to account for the "further proliferation" that occurred, it is the parties to the treaty themselves. It seems unlikely that India would have been in a position to manufacture a nuclear explosive device, certainly not as early as 1974, if *all* the provisions of Articles I and II had been faithfully observed, in particular the undertaking not "in any way" to assist, encourage or induce any non-nuclear-weapon state to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices or control over them.

Even before the NPT was signed, India and a few other near-nuclear-weapon states had made it clear that they would not adhere to it. This, in itself, should have served as a warning for the suppliers of nuclear material and associated equipment. However, no precautionary measures were taken; the recipient countries enjoyed the benefit of the doubt. But after the entry into force of the NPT, and after the official statement by India in 1971 that it was preparing a nuclear explosion "for peaceful purposes", the parties to the NPT must have been aware that in continuing their nuclear supplies they were assisting that country in the acquisition of a nuclear-explosion capability. This clear case of remissness was passed over in silence by the Review Conference. All the Conference did, in an indirect reference to the Indian explosion, was to congratulate itself upon the fact that certain supplier states had decided to require from the recipient states an undertaking not to divert the supplied nuclear material or equipment to nuclear weapons or other nuclear explosive devices,[1] as if such a condition had not been obvious from the provisions of the NPT. If states were free to conduct nuclear explosions and define them as peaceful by making a declaration to this effect, the whole concept of controlling nuclear-weapon proliferation would be destroyed. A clear understanding on the point of prohibition of *any* nuclear explosive device existed among the NPT negotiators who later became party to the treaty and was confirmed in interpretative

[1] This undertaking is contained in all recently concluded IAEA safeguards agreements.

statements by the UK, the USA and the USSR on the eve of the signing of the treaty. In any event, a non-diversion undertaking is not sufficient to prevent proliferation if it does not apply also to nuclear material or equipment produced indigenously. The origin of plutonium used in the manufacture of a nuclear device is of no importance.

India has for some time been using indigenous uranium in the Canadian-supplied reactor at Trombay, and the plutonium produced there, as well as the plutonium produced from the Kalpakkam and Narora plants under construction, will not be subject to any international controls. Together these nuclear plants will produce 260 kg of plutonium per year [15]. Thus, India, which has its own plutonium separation facility, will be in a position to conduct new nuclear explosions, at least with part of the plutonium produced, even upon accepting the condition put forward by certain states that their supplies should be used only for specified peaceful purposes.

No sooner had the political fallout from the Indian nuclear explosion settled, when a new, even more disturbing act related to the NPT was revealed.

As a result of secret talks started in 1974, an agreement was signed on 27 June 1975 between the Federal Republic of Germany and Brazil "on cooperation in the field of peaceful uses of nuclear energy". Under the terms of the agreement, which will be in force for 15 years and may be extended for periods of five years, the latter country will buy from the former a complete nuclear fuel cycle. The cycle will cover prospecting, mining and processing uranium ores in Brazil, as well as production of uranium compounds; uranium enrichment; the construction of up to eight nuclear power stations; manufacture of fuel elements; and reprocessing of irradiated fuels. The cooperation includes exchanges of technological information. Several joint enterprises are envisaged. Re-export or transfer to third countries of nuclear materials and equipment, including enriched uranium, uranium enrichment facilities and facilities for processing spent reactor fuel, will be permitted under certain circumstances. (Whether and to what extent the membership of FR Germany in Euratom and the present dependence of Euratom on US supplies will restrict these transactions, remains to be seen.) Never before has such a comprehensive nuclear deal been concluded. It is also conspicuous by its sheer size: an estimated DM 12 billion is to be spent in the Federal Republic of Germany over the next 15 years. Economically, it will mean vast energy supplies for oil-deficient Brazil at a time when its hydroelectric power will have been exploited to its limits (Brazil is planning to have more nuclear-powered electricity-generating plants by the year 2000 than the USA has today [16]), while FR Germany, in addition to immediate commercial gains, may get ensured access to the deposits of Brazilian uranium, which it will help to develop (if the optimistic forecasts for Brazil's uranium potential are fulfilled). Both countries may eventually be relieved from dependence on US nuclear fuel for their reactors which are of the light-water type and which use reactor-grade enriched uranium.[2] Politically, however, the deal signifies the creation of a new self-sufficient nuclear state with a nuclear-weapon capability.

There is concern about the sale to Brazil of a uranium enrichment facility. Indeed, this is a novel item on a nuclear shopping list. The plant to be provided will use the method known as the "jet nozzle" or vertical wall centrifuge, developed by the Karlsruhe nuclear research centre in FR Germany.[3] It is not known whether this method will be employed to produce only uranium enriched up to about 3 per cent, as needed for the widely used power reactors of the light-water type, or also highly enriched uranium required for power reactors of other types now under development. But highly enriched uranium can be used in a nuclear bomb or as a trigger for a thermonuclear bomb. According to the Chief Scientist of the British Department of Energy, the technology and investment required to enrich uranium to nuclear fuel levels is actually more difficult than the further step of reaching "bomb-grade" levels.

However, already the acquisition of plutonium reprocessing technology will be enough for Brazil to secure a nuclear military potential. Brazil will be able to manufacture nuclear weapons once it starts operating its own, indigenously built reactors using indigenously enriched uranium, subject to no international control. It is the availability of plutonium which is essential, the design and manufacture of a nuclear explosive being no longer a very difficult task. The assurances that the plants for enrichment and reprocessing will be used exclusively to make reactor fuel, and the envisaged IAEA safeguards to prevent diversion, though unaffected by the termination of the cooperation agreement, will apply only to the equipment, installations and materials supplied by the Federal Republic of Germany.

Brazil undertook not to use the technological information received for the manufacture of nuclear weapons or other nuclear explosive devices; the transfer of technology is to be subject to IAEA safeguards.[4] But such safeguards may be difficult to put into practice. In the context of nuclear

[2] In March 1975, when the US Nuclear Regulatory Commission suspended the issuance of licences for export of enriched uranium "pending a policy review", the West German minister for research and technology said that the export stoppage underlines the necessity for the Federal Republic to make itself as independent as possible from external sources of energy [17]. FR Germany depends now on the USA for 86 per cent of its nuclear fuel [18].

[3] In the jet nozzle process, uranium hexafluoride gas (mixed with hydrogen) is pumped through a long slit, forming a rapidly moving sheet of gas. The gas strikes a curved wall, bending the sheet through 180 degrees. Centrifugal forces then carry the heavier uranium-238 to the outer surface of the sheet, where a barrier pares it off. The lighter fraction, now slightly enriched in uranium-235, is routed through hundreds of additional stages to reach the desired level of enrichment. The process consumes more electric power than a gaseous diffusion plant or a centrifuge plant [19].

[4] A precedent can be found in the 1975 agreement for the application of safeguards between the IAEA, the Republic of Korea, and France, which covers nuclear facilities and specified equipment designed, constructed or operated on the basis of or by the use of specified information supplied, "specified information" meaning the information designated as such by the supplier [20].

supplies, transfer of technology is usually described as provision of technical data designated by the supplying country as important to the design, construction, operation or maintenance of specified nuclear facilities or major components thereof, but excluding data generally available in the form of books or journals, or that which has been made available without restrictions upon further dissemination. A recipient country which decides to build plants using the blueprints of imported facilities could claim that it had acquired the necessary information from open sources and/or through its own research; technological information, however classified, is bound eventually to be declassified and become public knowledge. Therefore restrictions on the use of transferred technology cannot but be limited in time. Some degree of assurance against abuse would perhaps be provided if critical facilities of the same type as those transferred, or serving the same purpose, were not allowed to be constructed by the recipient countries at all, without any time limit. But as regards plants for the separation of plutonium from spent fuels, the economics of civilian pursuits do not, as yet, justify their acquisition in the first place. The USA, for example, with some 55 nuclear power reactors, has no commercial reprocessing plants now in operation; spent fuel is simply stored and not reprocessed. The commercial use of plutonium as a power-reactor fuel will depend on the development of technology which may take at least 20 years. At present, the only significant industrial use for plutonium is for nuclear weapons or other nuclear explosive devices, and in this case profitability is of no consequence. The spread of plutonium separation facilities poses the most immediate danger, because nations acquiring them gain access to weapon-grade material. Restraint on the provision of such equipment should, therefore, apply to all non-nuclear-weapon states, even under IAEA safeguards. The IAEA can detect abuses but has no power to avert them. Neither can the possibility of abrogation of the NPT and/or the safeguards agreements be ruled out, notwithstanding the political risks involved in such a move. The defaulting state could, of course, be penalized by a denial of further nuclear material and equipment deliveries by the suppliers. But such a belated sanction may turn out to be relatively light (perhaps even of short duration) and not effective in preventing a state which already possesses complete and working plants from "going nuclear".

The Federal Republic of Germany declared [21] that it would share its know-how and experience in the peaceful uses of nuclear energy only with countries which have decided to renounce the manufacture or acquisition of nuclear explosive devices. But Brazil does not belong to this category of states: it has refused to join the NPT; and although it has signed and ratified the Treaty for the Prohibition of Nuclear Weapons in Latin America (Treaty of Tlatelolco), it has not waived the requirements for the entry into force of the treaty, as laid down in Article 28, and is therefore not bound by its provisions. Brazil (as well as Argentina) insists on the right to carry out nuclear explosions for peaceful purposes, "including explosions which involve devices similar to those used in nuclear weapons",[5] that is, the right to do something that is explicitly forbidden by the NPT and implicitly prohibited by the Treaty of Tlatelolco as interpreted by other parties to the treaty. Under these circumstances, the statement made by Brazil and FR Germany—that they "commit themselves" to the principle of the non-proliferation of nuclear weapons—rings hollow. Any nuclear transaction with Brazil which enables it either directly or indirectly to achieve a nuclear-explosion capability conflicts with the fundamental purpose of the international non-proliferation policy.

According to the letter of the NPT, nuclear-weapon states alone are not allowed to "assist, encourage, or induce any non-nuclear-weapon state to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices". There is no express prohibition for non-nuclear-weapon states party to the NPT to provide such assistance, encouragement or inducement to other non-nuclear-weapon states which are not party to the NPT. But the West German government could not have counted on taking advantage of this omission. In 1954, FR Germany undertook an obligation not to produce atomic weapons on its own territory. By becoming party to the NPT, it committed itself not to produce them anywhere, and it certainly was familiar with the authoritative, uncontested interpretation given to Articles I and II of the NPT by the USA and the USSR, the powers responsible for the formulation of the relevant provisions. As early as in 1968, in response to an Egyptian proposal to close the apparent loophole in the NPT, the Soviet Union made it clear that "if a non-nuclear-weapon State Party to the Treaty were to assist another non-nuclear State to manufacture and acquire nuclear weapons, such a case would be regarded as a violation of the Treaty". (This interpretation was reiterated during the 1975 NPT Review Conference.) The USA then argued that "it seems clear that a non-nuclear-weapon State which accepts the Treaty's restrictions on itself would have no reason to assist another country not accepting the same restrictions to gain advantage from this fact in the field of nuclear weapon development". It also stated that "if a non-nuclear-weapon Party did nevertheless attempt to provide such assistance in the territory of a non-party, the presumption would immediately arise that these acts had the purpose of developing nuclear weapons for itself, in violation of the Treaty".

The Review Conference rightly pointed out that strict observance of Articles I and II is "central to the shared objective of averting the further proliferation of nuclear weapons". However, it is precisely the failure to observe strictly these articles, in particular the obligation not to assist "in

[5] Statements to this effect were made by Argentina and Brazil on 27 September 1967 and 9 May 1967, respectively, on the occasion of the signing of the Treaty of Tlatelolco.

any way" a non-nuclear-weapon state to manufacture nuclear explosive devices, that contributes to the weakening of the NPT, thus raising the question as to what extent non-proliferation really is a "shared" objective.

Nuclear safeguards

Under Article III of the NPT, the non-nuclear-weapon states undertook to conclude safeguards agreements with the IAEA covering all their peaceful nuclear activities, within the prescribed time limit of 24 months for the original parties and 18 months for acceding states. The stated purpose of nuclear safeguards is to verify the fulfilment of the treaty obligations with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices.

Although the control provisions constitute an inseparable part of the NPT commitments, not all non-nuclear-weapon parties have concluded the required agreements [22], and in many cases the deadlines indicated above have elapsed. The defaulting parties are exclusively such states which as yet have no significant nuclear activities, and there may be nothing to safeguard on their territories. Nevertheless, the NPT Review Conference recognized that this was an unsatisfactory state of affairs by emphasizing the "necessity for the States Party to the Treaty that have not yet done so to conclude as soon as possible safeguards agreements with the IAEA". No definitive date has been set.

The Conference declaration attached considerable importance to the continued application of safeguards to the nuclear activities of the non-nuclear-weapon parties to the NPT, "on a non-discriminatory basis". It failed, however, to settle the problem of discriminatory treatment of the parties to the NPT as compared with non-parties. As a result of the policies of the suppliers, the latter, as distinct from the former, are not subject to safeguards comprehensively covering their nuclear activities; safeguards applied in their territories are facility-oriented [23], which means that they may put nuclear material only in certain facilities under IAEA safeguards and retain unsafeguarded all or part of a nuclear fuel cycle. There can, therefore, be no guarantee that non-peaceful nuclear activities are not carried out on the territory of the recipient states, non-party to the NPT. As mentioned above, the application of international safeguards to imported nuclear materials does not constitute an obstacle for India to manufacture and explode nuclear devices.

The Review Conference expressed the hope that "all states having peaceful nuclear activities will establish and maintain effective accounting and control systems". It also recommended that "more attention and fuller support" should be given to the improvement of safeguards techniques, instrumentation, data-handling and implementation in order, among other things, to ensure optimum cost-effectiveness. However, all these measures, even if realized, would remain of limited consequence, if they applied only to states which had already forsaken the nuclear-weapon option by becoming party to the NPT. On the other hand, non-parties may have no incentive to join the NPT and/or accept safeguards on all their nuclear activities as long as they are assured of continued nuclear supplies. They have nothing tangible to gain from abandoning their freedom of action.

The Conference took note of the view that the safeguards required under Article III.2, which deals with supplies of fissionable material and relevant equipment to "any" non-nuclear-weapon state, "should extend to all peaceful nuclear activities in importing States". It further noted the suggestion that it was "desirable to arrange for common safeguards requirements in respect of nuclear material processed, used or produced by the use of scientific and technological information transferred in tangible form to non-nuclear-weapon States not Party to the treaty". In meeting these postulates, the Final Declaration went only so far as to "urge" that export requirements relating to safeguards be strengthened but, at the same time, obliquely indicated that safeguards agreements with non-parties might be considered satisfactory if they were of "adequate duration, preclude diversion to any nuclear explosive devices and contain appropriate provisions for the continuance of the application of safeguards upon re-export".

From the point of view of non-proliferation, a tightening of safeguards applying merely to the nuclear material supplied is inadequate. As pointed out by the IAEA Director-General during the NPT Review Conference [24] and, subsequently, at the nineteenth regular session of the IAEA General Conference [25], there will be no overall satisfactory safeguards system operating "until suppliers of equipment and materials make it a condition for delivery that the entire nuclear activity in the receiving country is placed under IAEA safeguards". The most radical solution would be to deny supplies to states that do not meet these requirements, because further export of nuclear materials, plants or know-how, without safeguards on the full fuel cycle in non-nuclear-weapon states, will unavoidably contribute to the further proliferation of nuclear-explosion capabilities. Certain states could be expected to resent such a solution. For example, Argentina, in clear reference to IAEA safeguards on all nuclear activities as envisaged in the NPT, pointed out that no provisions of a treaty can be imposed on third states "which have decided, in exercise of their sovereignty, not to sign the treaty" [26]. Brazil stated that, as a non-party to the NPT, it "cannot view as pertinent the introduction of binding principles inspired by the NPT" in the context of organizations to which it belongs, such as the IAEA [27]. And India strongly objected to any suggestion of what it termed "a boycott on those who are not favourably disposed towards the NPT" [28], and stated that an "attempt to enforce on the entire membership of the United Nations or the IAEA considerations which are not universally relevant and obligations which have not been universally accepted would only lead to a sense of discrimination which is not in the long-term interest of the United Nations or the IAEA" [29]. Indeed, a few states would certainly feel discriminated against. But a denial of nuclear material deliveries to states unwilling to accept safeguards which are already applied in many countries, without hampering their economic, scientific and technological development, would not be a coercive measure promoting particular political or economic interests, as has been the case with certain embargoes. It would rather serve the long-term interest of all.

The non-proliferation effect of a cut-off measure would be reinforced if, as proposed by Finland, the parties to the NPT, in addition to restrictions on export to non-parties, were to import nuclear materials and special equipment "only from states which are parties to the NPT or which have accepted equivalent IAEA safeguards or which have otherwise shown that they act in their supply policies as if they were parties to the NPT" [30–31]. Such a policy, aimed at further limiting the quantities of nuclear material entering the world market outside the framework of the NPT, would put pressure on the exporting countries to observe the non-proliferation rule.

Australia [32], Belgium [32], Canada [33], Italy [34], Sweden [35] and a number of other industrialized countries insisted that all nuclear-weapon powers party to the NPT should agree to apply IAEA safeguards to all their peaceful nuclear activities, even though they are not obliged to do so under the treaty. Wider openness to verification could reduce the sense of discrimination of non-nuclear-weapon states and perhaps satisfy the commercial interests of the nuclear industry. But from the point of view of non-proliferation of nuclear weapons, safeguarding peaceful activities in countries unrestricted in their military nuclear programmes does not make sense: while absorbing much qualified manpower of the IAEA, it amounts to verifying the fulfilment of non-existing obligations. On the other hand, it would seem useful to safeguard transfers of nuclear material from non-nuclear-weapon states to nuclear-weapon powers in order to ensure that they do not contribute to a further build-up of nuclear-weapon arsenals. (In June 1974, the UK, the USA and the USSR undertook to provide the IAEA with information regarding nuclear material exports from and imports to the three respective countries.)

The preamble to the Final Declaration of the Conference stressed that the absence of "effective safeguards" will under the conditions of the accelerated spread and development of peaceful applications of nuclear energy contribute to further proliferation of nuclear explosive capability, but it failed to draw all conclusions from this important statement.

On the positive side, the Conference recognized the need for physical protection of nuclear material in storage, use or transit. It called upon all states engaging in peaceful nuclear activities to enter into such international agreements and arrangements as may be necessary to ensure this protection and, in the framework of their respective physical protection systems, to give the earliest possible effective application to the recommendations elaborated within the IAEA.[6] Strictly speaking, the matter lies outside the framework of the NPT. Nevertheless, the theft of nuclear material may have serious international repercussions, because material stolen in one country could appear in another and be used there, for instance, for sabotage or blackmail. To minimize the risk of such occurrences, adherence to a convention setting uniform minimum standards for the protection of fissionable material could be made a condition for supplying nuclear material and equipment. The norms of security would have to be formulated in general terms, because too much publicity given to concrete measures of protection could be counter-productive; it would only facilitate the task of would-be offenders. It would then be up to individual states to work out detailed modalities for the implementation of the convention. Some states, however, such as Belgium and FR Germany, prefer an agreement providing only for an international exchange of information about possible dangers and cooperation in case of pursuit of offenders outside the national borders, thus leaving the matter essentially within the competence of national authorities [30].

Peaceful uses of nuclear energy

Article IV of the NPT deals with the contribution by states, in a position to do so, to the development of the applications of nuclear energy for peaceful purposes, "especially in the territories of non-nuclear-weapon States Party to the Treaty, with due consideration for the needs of the developing areas of the world".

The implementation of this article was seriously questioned by many participants at the Review Conference when statistics showed that non-parties to the NPT had benefited considerably more from international exchange in the field of the peaceful uses of nuclear energy than had the parties to the treaty [11]. This anomaly was recognized, again only indirectly, in the Final Declaration of the Conference which recommended, *inter alia,* that in reaching decisions on the provision of equipment, materials, services and scientific and technological information for the peaceful uses of nuclear energy, on concessional and other appropriate financial arrangements and on the furnishing of technical assistance in the nuclear field, including cooperation related to the continuous operation of peaceful nuclear facilities, states party to the treaty "should give weight" to adherence to the NPT by recipient states. It further recommended that any special measures of cooperation to meet the growing needs of developing states party to the treaty might include increased and supplemental voluntary aid provided bilaterally or through multilateral channels, such

[6] An updated and extended version of these recommendations was published in 1976 in a booklet entitled "The Physical Protection of Nuclear Material" [36].

as the IAEA's facilities for administering funds-in-trust and gifts-in-kind, and that the states party to the NPT meet, to the fullest extent possible, "technically sound" requests for technical assistance, submitted to the IAEA by developing states party to the treaty, which the IAEA is unable to finance from its own resources.

Although the postulates of the developing non-nuclear-weapon states—as embodied in a draft resolution submitted by Mexico, Nigeria, the Republic of Korea, and the Philippines [37]—have been met to some extent, no firm undertakings to fulfil specific requests of these countries were made. The nuclear powers ignored the proposal included in the above-mentioned draft resolution to make available, through the IAEA, "part of the fissionable material resulting from the measures of nuclear disarmament" to non-nuclear-weapon parties to the NPT. They also disregarded the Philippine suggestion for a 1 per cent reduction of military expenditures by all parties and use of the resources so released to finance nuclear power stations and other related projects in the developing countries party to the NPT [38]. And yet, such undertakings could, perhaps, induce wider acceptance of the NPT. Italy complained that the question of stability of prices and of continuity of fuel supply was not reviewed in the Conference Declaration [39].

In the matter of nuclear supplies it is necessary that all exporting countries, parties and non-parties to the NPT, pursue the same policy. Commercial competition hampers the pursuance of non-proliferation objectives if it is based on the scope of safeguards required. In 1974, a group of exporting states reached a common understanding on the way in which each of them would interpret and implement either its commitments under Article III.2 of the NPT or its own policies regarding exports of certain categories of equipment and material. This understanding was communicated to the Director-General of the IAEA with a memorandum containing a list, the so-called trigger list, of equipment and material especially designed or prepared for the processing, use or production of special fissionable material which, when provided by one of these states to any non-nuclear-weapon state, would bring about IAEA safeguards in respect of the nuclear material processed or used in the equipment or material in question. This list includes reactors and important reactor components (pressure vessels, fuel charging and discharging machines, control rods, pressure tubes, zirconium tubes and primary coolant pumps), deuterium, heavy water and nuclear grade graphite, as well as plants and equipment for the reprocessing of irradiated fuel elements, plants for the fabrication of fuel elements, and equipment for the separation of isotopes of uranium [40]. Further attempts at establishing common standards were made in 1975 by Canada, FR Germany, France, Japan, the UK, the USA and the USSR, the industrial nations responsible for most nuclear material supplies on the world market. In November 1975, this so-called group of seven, meeting in London, reached a gentlemen's agreement (subsequently formalized by an exchange of letters) laying down guidelines for nuclear transfers to any non-nuclear-weapon states for peaceful purposes, and setting certain common safeguards requirements (to be reconsidered before the end of 1976). In particular, the list of equipment and material "triggering" IAEA safeguards, as established in 1974, was enlarged by including plants and equipment for the production of heavy water and deuterium. IAEA safeguards have also been recommended for facilities for reprocessing, enrichment or heavy water production, constructed during an agreed period in the recipient country and identified as using transferred technology. The need to ensure physical protection of nuclear material was emphasized. Some further restrictions have been proposed on retransfer of especially sensitive "trigger" items. The principle adopted in London that an assurance should be given by the recipient country that the nuclear material supplied will not be used to manufacture explosive devices had already been practised for some time, even before the seven-nation session began [41–45]. (It should be noted that unless *all* exporters of nuclear technology subscribe to the rules of conduct set by the group of seven, even these modest steps towards tightening safeguards against diversion may prove to be unavailing.)

The guidelines for nuclear transfers provide for consultations among the seven on matters related to their implementation, presumably before concluding a major export contract, but they contain nothing that would indicate a determination to refrain from selling to individual countries such critical equipment as uranium enrichment and plutonium reprocessing facilities. A proposal to this effect made by some participants at the London meetings proved unacceptable to others [46]. Notwithstanding certain innovations, non-parties to the NPT will continue to be subject to less comprehensive safeguards than the parties, and adherence to the NPT will still not entitle the latter to favoured treatment in nuclear supplies. More pertinently, the gentlemen's agreement of the suppliers has not prevented FR Germany from going ahead with its 1975 nuclear deal with Brazil, a non-signatory of the NPT, and on 24 February 1976 the IAEA Board of Governors approved the Agency safeguards to be applied to this deal [47]. No party to the NPT has ever been promised so much in terms of material and sophisticated technology. It might be added that by September 1975, more than half of the nuclear reactors exported by the USA went to non-NPT countries [48].

Admitting that wide availability of nuclear technology and fissionable material aggravates the possibility of nuclear-weapon proliferation, the Review Conference considered a proposal for setting up regional or multinational nuclear fuel cycle centres. Large centralized facilities could reduce national incentives to develop individual enrichment and reprocessing plants (enrichment and reprocessing are uneconomical unless tied to a large number of power reactors), satisfy the need for an assured supply of fuel and make technical assistance to less developed countries more effective.

Moreover, the application of safeguards would be facilitated and physical protection of nuclear material enhanced due to a decrease of transportation risks. (The first significant reprocessing facility for civilian purposes in Europe was the result of a regional initiative.)

The Final Declaration contains an appeal to all parties to the NPT to cooperate in studies of this proposal, particularly by providing the IAEA with economic data concerning the construction and operation of chemical reprocessing plants, plutonium fuel fabrication plants, waste management installations and longer-term spent fuel storage. There would, of course, be problems with the selection of sites for cycle centres; ideally, they would have to be situated in reasonable proximity to power stations and in regions which are politically stable (to minimize the risks of seizure) and not plagued by natural disasters. Even more formidable would be problems of jurisdiction, financing, ownership and management. The idea of multinational fuel cycle centres was considered within the group of seven supplier nations, but the discussion was inconclusive.

Peaceful nuclear explosions

Article V of the NPT contains an obligation to ensure that potential benefits from any peaceful applications of nuclear explosions should be made available to non-nuclear-weapon states party to the treaty, under "appropriate" international observation and through "appropriate" international procedures, and that the charge for the explosive devices used should be as low as possible and exclude any charge for research and development. A basic agreement defining the functions of an appropriate international body, through which the benefits from peaceful nuclear explosions could be obtained, was envisaged and the possibility of concluding a series of separate international agreements dealing with particular projects was left open. In 1968, the USA and the USSR promised to start the necessary consultations promptly and to consider the matter even before the entry into force of the NPT [49]. This did not happen, but the two powers discussed, on a bilateral basis, certain technical aspects of the use of peaceful nuclear explosions. Since 1974 they had been engaged in talks on the regulation of such explosions under the US-Soviet treaty limiting underground nuclear-weapon tests (the Threshold Test Ban Treaty), but these negotiations had no direct relevance to the implementation of the NPT provisions.

The Review Conference considered that the IAEA was an appropriate body through which the task of providing nuclear explosion services could be performed, and urged the Agency "to expedite work on identifying and examining the important legal issues involved in, and to commence consideration of, the structure and content of the special international agreement or agreements contemplated in Article V of the Treaty", taking into account the views of the CCD and the UN General Assembly. The proposal made by

Ghana, Mexico, Nigeria, Peru, the Philippines, Romania, Syria and Yugoslavia [50] that "immediate" consultations should be initiated to set the place and date for holding a meeting of NPT parties in order to conclude the envisaged special agreement, was found unacceptable by the nuclear-weapon powers. Evidently, these powers prefer to deal with the matter within the framework of the IAEA where, due to the Agency's statute, they can more effectively exercise their influence, rather than at a conference which may establish its own rules of procedure less favourable to them.

The NPT is not explicit as to whether or not non-parties may benefit from peaceful nuclear explosion services. It would seem that such services, if provided, would not be concordant with the policy of creating incentives for states to join the NPT. On the other hand, it can be argued that non-parties might be dissuaded from, or deprived of an excuse for, developing an independent nuclear explosive capability if they were assured of foreign assistance. The latter point of view prevailed and the Conference decided that any potential benefits from peaceful nuclear explosions could be made available also to non-nuclear-weapon states not party to the treaty. It is not clear from the Declaration whether the terms would be as advantageous as in the case of parties. Probably, they would have to be favourable enough to counteract the tendency towards independent development of explosive devices. Another, even more important point which remains unanswered is the status of non-nuclear-weapon states, non-parties to the NPT, which have already started an autonomous nuclear explosion programme for peaceful purposes and are determined to proceed with it. According to the letter of the NPT, these states are to be considered non-nuclear-weapon states, in spite of the explosions, because only states which had carried out a nuclear explosion prior to *1 January 1967* are, for the purposes of the treaty, nuclear-weapon states (Article IX.3). The countries in question could, therefore, claim the same rights as other non-nuclear-weapon countries, not party to the NPT. But such a formalistic approach would contradict the spirit of the treaty. The inclusion of non-parties engaged in nuclear explosions (whatever their declared aim) in the category of possible beneficiaries under Article V of the NPT could be construed as a "premium" for undermining the international non-proliferation régime. A new situation would arise if non-nuclear-weapon parties to the NPT decided to accept offers for nuclear explosion services from non-parties in a position to provide these services, because the latter countries are unlikely to comply with arrangements under Article V of the treaty.

The Conference Declaration noted that the technology of nuclear explosions for peaceful purposes was still "at the stage of development and study" and that there were a number of interrelated aspects of such explosions which still needed to be investigated. Sweden suggested that if the studies showed that, on balance, no considerable benefits could be derived from peaceful nuclear explosions, states should refrain from their use [51].

The Western countries were very sceptical as to the usefulness and feasibility of these explosions, and the USA seemed to favour the idea of giving them up altogether. (US experiments have been disappointing and no new field tests are currently scheduled.) However, most other countries, including the USSR which claims some achievements in the field of peaceful nuclear explosions, continued to believe in the economic gains they may produce, and that environmental hazards could be avoided.

Apart from the problem of the practicability of nuclear explosions for peaceful purposes, which includes health and safety considerations, a question arises about their implications for existing and possible future arms-control agreements. This question was not discussed in detail at the Review Conference, but was subsequently taken up by the CCD. On the basis of the opinions expressed by the members of the CCD and their experts,[7] the following conclusions can be drawn.

1. It is impossible to develop nuclear devices which would be capable only of peaceful application. All such devices could also be used as weapons; they are transportable and could be carried to targets by various delivery vehicles. Thus, any state conducting peaceful nuclear explosions acquires a nuclear-weapon capability. And since, from the point of view of arms control, it is the capability rather than the declared intention of states that matters, the proliferation of peaceful nuclear explosives would be equivalent to the proliferation of nuclear weapons. These considerations lay behind the NPT provision which prohibits the manufacture of *any* nuclear explosive device by non-nuclear-weapon countries.

2. As distinct from contained underground explosions, the use of nuclear explosions for excavation purposes, for example to dig canals or harbours, would inevitably release radioactive products into the atmosphere. Should the debris cross the territorial limits of the state under whose jurisdiction or control the explosion was conducted, the state in question would be brought to task for violating the 1963 Partial Test Ban Treaty, which prohibits such events.

3. Any agreed restraints on underground nuclear-weapon testing by the nuclear powers, placing a limit on the number of explosions and/or their yield, must be accompanied by corresponding limitations on peaceful nuclear explosions, because peaceful programmes could be used to obtain weapon-related information.

4. With a treaty banning all nuclear-weapon tests, the incentive for seeking military benefits from peaceful nuclear explosions would be even greater. An effective verification system would, therefore, be needed to ensure that weapon tests are not carried out under the guise of peaceful explosions conducted by nuclear-weapon states on their own territory, or

[7] On 14–18 July 1975 the CCD held informal meetings with experts to consider the arms-control implications of peaceful nuclear explosions.

elsewhere under Article V of the NPT. Failing such a system, a choice would have to be made between peaceful nuclear explosions and a comprehensive test ban.

Some countries suggested a suspension of peaceful nuclear explosions until their economic value had been proved and the problem of their compatibility with a comprehensive test ban solved [52–53]. It would seem, however, that a temporary measure could be meaningful only if a moratorium on all nuclear tests, both military and non-military, were declared, as there is a direct relationship between these two types of testing. In any case, elaboration of an agreement regulating the question of nuclear explosion services is an NPT requirement which should be fulfilled, irrespective of whether or not peaceful nuclear explosions will actually be carried out outside the territories of the nuclear-weapon powers.

Switzerland raised the question of the legality, under the NPT, of contained thermonuclear micro-explosions for peaceful purposes [54]. In this connection, the US delegation to the NPT Review Conference made the following statement:

> A question has been raised with respect to energy sources, of a kind on which research has been reported, involving nuclear reactions initiated in millimeter-sized pellets of fissionable and/or fusionable material by lasers or by energetic beams of particles, in which the energy releases, while extremely rapid, are designed to be, and will be, nondestructively contained within a suitable vessel. On the basis of our present understanding of this type of energy source, which is still at an early stage of research, we have concluded that it does not constitute a nuclear explosive device within the meaning of the NPT or undertakings in IAEA Safeguards Agreements against diversion to any nuclear explosive device [55].

This interpretation was supported by the United Kingdom and Denmark [55]. The Soviet Union did not object.

It is very uncertain if the described technique would find practical applications. It is also unclear how much its development could contribute to substantial knowledge about the manufacture of nuclear weapons.

Disarmament obligations

Article VI of the NPT contains a commitment to pursue negotiations "in good faith" on effective measures relating to the cessation of the nuclear arms race at an early date and to nuclear disarmament, as well as on a treaty on general and complete disarmament under strict and effective international control.

Although, formally, all parties undertook the above obligation, and the depositary states were keen to stress this point, it is clear that nuclear disarmament, which is of paramount importance in a treaty dealing with nuclear proliferation, can only be effected by the nuclear powers. It is therefore these powers, parties to the NPT, that were subjected to criticism for not fulfilling the relevant undertakings. The non-nuclear-weapon participants at the Review Conference, in particular representatives of the nonaligned countries, drew attention to and showed concern about the continuing nuclear-weapon test programmes and the steady increase of nuclear arsenals in spite of the negotiations on their limitation. In response to the Soviet contention that the basic problems of nuclear disarmament can only be solved with the participation of *all* nuclear powers, opinion was expressed that the USA and the USSR, being the most powerful nations, should take the lead in the disarmament process, thereby encouraging other states to join. Various proposals were put forward with a view to speeding up the conclusion of arms-control agreements which would substantially reduce the levels of nuclear armaments and halt their qualitative development.

A group of 20 states—Bolivia, Ecuador, Ghana, Honduras, Jamaica, Lebanon, Liberia, Mexico, Morocco, Nepal, Nicaragua, Nigeria, Peru, the Philippines, Romania, Senegal, Sudan, Syria, Yugoslavia and Zaire—suggested the adoption of a protocol to the NPT (Additional Protocol I), under which the depositary governments—the UK, the USA and the USSR—would undertake "to decree the suspension of all their underground nuclear weapon tests for a period of ten years", as soon as the number of parties to the NPT reached 100; to extend by three years the moratorium contemplated above, each time that five additional states became party to the NPT; and to transform this moratorium into a permanent cessation of all nuclear-weapon tests through the conclusion of a multilateral treaty for that purpose, as soon as the other nuclear-weapon states indicated their willingness to become party to it. The protocol would be of indefinite duration, but the NPT provisions regarding withdrawal would apply to it. It would be subject to ratification by the three depositary states of the NPT and would enter into force on the date that the instruments of ratification of two of them were received by the UN Secretary-General who would serve as the depositary of the protocol. The sponsors of the protocol expressed the conviction that the proposed document would in no way undermine the security of the depositary states since the extent of the lead in nuclear-weapon technology and the enormity of the nuclear arsenals of the USSR and the USA were such that "even if they were to suspend all nuclear weapon tests for half a century, it is absolutely certain that they would continue to maintain an indisputable superiority".

The same group of nations, with the exception of the Philippines, also proposed the acceptance of another protocol (Additional Protocol II), by which the USA and the USSR would undertake, as soon as the number of parties to the treaty had reached 100, to reduce by 50 per cent the ceiling of 2 400 nuclear strategic delivery vehicles contemplated for each side under the 1974 Vladivostok accords; and reduce likewise by 50 per cent the sub-ceiling of 1 320 strategic ballistic missiles which, under those accords, each side may equip with multiple independently targetable re-entry vehicles (MIRVs). The governments concerned would also undertake, once such reductions had been carried out, to reduce by 10 per cent the ceilings of 1 200 strategic nuclear delivery vehicles and of 660 strategic ballistic missiles that may be equipped with MIRVs, each time that 10 additional states became parties to the NPT. Other clauses would be the same or similar to those of the first protocol. The sponsors contended that the reductions suggested would in no way affect the system on which the proportions accepted in the Vladivostok accords were based. They also argued that the extent of the lead of the USA and the USSR was such that "even after they had carried out the parity reductions called for in the Additional Protocol, the number of nuclear weapons and of delivery vehicles which each one would maintain would still be much superior to that which might be at the disposal of all the other nuclear-weapon States taken together".

The above proposals proved completely unacceptable to the nuclear-weapon states. They refused to discuss any time-table for nuclear arms-control measures, even though, according to the NPT, such measures should be carried out "at an early date". They contended that the Review Conference was not competent to deal with a matter which was their exclusive concern. The Soviet Union qualified these attempts as inadmissible interference with US-Soviet relations and the USA stressed that it was up to the SALT negotiators to determine the pace of progress in nuclear arms limitation [56]. Also other states, while supporting the general aim of additional protocols to the NPT, considered it unrealistic for the Review Conference to impose specific terms of disarmament agreements upon the great powers. The linkage between the number of parties to the NPT and the number of nuclear weapons allowed to be kept in the arsenals of the USA and the USSR was found artificial and arbitrary by many. It is certainly not the poor adherence to the NPT alone that stands in the way of nuclear disarmament. Furthermore, the absolute number of NPT members is not decisive for the strength of the non-proliferation régime; the countries which are of crucial importance are the so-called near-nuclear-weapon countries, and relatively few of them remain outside the treaty. Subsequently, Mexico, the main sponsor of the draft additional protocols, expressed readiness to amend the texts in order to take account of the "quality" of new adherents to the NPT and to require the presence among them of a few near-nuclear states as a *quid pro quo* for nuclear disarmament measures [57]. But since the nuclear-weapon powers were not at all inclined to discuss the substance of the proposals, the drafts remained unchanged.

The preamble to the Conference Declaration recognizes that it is essential to maintain in the implementation of the NPT an acceptable balance of mutual responsibilities and obligations of all the parties to the treaty. The additional protocols were presented with a view to redressing the balance by matching the cessation of "horizontal" proliferation with a halt to "vertical" proliferation. Some dispute the existence of a direct relationship between the two types of proliferation. Indeed, if at this stage any new country acquires nuclear weapons, it will do so presumably in order to intimidate or impress its immediate neighbours, or to enhance its international standing and gain more political prestige, influence and consideration in world councils, rather than to compete militarily with the present nuclear-weapon powers, especially the USA and the USSR. Be that as it may, a treaty denying a powerful weapon to most nations in order to preserve a firebreak between the "haves" and "have-nots" is not likely to withstand the pressures of a continued arms race. Since nuclear weapons appear to have political and military usefulness for the nuclear powers, the non-nuclear-weapon countries may feel that they too must obtain these advantages. A dynamic process of nuclear disarmament is therefore necessary to de-emphasize the role of nuclear weaponry in world diplomacy and military strategy and to generate political and moral inhibitions dampening the nuclear ambitions of non-nuclear-weapon states. However, the way in which the proposals for reaching this aim were formulated at the Review Conference could convey a wrong impression that in renouncing a nuclear-weapon option the non-nuclear states had rendered a service to the nuclear powers; that non-proliferation was in the interest of some nations only; and that, therefore, these nations should pay a "price" for other countries' adherence to the NPT. In reality, the NPT serves the interests of all nations. The emergence of ever new nuclear-weapon powers would jeopardize international security in general, and, therefore, the big-power nuclear rivalry and lack of progress in disarmament negotiations should not be used as justification for acquiring or seeking to acquire nuclear weapons.

Nevertheless, the essence of the proposals submitted to the Review Conference could not be entirely ignored. The Final Declaration contains an appeal to the nuclear-weapon parties to the NPT to make every effort to reach agreement on the conclusion of an effective comprehensive test ban. It notes that a considerable number of delegations expressed the desire that the nuclear-weapon states party to the treaty should as soon as possible enter into an agreement, open to all states and containing appropriate provisions to ensure its effectiveness, "to halt all nuclear weapons tests of adhering states for a specified time, whereupon the terms of such an agreement would be reviewed in the light of the opportunity, at that time, to achieve a universal and permanent cessation of all nuclear weapons tests". The Conference also called upon the signatories to the Threshold Test Ban Treaty (TTBT) meanwhile to limit the number of their underground nuclear-weapon tests to a "minimum". (It will be recalled that the TTBT already contains such an obligation, but the term "minimum" has not been specified.)

Furthermore, the Conference appealed to the USA and the USSR to endeavour to conclude at the earliest possible date the agreement on the limitation of strategic arms outlined by their leaders in November 1974, and stated that it was looking forward to the commencement of follow-up negotiations on "further limitations of, and significant reductions in, their nuclear weapons systems" as soon as possible following the conclusion of such an agreement. Also the Conference of the Committee on Disarmament (CCD) was urged to increase its efforts to achieve effective disarmament agreements on all subjects on its agenda.

On the initiative of Romania [58], the United Nations was invited to consider ways and means of improving its existing facilities for the collection, compilation and dissemination of information on disarmament issues, "in order to keep all governments as well as world public opinion properly informed on progress achieved" in the realization of the provisions of Article VI of the NPT. The USSR did not support this proposal. In its view the existing organs of the United Nations "suffice to ensure that all states and world opinion are informed on such issues".

The security of non-nuclear-weapon states

At its twenty-ninth session, held in 1974, the UN General Assembly decided that member states should consider, in the appropriate forums, the question of strengthening the security of non-nuclear-weapon states [59]. The NPT Review Conference was certainly an appropriate forum to implement this recommendation.

It will be recalled that in a UN Security Council resolution adopted on 19 June 1968 [60], the states renouncing the acquisition of nuclear weapons under the NPT had already received a pledge of immediate assistance, in accordance with the UN Charter, in the event they became "a victim of an act or an object of a threat of aggression in which nuclear weapons are used". (The nature of the assistance was not specified.) But the value of this document has been repeatedly questioned on the following grounds: *first,* the resolution and the declarations by the UK, the USA and the USSR, associated with it, merely reaffirm the existing UN Charter obligation to provide or support assistance to a country attacked, irrespective of the type of weapon employed; *second,* as long as all the nuclear-weapon powers, that is, powers capable of using nuclear weapons, are also permanent members of the Security Council, any decision concerning military or non-military measures against the delinquent state would require their approval, and it is inconceivable that an aggressor nation would consent to a collective action being taken against itself; and, *third,* immediate active intervention, as envisaged by the resolution, is deemed unacceptable by some nonaligned and neutral states, unless assistance has been specifically requested by the victim. Furthermore, the resolution in question relates to a possible action by the Security Council only when a threat of nuclear attack has been made or the attack has actually occurred. It does not offer assurance for the prevention of the use or threat of use of nuclear weapons. These deficiencies were pointed out by many delegations at the NPT Review Conference. But at the same time, doubts were expressed as to whether it was at all possible in the present world situation to devise such "positive" security guarantees which would be both credible and effective as well as acceptable to all. There was, therefore, wide support for additional assurances in the form of legally binding "negative" security guarantees. These were proposed by a group of 11 states: Bolivia, Ecuador, Ghana, Mexico, Nigeria, Peru, Romania, Senegal, Sudan, Yugoslavia and Zaire. The proposal was that a protocol (Additional Protocol III) should be adopted, under which the depositary governments of the NPT would undertake "never and under no circumstances" to use or threaten to use nuclear weapons against non-nuclear-weapon states party to the treaty whose territories were "completely free from nuclear weapons", and to refrain from "first use" of nuclear weapons against "any other" non-nuclear-weapon state party to the treaty. The protocol would also contain positive assurances patterned after the 1968 UN Security Council resolution, namely, an obligation to provide immediate assistance to a victim of a nuclear threat or attack with nuclear weapons, at the request of the victim, and without prejudice to the obligations under the UN Charter. The provisions on the duration of the protocol, as well as those regarding possible withdrawal, would be the same as under the NPT itself.

Responding to the proposal for "negative" security guarantees, the USA argued that such commitments, undertaken on a global scale, would not serve the objective of non-proliferation and universal adherence to the NPT; they could encourage those states which are now protected by nuclear-weapon-powers against a threat of a conventional attack, to acquire their own nuclear weapons for defence [61]. In the view of the USA, renunciation of the option of first-use of nuclear weapons would amount to accepting a "self denying ordinance that weakens deterrence". It is, therefore, prepared to make use of nuclear weapons "should we be faced with serious aggression likely to result in defeat in any area of very great importance to the United States in terms of foreign policy" [62]. In this context, reference has been made to possible conflict situations in Europe and in the Korean peninsula, where US tactical nuclear weapons are stationed.

Five states—Ghana, Nepal, Nigeria, Romania and Yugoslavia—submitted a draft resolution [63] which invited the nuclear-weapon states party to the NPT to initiate negotiations on the conclusion of a treaty on the withdrawal from the territories of the non-nuclear-weapon states party to the NPT of all nuclear-weapon delivery systems, especially tactical nuclear weapons. The resolution would further request the immediate discontinuation of further deployment of all types of nuclear-weapon delivery systems within the territories of non-nuclear-weapon states party to the NPT and a gradual withdrawal of these weapons pending the entry into force of the treaty. It also invited the non-nuclear-weapon states party to the NPT on whose territories, waterways or airspace the nuclear-weapon delivery systems were deployed "not to allow the use or threat of use of nuclear weapons" against other non-nuclear-weapon states party to the NPT. Yugoslavia said that the deployment of nuclear weapons in the territories of non-nuclear-weapon states, and the training of allied armed forces in their use, represented an indirect nuclearization of those countries, which was incompatible with the spirit and objectives of the NPT, and that the vital interests of many non-nuclear-weapon states were directly threatened by the proliferation of tactical nuclear weapons in sensitive regions in the world [61].

The above proposal, only loosely connected with the question of security guarantees, is of direct relevance to the implementation of Articles I and II of the NPT, prohibiting transfer of control over nuclear weapons from nuclear- to non-nuclear-weapon states. As long as nuclear weapons are stationed on foreign territories, there will be a danger of sudden change in command and control,[8] and there is no international mechanism which could prevent this from happening. Unlike the non-manufacture obligation, the non-transfer commitment is not subject to any international control whatever.

In the course of the debate, reference was frequently made to Article VII of the NPT reaffirming the right of any group of states to conclude regional treaties in order to assure the total absence of nuclear weapons in their respective territories. Thus, the sponsors of the protocol on security assurances (Additional Protocol III) requested that the depositary governments should undertake to encourage negotiations to establish nuclear-weapon-free zones and to respect the status of the zones established. Also, in a separate proposal [64], Iran urged the nuclear-weapon states to undertake a solemn obligation "never to use or threaten to use nuclear weapons against countries which have become Parties to and are fully bound by the provisions of such regional arrangements".

The Final Declaration recognized that nuclear-weapon-free zones could contribute to the security of states, but did not specify that the nuclear-weapon states should undertake not to use nuclear weapons against the denuclearized countries. It simply recorded the desire of a "considerable number of delegations" that nuclear-weapon states should provide, in an appropriate manner, binding security assurances to the states concerned. The USA stated that "each nuclear-free zone proposal must be judged on its own merits to determine whether the provision of specific security assurances would be likely to have a favourable effect", and expressed the

[8] A significant number of US nuclear warheads stockpiled in Western Europe are earmarked for use by NATO forces in case of war.

opinion that it would not be realistic to expect nuclear-weapon states to make implied commitments to provide such assurances "before the scope and content of any nuclear-free zone arrangement are worked out".[9] The USSR, for its part, put forward a condition that the territories of the states concerned should be "genuinely" transformed into zones completely free of nuclear weapons, without any loopholes for violating the non-nuclear status of the zones.[10]

The Soviet Union and its allies also suggested that the UN Security Council give the force of law, with an internationally binding effect, to the 1972 UN General Assembly resolution on the renunciation of the use of force in international relations and simultaneous prohibition of the use of nuclear weapons. But since the resolution presumed an indissoluble link between non-use of force and non-use of nuclear weapons, it actually condoned the first use of these weapons against any nation in response to a non-nuclear, conventional attack.

Unlike the case of the USA, which long ago officially stated that it was prepared to take "whatever action with whatever weapons are appropriate" in the event of an aggression that could not be repulsed by conventional forces [65], the Soviet refusal to accept a no-first-use doctrine is a relatively new development. For many years, the USSR had advocated the prohibition of the use of nuclear weapons in general, and of first use in particular, and had even proposed a convention on the subject [66]. During the NPT negotiations, it was willing to provide a guarantee, along with other nuclear-weapon powers, that it would not use nuclear weapons against any non-nuclear-weapon party to the treaty, on the territory of which such weapons were not stationed.[11] The reasons for the reversal of the Soviet position have not been given. It is difficult to envisage a situation in which the Soviet Union might feel compelled to resort to a first use of nuclear weapons against a non-nuclear-weapon state.

The proposals submitted to the Conference reflected the different security situations in which states find themselves. There were clear differences in the attitudes of nuclear-weapon powers, the allies of these powers which believe that they are protected by a "nuclear umbrella", nonaligned countries which fear a nuclear threat, and nonaligned countries which do not perceive themselves to be under such a threat.[12]

[9] The non-use undertaking by the USA and the UK with regard to the Latin American nuclear-weapon-free zone, under Additional Protocol II to the Treaty of Tlatelolco, is conditional; the two powers have made it clear that they would reconsider their pledge if an armed attack were made by a member of the zone with the support of or assistance by a nuclear-weapon state.

[10] The USSR has not adhered to Additional Protocol II to the Treaty of Tlatelolco because it does not consider the Latin American zone to be a "genuine" nuclear-weapon-free zone.

[11] This proposal is often referred to as the "Kosygin formula" [67].

[12] Taking into account the difficulties standing in the way of an agreement on security guarantees because of prevailing strategic doctrines, the Sixth Islamic Conference of Foreign Ministers, held in Jeddah on 12–15 July 1975, proposed a compromise formula: the nuclear-

Eventually, the Conference confined itself to issuing an appeal to all states to refrain from the threat or use of force in their mutual relations. This amounted to a reiteration of the UN Charter requirement, valid for all, irrespective of the NPT. But the NPT parties received no assurance from the depositary governments that the weapons they had renounced would not be used against them. It is noteworthy that China, a non-party to the NPT, is the only nuclear-weapon power to declare that it would never, under any circumstances, be the first to use nuclear weapons against any country.

Follow-up action

The parties to the NPT proposed that a second conference to review the operation of the treaty should be convened in 1980. In the meantime, at the suggestion of a group of 20 countries [69], the UN General Assembly will be requested to discuss the implementation of the conclusions of the first Review Conference at its thirty-first (1976) and thirty-third (1978) sessions. The latter session would also consider the establishment of a preparatory committee for the second conference.

The Soviet Delegation, however, insisted that the procedure for reviewing the operation of the NPT should be strictly in accordance with the text of Article VIII which stipulates that a "majority of the Parties to the Treaty may obtain, by submitting a proposal to this effect to the Depositary Governments, the convening of further conferences". Whatever the practical modalities, the question of the implementation of the NPT has been assured a prominent place on the disarmament debate agenda during the next five years.

As a matter of fact, non-proliferation problems continued to be discussed at the thirtieth UN General Assembly in 1975. In particular, the United Kingdom put forward the following points for consideration:

1. The Members of the United Nations should solemnly affirm that each and all of them will not convert nuclear materials from civil use to military use.
2. This solemn declaration should be reinforced by an agreement to accept a common system of international inspection through the International Atomic Energy Agency. There should be one set of rules for all countries in the world.
3. All civil nuclear materials and facilities should be brought within the common inspection system.
4. The agency should assume responsibility for inspection of enrichment and processing plants, in addition to its present task of safeguarding nuclear reactors.
5. The new set of common rules should be based on monitoring nuclear material and accounting for its use at all stages through the life of the fuel.

In presenting its proposals, the UK referred to the NPT Review Conference recommendation that "intensified efforts be made towards the

weapon states would undertake not to use or threaten to use nuclear weapons, under any circumstances, against non-nuclear-weapon states "which are not protected by treaty guarantees from a nuclear power against nuclear threat or attack" [68].

standardization and the universality of application of IAEA safeguards", but stressed that they were not based on the NPT and had a wider purpose. The intention was "to give practical expression to the pledges" that had already been made by many governments, whether parties to the NPT or not, that they would not divert nuclear material from civil to military purposes [70–71]. The UK assumes that certain countries, unwilling to adhere to the NPT for political or other reasons, might nonetheless be prepared to accept safeguards on all their nuclear activities. (The British proposals were subsequently submitted in a modified version to the IAEA Board of Governors.)

The UN General Assembly noted the establishment by the IAEA of an advisory group on nuclear explosions for peaceful purposes[13] and invited the USA and the USSR to provide information on such consultations as they may have entered into or may intend to enter into for the conclusion of the special basic international agreement on nuclear explosions for peaceful purposes as envisaged in Article V of the NPT [72].

Adherence to the NPT

The convening of the Review Conference speeded up NPT ratification by several countries. In February, March and April 1975, Sierra Leone, Western Samoa and the Republic of Korea joined the treaty. In May, five Euratom countries—Belgium, FR Germany, Italy, Luxembourg and the Netherlands—as well as Gambia, Libya and Rwanda became parties. Thus, by the end of the Conference, 96 states were bound by the provisions of the NPT. (Since then, Venezuela joined the NPT, bringing the total number of parties to 97.)

The Conference expressed the hope that all states that had not joined the NPT would join it at the earliest possible date, but there is no sign that they will soon do so.

By 31 December 1975, fourteen countries had signed the treaty but had not ratified it: Barbados, Colombia, Democratic Yemen, Egypt, Indonesia, Japan, Kuwait, Panama, Singapore, Sri Lanka, Switzerland, Trinidad and Tobago, Turkey and Yemen. Egypt said that it would ratify the NPT only if Israel did the same [73], and the Egyptian President declared that if Israel obtained nuclear strike capacity, then Egypt would follow suit [74]. In Japan, the government failed to get the treaty ratified by the Diet in 1975. The Indonesian minister for scientific research stated that his government had not ruled out the possibility of developing nuclear weapons [75]. The

[13] The group, which is open to all members of the IAEA and all parties to the NPT, was set up in June 1975. It held its first meeting in September 1975 with the participation of 39 states. It will establish a catalogue of possible applications of peaceful nuclear explosions and their feasibility and will also study the health, safety and environmental aspects of these explosions, the economics of their applications as compared with alternative technologies, and the legal aspects of the matter. Its work is due to be completed by the end of 1976.

Turkish defence minister claimed that his country had to have nuclear energy and atomic weapons to "protect our independence in the present world strategy and to survive" [76], and the Prime Minister made it clear that Turkey would not ratify the NPT [77].

Those who have neither signed nor ratified the NPT include two nuclear-weapon powers, China and France; India, which has exploded a nuclear device and is engaged in a space programme which may lead to the development of a missile-based nuclear delivery system;[14] and half a dozen states, generally considered as near-nuclear: Argentina, Brazil, Israel, Pakistan, South Africa and Spain. Since Argentina and Brazil have opted to develop nuclear explosives, their adherence to the treaty is improbable. Brazil may be on its way to acquiring a nuclear explosion capability due to the recent deal with FR Germany.[15] Argentina is operating two nuclear power reactors fuelled with natural uranium and possesses a pilot fuel-reprocessing plant for extracting plutonium. In April 1975, a bill was introduced in Argentina calling on the government to build a nuclear bomb [80]. The President of Israel announced that his country had a potential for nuclear-weapon development [81], and the former Israeli defence minister said that he favours an independent nuclear deterrent [82]. The Israeli reactor at Dimona, which is not subject to any known international safeguards, is believed to be capable of producing enough plutonium for at least one nuclear bomb per year, and there have been persistent press reports that Israel is already in possession of a few such bombs [83]. Pakistan has refrained from accepting non-proliferation obligations because of the negative position of India. It has decided to acquire from France a reprocessing facility, paying little attention to Canada's apprehension [84] that the facility could be used to re-treat wastes from a Canadian-supplied nuclear reactor with a view to obtaining weapon-grade plutonium, as was the case in India. On 24 February 1976, the IAEA Board of Governors approved an ageement for the application of safeguards to this reprocessing plant. South Africa, which has major deposits of uranium, is operating a pilot plant for uranium enrichment. It stated that the plant had been designed to produce civil-grade material for commercial purposes [85], but the process opens the way to produce weapon-grade uranium. West German firms have been accused by the African National Congress of South Africa [86] and by African members of the UN [87–89] of providing the technology for, and Iran has been reported to consider financial participation in [90–91],

[14] In a private briefing to the Indian Parliament's consultative committee on atomic energy, space and electronics on 8 July 1974, the chairman of the Indian Space Research Organization (ISRO) was quoted as having said: "If the government desires us to produce a IRBM [intermediate-range ballistic missile], we can." [78]

[15] The scientific director of Brazil's Centre of Physical Research said that "Brazil already has the necessary conditions for building its first atomic bomb" [79].

the construction of a large uranium-enrichment plant in South Africa, expected to cost over $1 billion.[16]

Even some parties to the NPT have indicated that under certain circumstances they might shed the obligations contracted under the treaty. Thus the Shah of Iran said that if other countries in the region came into possession of nuclear weapons, Iran would also have to acquire them [94]. The President of the Republic of Korea stated that his country would develop its own nuclear weapons,[17] if the US "nuclear umbrella" were withdrawn [96]. And the Libyan President expressed the opinion that in the future "atomic weapons will be like traditional ones, possessed by every state according to its potential. We will have our share of this new weapon" [97]. Other countries may have similar ambitions, even though they have not voiced them publicly.

Summary and conclusions

The number of parties to the NPT is approaching 100 and includes many highly industrialized countries. Of particular importance is the participation of the non-nuclear-weapon members of Euratom. This may be taken as evidence that the non-proliferation idea has been accepted by a substantial portion of the international community. However, the objective of the NPT, that of preventing an increase in the number of states with nuclear-weapon capability, has not been achieved. The explosion of a nuclear device by a non-nuclear-weapon state in 1974 marked the emergence of a sixth power belonging to the category of countries the treaty had intended to restrict to five. Several other countries still keep their nuclear-weapon option open. The behaviour of non-parties to the NPT is bound to influence the behaviour of the parties. The latter have the right to withdraw from the treaty on three months' notice, and some could do so without exposing themselves to great political risks.

Since the temptations to "go nuclear" are generated *pari passu* with the spread of nuclear technology,[18] especially with the growing rate of production and availability of plutonium,[19] the non-proliferation régime will be in

[16] The UN Special Committee against *Apartheid* appealed to all governments to withhold any assistance to South Africa in connection with the latter's plans to build a uranium enrichment plant. The West German government stated that there existed no "official" cooperation in the nuclear field between FR Germany and South Africa [93].

[17] It was only after strong representations had been made by the USA that the South Korean government decided to suspend its plans to acquire a French pilot plutonium reprocessing plant [95].

[18] In 1970, total nuclear power capacity installed throughout the world amounted to 16 300 MW. By 1980 it is expected to be over 220 000 MW [98]. Over half of the nuclear power reactors will then be in non-nuclear-weapon states [99]. The IAEA estimates that by 1985 about 20 per cent of the world's electrical energy will be produced by nuclear power plants [100].

[19] It will be noted that a country wishing to manufacture nuclear explosives could do so from a research reactor using natural uranium and heavy water; nuclear power stations are not necessary. It is even easier to process fuel from a research reactor to extract plutonium than to process fuel strongly irradiated from a power reactor.

constant danger as long as the NPT has not been subscribed to by all states having the potential to manufacture nuclear explosives. Only such universal adherence to the NPT could reinforce the legal barrier against further nuclear-weapon dissemination. The 1975 Review Conference provided an opportunity to promote this goal through concrete measures directed at both the parties and the non-parties to the NPT:

Pressure could have been brought to bear upon non-parties by denying them the advantages that the parties enjoy under the treaty.

The parties could have been granted greater assistance than heretofore to develop peaceful uses of nuclear energy.

Participation in the treaty could have been made more attractive if it implied increased security for the participants.

All this could have been achieved through agreed statements of understanding and/or international instruments complementary to the NPT, without modifying the text of the treaty, but it was not. The Conference has revealed profound differences in the understanding of the meaning of the NPT. It became clearer than ever before that the nuclear-weapon powers consider the NPT as an end in itself, while all, or almost all, other parties look at it as a transitional stage in a process of nuclear disarmament. Moreover, in a competition among the developed countries to sell nuclear technology, plants and equipment, little attention is accorded to the consequences for the non-proliferation régime; the commercial interests and short-term political considerations of a few supplier states continue to take precedence over the security interests of the international community as a whole.

The Conference succeeded in not breaking down. But it failed in solving the problems essential for the survival of the NPT. Hence the vagueness and ambiguity of the declaration it issued. The declaration reaffirmed the provisions of the NPT, but ignored the fact that important stipulations were being circumvented. It promised more favourable treatment of the parties, but contained no firm undertakings to end discriminatory supplier policies. It stressed that the responsibilities and obligations of all parties must be balanced, but did not commit the nuclear powers to fulfilling their part of the bargain by reversing the nuclear arms race. The only novel features were the promotion of international arrangements to ensure the physical protection of nuclear materials, and a stimulus to the idea of setting up multinational nuclear fuel cycle centres.

Given the rigid attitude of the nuclear-weapon powers, it was perhaps unrealistic to expect more from the Conference. In addition, the poor attendance of non-nuclear-weapon states and the tactics of those who attended of presenting extravagant proposals made it easier for the great powers to block truly constructive initiatives. As a result, only the latter powers and their allies (although not all) were pleased with the outcome. Most other participants expressed deep disillusionment. Yugoslavia even went so far as to announce that it would "re-examine its attitude towards the Treaty and draw corresponding conclusions".

The next Review Conference is scheduled to take place in 1980. The fact that a date has already been set may, perhaps, speed up the process of ratification of the NPT by some countries, as was the case before and during the first conference. But, if in the intervening years no progress is made in streamlining nuclear supply policies in accordance with the spirit of the treaty, and if no halt is put to the nuclear arms race, a second meeting of the parties will be faced with a further erosion of the NPT.

II. *Other agreements*

The Antarctic Treaty

Article IX of the Antarctic Treaty provides for periodic meetings of parties to the treaty for exchanging information, consulting on matters of common interest pertaining to the Antarctic, and recommending to the governments measures in furtherance of the principles and objectives of the treaty. It will be recalled that the treaty has made the area south of 60° South Latitude a demilitarized and nuclear-free zone, freezing territorial claims and providing a basis for international scientific cooperation.[20] The eighth consecutive consultative meeting took place in Oslo on 9–20 June 1975 and was attended, as in previous years, only by the 12 original parties, namely, Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, the UK, the USA and the USSR. It focussed its attention on Antarctic resources and the effects of mineral exploration. Since economic activities are not regulated by the treaty, the meeting may be considered a turning point in attitudes toward the development of the Antarctic.

Mineral resource exploration and exploitation could adversely affect the environment of the Antarctic and of other ecosystems dependent on the Antarctic environment. But the political consequences of such activities could be even more severe. Questions would arise as to whom the resources belong, who should be entitled to license their extraction and who would receive the benefits—the country which claims sovereignty to a given sector of the continent, the parties to the Antarctic Treaty, as a group, or the whole world community? Considering that certain territorial claims in the Antarctic overlap and that some treaty powers, including the USA and the USSR, do not recognize any claims to the area, there are no easy answers to these queries, and the Oslo meeting did not attempt to provide them. It recognized, however, the need for restraint, and urged states and persons to

[20] For the text of the Antarctic Treaty, see *SIPRI Yearbook 1973*, pp. 487–93.

refrain from actions of commercial exploration and exploitation while agreed solutions were being sought to the problems raised by the possible presence of valuable mineral resources in the Antarctic Treaty area. The recommendation was that the problem of the Antarctic resourccs should be "fully studied in all its aspects" in relation to the treaty and be the subject of consultation among governments with a view to convening a special meeting in 1976 (Recommendation VIII-14 of the Antarctic Treaty Eighth Consultative Meeting). It remains to be seen how extensive these resources are, and whether their recovery is economically feasible. Those parties which are least technologically or economically prepared to engage in exploitation of Antarctic resources may not be particularly interested in finding early solutions. But, unless the resource problem is satisfactorily resolved before actual exploitation begins, the treaty, which is now an instrument for maintaining peace and preventing the region from becoming the scene or object of international discord, could be in serious jeopardy: an acute conflict of interests among states may bring about a collapse of the Antarctic arms control provisions.

Under the item entitled "Man's impact on the Antarctic environment", the consultative meeting decided to reaffirm the treaty prohibition on the disposal of nuclear waste in the Antarctic (Recommendation VIII-12 of the Antarctic Treaty Eighth Consultative Meeting). The reaffirmation was deemed necessary in view of suggestions made in recent years that isolation of radioactive waste produced in the course of nuclear energy generation might be effected through burying the waste in the Antarctic ice sheet. In a special statement attached to the report of the meeting, the Australian representative expressed the view that safe disposal of radioactive waste in the ice sheet "cannot be guaranteed on the basis of existing knowledge".

The meeting also recommended detailed studies of the Antarctic marine living resources with a view to adopting effective measures for their conservation (Recommendation VIII-10 of the Antarctic Treaty Eighth Consultative Meeting).

Recommendations issued by the consultative meetings are addressed to governments party to the Antarctic Treaty, which may or may not endorse them. In any event, they are not and cannot be binding on non-parties. Article X of the Antarctic Treaty places a responsibility upon the contracting parties to exert appropriate efforts, consistent with the Charter of the United Nations, to ensure that no one engages in any activity in the Antarctic contrary to the principles or purposes of the treaty. But in the case of exploration and exploitation of economic resources it cannot be claimed that these activities are "contrary to the principles or purposes" of the treaty.

To prevent a developed country not bound by the Antarctic Treaty from conducting activities prohibited by the treaty would be difficult. But it could prove even more difficult to impose upon non-parties the decisions adopted by a restricted group of states, and dealing with matters not covered by the treaty at all, whether or not such decisions are decreed to form an integral part of the treaty régime. These considerations must have been on the mind of the participants in the Oslo meeting when they reaffirmed a 1972 recommendation that states which are not contracting parties to the treaty should be invited to accede to the treaty, and when they urged states that had or would become parties to approve the recommendations adopted at consultative meetings (Recommendation VIII-8 of the Antarctic Treaty Eighth Consultative Meeting). Significantly enough the invitation to accede was addressed only to non-parties conducting substantial or continuing activities or presenting territorial claims in the Antarctic Treaty area.

By 31 December 1975, there were no more than 19 parties, with Brazil being the only new accession in 1975, and a number of recommendations issued by consultative meetings had not been approved by the governments. To widen the adherence to the treaty, one would have to make it attractive to as many states as possible. One way to achieve this could be the abolition of the special status which the founder members enjoy under the treaty and the enlargement of the circle of participants in the consultative meetings. The present requirements for becoming a full-fledged party seem to be excessively restrictive.[21]

The next consultative meeting will be held in London in 1977.

The Partial Test Ban Treaty

In 1975, for the first time since the conclusion of the Partial Test Ban Treaty, no nuclear explosions were reported to have been carried out in the atmosphere, in outer space or under water, that is, in the environments covered by the treaty. All 33 explosions (according to preliminary data) were conducted underground: 16 by the USA; 14 by the USSR; 2 by France; and 1 by China. It should be noted that from 1967 to 1974, France had been engaged exclusively in atmospheric testing, while for China the 1975 underground test was only the second such test since its nuclear-weapon testing programme started in 1964. Nevertheless, it is not likely that either country would join the Partial Test Ban Treaty, even though the government of France has recently unilaterally committed itself not to conduct further tests above ground. A nuclear explosion carried out by China in January 1976 was again in the atmosphere.

As regards US nuclear explosions in 1975, it is remarkable that their yields were higher than a year before: five tests were in the range of 200–1 000 kt, while in 1974 none exceeded 200 kt. High-yield testing by the USA continued in 1976: of nine explosions carried out during the first 14 weeks of this year (by 31 March), seven were announced to be in the 200- to 1 000-kt range. This suggests that efforts have been made to experiment

[21] For a critical analysis of the Antarctic Treaty, see *SIPRI Yearbook 1973*.

with those types of warheads whose yield exceeds the limit of 150 kt agreed under the 1974 US-Soviet Threshold Test Ban Treaty (TTBT) which was due to enter into force on 31 March 1976.[22] Less is known about the yields of Soviet explosions, but there is no doubt that in 1975 at least two were in the multimegaton range.

The thirtieth UN General Assembly condemned all nuclear-weapon tests, in whatever environment they may be conducted, and emphasized the urgency of reaching agreement on the conclusion of an effective comprehensive test ban [101].

The estimate is that since 1945 a total of 1 045 nuclear explosions have been carried out in all environments (see appendices 9B and 9C).

The Treaty of Tlatelolco

In 1975 one new state, Grenada, joined the Treaty for the prohibition of nuclear weapons in Latin America and waived the requirements for the entry into force of the treaty, as laid down in Article 28. (See appendix 9E for a summary of the relevant provisions of the Treaty of Tlatelolco.) Since also Trinidad and Tobago, which had ratified the treaty in 1970, waived the above requirements last year, by 31 December 1975 as many as 20 Latin American countries had been fully bound by the ban on the testing, use, manufacture or acquisition by other means, as well as the receipt, storage, installation, deployment and any form of possession of nuclear weapons. Four states in the region—the Bahamas, Cuba, Guyana and Surinam—had remained outside the Treaty of Tlatelolco, while Argentina, which had signed but not ratified the treaty, and Brazil and Chile, which had ratified the treaty but had not waived the requirements for its entry into force, were still not full parties.

Argentina and Brazil are the two most advanced Latin American nations in the field of nuclear technology. They are also the only nations in the region which have declared the intention of acquiring nuclear explosive devices. Their continued refusal to accept the obligations under the Treaty of Tlatelolco weakens the effectiveness of the treaty and constitutes a threat to its viability.

No changes occurred in the status of the implementation of Additional Protocols I and II of the treaty. The thirtieth UN General Assembly urged the USSR to sign and ratify Protocol II which provides for an undertaking by nuclear-weapon states to respect the statute of military denuclearization of Latin America, and not to use or threaten to use nuclear weapons against the parties to the treaty [102]. China, France, the UK and the USA are

[22] For an analysis of the TTBT, see *SIPRI Yearbook 1975*, pp. 405–16.

already party to this protocol. The Secretary-General of the Agency for the prohibition of nuclear weapons in Latin America (OPANAL) expressed the opinion that also India fell under the category of states contemplated by the treaty to become parties to Additional Protocol II. He put forward the following arguments:

> Notwithstanding the declared intentions with which a nuclear explosive device was developed by the Indian Government, from the point of view of the Treaty of Tlatelolco we are concerned only with one indisputable fact: India has developed a device which according to all information available fits the definition of a nuclear weapon contained in Article 5 of the Treaty, that is, a "device which is capable of releasing nuclear energy in an uncontrolled manner and which has a group of characteristics that are appropriate for use for warlike purposes" [13].

But India claims not to have acquired a nuclear weapon and does not consider itself to be affected by the Treaty of Tlatelolco.

The UN General Assembly also urged France and the USA to sign and ratify Additional Protocol I [103], under which the extra-continental or continental states responsible *de jure* or *de facto* for territories lying within the limits of the geographical zone established by the treaty undertake to apply the statute of military denuclearization to such territories. The UK and the Netherlands ratified it in 1969 and 1971, respectively.

To bring additional pressure to bear on the nuclear-weapon powers, the fourth General Conference of OPANAL decided to bring the matter of adherence to Additional Protocols I and II before the UN Security Council, in case the powers in question did not sign those instruments before 14 February 1977, the tenth anniversary of the signing of the Treaty of Tlatelolco.

The Sea-Bed Treaty

Article VII of the Treaty on the prohibition of the emplacement of nuclear and other weapons of mass destruction on the sea-bed and the ocean floor and in the subsoil thereof provides that five years after the entry into force of the treaty a conference of the parties shall be held at Geneva. Since the treaty will have been in force for five years on 18 May 1977, it is expected that the conference will take place soon after that date. Its task will be to review the operation of the treaty in order to assure that the purposes of the preamble and the provisions are being realized. The review must take into account any relevant technological developments. The thirtieth session of the UN General Assembly noted that "after appropriate consultation" a preparatory committee of parties is to be arranged and expressed the hope for the widest possible adherence to the treaty [104]. By 31 December 1975, 58 states had ratified or acceded to the Sea-Bed Treaty.

The Geneva Protocol for the prohibition of chemical and bacteriological warfare

On 17 June 1975, 50 years had elapsed since the signing in Geneva of a protocol for the prohibition of the use in war of asphyxiating, poisonous and other gases and of bacteriological methods of warfare. The agreement was prompted by the shocking experience of World War I during which at least 125 000 tons of toxic chemicals were used and the toxic gas casualties numbered as many as 1 300 000.

The historic significance of the Geneva Protocol lies in the fact that an international legal constraint, "binding alike the conscience and the practice of nations", was imposed on acts which were generally held in abhorrence and had been condemned by the opinion of the civilized world. Its weakness, however, is the same as that of other laws of war: rules of conduct which are set for belligerents in time of peace may not resist the pressure of military expedience generated in the course of hostilities. Indeed, since 1925 chemical weapons have been used on several occasions. But on each such occasion, the extent of worldwide indignation and censure testified to the immutability of the generally recognized standard of international law, as embodied in the Geneva Protocol. It is, in great part, due to the Protocol that the history of chemical warfare since World War I has been one of relative restraint and that no bacteriological weapons have been used in modern times. Nevertheless, the danger that the weapons prohibited by the Geneva Protocol may, under certain circumstances, be resorted to will not disappear as long as they exist in the military arsenals of states.

During the past 50 years, new, more toxic compounds than those employed in World War I have been discovered, and the means of their dispersion considerably improved. Were these new weapons ever to be used on a large scale, they would cause a tremendous loss of human life, much greater than ever before, with civilians being even more vulnerable than the military; the whole structure of society and the environment in which we live could be affected. Only a complete cessation of the development and production as well as the destruction of the existing stockpiles of the weapons in question could remove this danger. The first step in this direction has already been made with the signing of the biological disarmament convention. However, an agreement on the prohibition of the development, manufacture and stockpiling of chemical weapons, which, from the military point of view, are more important than biological weapons, is still pending in spite of years of international negotiations. In the meantime a new danger has arisen, that of the possible introduction of the so-called binary nerve-gas munition. This is a munition filled with two or more non-toxic chemicals that mix and react when the munition is delivered to the target, the reaction product being a nerve gas. Once these weapons are deployed, the difficulties experienced at the chemical disarmament negotiations with regard to verification of compliance may increase to the point of making an agreement well-nigh impossible. Speedy measures in this field are, therefore, urgently needed. But they should not hamper further action aimed at the strengthening of the Geneva Protocol.

With the recent ratification by the USA, all militarily important states are already bound by the Geneva Protocol, but many states are still missing; only 94 nations are party to it. (For the list of parties and non-parties, see appendix 9F.) And yet, chemical warfare is more likely to occur between small countries than among the great powers. Universal adherence to the Geneva Protocol, as has been repeatedly recommended by the UN General Assembly, would reinforce it considerably. In addition, the parties should accept the application of the protocol to *all* armed conflicts.

A formal reaffirmation by individual states of the comprehensive nature of the ban under the Geneva Protocol would also seem desirable. It would have to be made in accordance with the 1969 UN General Assembly resolution stating that the protocol prohibitions apply to the use of *all* biological and chemical methods of warfare, regardless of any technical developments.

Furthermore, the reservations attached to the protocol by a number of states and limiting its applicability to nations party to it, and to first use only, should be withdrawn to make the prohibitions more universal and absolute. In any event, the reservation concerning the right to use bacteriological methods of warfare against non-parties, or in retaliation, is clearly incompatible with the convention for the complete elimination of biological weapons, and should be declared null and void.

And, finally, the effectiveness of the Geneva Protocol would increase if an international procedure were agreed upon to verify allegations of breaches. Past experience has clearly demonstrated the need for such a procedure.

The BW Convention

The Convention on the prohibition of the development, production and stockpiling of bacteriological (biological) and toxin weapons and on their destruction entered into force on 26 March 1975. Under Article II of the convention, the parties are obliged to destroy, or to divert to peaceful purposes, all prohibited agents, toxins, weapons, equipment and means of delivery in their possession, not later than nine months after the convention becomes effective. Accordingly, the USA stated that "the entire United States stockpile of biological and toxin agents and weapons has already been destroyed, and our former biological warfare facilities have been converted to peaceful uses" [105]. The United Kingdom said that it had "no stocks of biological weapons" and that under the legislation in force in the areas covered by the UK ratification, it was now a criminal offence for anyone to be involved in the activities prohibited by the convention [106]. The USSR made the following announcement:

In accordance with the legislation and practice of the Soviet Union, compliance with the provisions of the Convention on the Prohibition of Bacteriological (Biological) and Toxin Weapons, which was ratified by decree of the Presidium of the Supreme Soviet of the USSR dated 11 February 1975, is guaranteed by the appropriate State institutions of the USSR. At present, the Soviet Union does not possess any bacteriological (biological) agents and toxins, weapons, equipment or means of delivery, as referred to in article I of the Convention [107].

Verification of the accuracy of such statements has not been envisaged in the convention.

In recent months, some press reports alleged that the US presidential directive on the destruction of biological weapons had been circumvented [108] and that the Soviet Union was building new facilities for the manufacture and storage of biological weapons [109]. Any party to the convention which finds that any other party is acting in breach of obligations deriving from the provisions of the convention may lodge a complaint with the UN Security Council. By 31 December 1975 no such complaint had been submitted.

The Helsinki document on confidence-building in Europe

The only concrete provision of the document "on confidence-building measures and certain aspects of security and disarmament", included in the Final Act of the Conference on Security and Cooperation in Europe, which was signed at Helsinki on 1 August 1975, concerns prior notification of major military manoeuvres. (For an analysis of the document, see chapter 8, section V.) The experience of the first few months after the conclusion of the conference showed that this provision, which "rests upon a voluntary basis", is being implemented. Notifications were given both by NATO countries and the USSR, as well as the nonaligned European states, mostly within the prescribed time limit. In addition to information about the designation, purpose, duration and area of the manoeuvres, as well as the number of troops engaged, the notifications contained data relating to the type and components of forces as well as the period of their absence from garrisons. In a number of cases, notification was given of even smaller-scale manoeuvres, involving fewer than the 25 000 troops envisaged in the Helsinki document. It is also significant that the Soviet Union invited observers from NATO countries to attend its manoeuvres held in January 1976; similar invitations were extended earlier by the NATO powers to the Eastern European states. (For the list and contents of notifications, see appendix 9G.)

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Appendix 9A

Final declaration of the Review Conference of the parties to the Treaty on the non-proliferation of nuclear weapons, 30 May 1975

PREAMBLE

The States Party to the Treaty on the Non-Proliferation of Nuclear Weapons which met in Geneva in May 1975, in accordance with the Treaty, to review the operation of the Treaty with a view to assuring that the purposes of the Preamble and the provisions of the Treaty are being realized,

Recognizing the continuing importance of the objectives of the Treaty,

Affirming the belief that universal adherence to the Treaty would greatly strengthen international peace and enhance the security of all States,

Firmly convinced that, in order to achieve this aim, it is essential to maintain, in the implementation of the Treaty, an acceptable balance of mutual responsibilities and obligations of all States Party to the Treaty, nuclear-weapon and non-nuclear-weapon States,

Recognizing that the danger of nuclear warfare remains a grave threat to the survival of mankind,

Convinced that the prevention of any further proliferation of nuclear weapons or other nuclear explosive devices remains a vital element in efforts to avert nuclear warfare, and that the promotion of this objective will be furthered by more rapid progress towards the cessation of the nuclear arms race and the limitation and reduction of existing nuclear weapons, with a view to the eventual elimination from national arsenals of nuclear weapons, pursuant to a Treaty on general and complete disarmament under strict and effective international control,

Recalling the determination expressed by the Parties to seek to achieve the discontinuance of all test explosions of nuclear weapons for all time,

Considering that the trend towards détente in relations between States provides a favourable climate within which more significant progress should be possible towards the cessation of the nuclear arms race,

Noting the important role which nuclear energy can, particularly in changing economic circumstances, play in power production and in contributing to the progressive elimination of the economic and technological gap between developing and developed States,

Recognizing that the accelerated spread and development of peaceful applications of nuclear energy will, in the absence of effective safeguards, contribute to further proliferation of nuclear explosive capability,

Recognizing the continuing necessity of full co-operation in the application and improvement of International Atomic Energy Agency (IAEA) safeguards on peaceful nuclear activities,

Recalling that all Parties to the Treaty are entitled to participate in the fullest possible exchange of scientific information for, and to contribute alone or in co-operation with other States to, the further development of the applications of atomic energy for peaceful purposes,

Reaffirming the principle that the benefits of peaceful applications of nuclear technology, including any technological by-products which may be derived by nuclear-weapon States from the development of nuclear explosive devices, should be available for peaceful purposes to all Parties to the Treaty, and

Recognizing that all States Parties have a duty to strive for the adoption of tangible and effective measures to attain the objectives of the Treaty,

Declares as follows:

PURPOSES

The States Party to the Treaty reaffirm their strong common interest in averting the further proliferation of nuclear weapons. They reaffirm their strong support for the Treaty, their continued dedication to its principles and objectives, and their commitment to implement fully and more effectively its provisions.

They reaffirm the vital role of the Treaty in international efforts

- to avert further proliferation of nuclear weapons
- to achieve the cessation of the nuclear arms race and to undertake effective measures in the direction of nuclear disarmament, and
- to promote co-operation in the peaceful uses of nuclear energy under adequate safeguards.

REVIEW OF ARTICLES I AND II

The review undertaken by the Conference confirms that the obligations undertaken under Articles I and II of the Treaty have been faithfully observed by all Parties. The Conference is convinced that the continued strict observance of these Articles remains central to the shared objective of averting the further proliferation of nuclear weapons.

REVIEW OF ARTICLE III

The Conference notes that the verification activities of the IAEA under Article I of the Treaty respect the sovereign rights of States and do not hamper the economic, scientific or technological development of the Parties to the Treaty or international co-operation in peaceful nuclear activities. It urges that this situation be maintained. The Conference attaches considerable importance to the continued application of safeguards under Article III, 1, on a non-discriminatory basis, for the equal benefit of all States Party to the Treaty.

The Conference notes the importance of systems of accounting for and control of nuclear material, from the standpoints both of the responsibilities of States Party to the Treaty and of co-operation with the IAEA in order to facilitate the implementation of the safeguards provided for in Article III, 1. The Conference expresses the hope that all States having peaceful nuclear activities will establish and maintain effective accounting and control systems and welcomes the readiness of the IAEA to assist States in so doing.

The Conference expresses its strong support for effective IAEA safeguards. In this context it recommends that intensified efforts be made towards the standardization and the universality of application of IAEA safeguards, while ensuring that safeguards agreements with non-nuclear-weapon States not Party to the Treaty are of adequate duration, preclude diversion to any nuclear explosive devices and contain appropriate provisions for the continuance of the application of safeguards upon re-export.

The Conference recommends that more attention and fuller support be given to the improvement of safeguards techniques, instrumentation, data-handling and implementation in order, among other things, to ensure optimum cost-effectiveness. It notes with satisfaction the establishment by the Director General of the IAEA of a standing advisory group on safeguards implementation.

The Conference emphasises the necessity for the States Party to the Treaty that have not yet done so to conclude as soon as possible safeguards agreements with the IAEA.

With regard to the implementation of Article III, 2 of the Treaty, the Conference notes that a number of States suppliers of nuclear material or equipment have adopted certain minimum, standard requirements for IAEA safeguards in connexion with their exports of certain such items to non-nuclear-weapon States not Party to the Treaty (IAEA document INF-CIRC/209 and Addenda). The Conference attaches particular importance to the condition, established by those States, of an undertaking of non-diversion to nuclear weapons or other nuclear explosive devices, as included in the said requirements.

The Conference urges that:

(a) in all achievable ways, common export requirements relating to safeguards be strengthened, in particular by extending the application of safeguards to all peaceful nuclear activities in importing States not Party to the Treaty;
(b) such common requirements be accorded the widest possible measure of acceptance among all suppliers and recipients;

(c) all Parties to the Treaty should actively pursue their efforts to these ends.

The Conference takes note of:

(a) the considered view of many Parties to the Treaty that the safeguards required under Article III, 2 should extend to all peaceful nuclear activities in importing States;

(b) (i) the suggestion that it is desirable to arrange for common safeguards requirements in respect of nuclear material processed, used or produced by the use of scientific and technological information transferred in tangible form to non-nuclear-weapon States not Party to the Treaty;
(ii) the hope that this aspect of safeguards could be further examined.

The Conference recommends that, during the review of the arrangements relating to the financing of safeguards in the IAEA which is to be undertaken by its Board of Governors at an appropriate time after 1975, the less favourable financial situation of the developing countries be fully taken into account. It recommends further that, on that occasion, the Parties to the Treaty concerned seek measures that would restrict within appropriate limits the respective shares of developing countries in safeguards costs.

The Conference attaches considerable importance, so far as safeguards inspectors are concerned, to adherence by the IAEA to Article VII.D of its Statute, prescribing, among other things, that "due regard shall be paid ... to the importance of recruiting the staff on as wide a geographical basis as possible"; it also recommends that safeguards training be made available to personnel from all geographic regions.

The Conference, convinced that nuclear materials should be effectively protected at all times, urges that action be pursued to elaborate further, within the IAEA, concrete recommendations for the physical protection of nuclear material in use, storage and transit, including principles relating to the responsibility of States, with a view to ensuring a uniform, minimum level of effective protection for such material.

It calls upon all States engaging in peaceful nuclear activities (i) to enter into such international agreements and arrangements as may be necessary to ensure such protection; and (ii) in the framework of their respective physical protection systems, to give the earliest possible effective application to the IAEA's recommendations.

REVIEW OF ARTICLE IV

The Conference reaffirms, in the framework of Article IV, 1, that nothing in the Treaty shall be interpreted as affecting, and notes with satisfaction that nothing in the Treaty has been identified as affecting, the inalienable right of all the Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination and in conformity with Articles I and II of the Treaty.

The Conference reaffirms, in the framework of Article IV, 2, the undertaking by all Parties to the Treaty to facilitate the fullest possible exchange of equipment, materials and scientific and technological information for the peaceful uses of nuclear energy and the right of all Parties to the Treaty to participate in such exchange and welcomes the efforts made towards that end. Noting that the Treaty constitutes a favourable framework for broadening international co-operation in the peaceful uses of nuclear energy, the Conference is convinced that on this basis, and in conformity with the Treaty, further efforts should be made to ensure that the benefits of peaceful applications of nuclear technology should be available to all Parties to the Treaty.

The Conference recognizes that there continues to be a need for the fullest possible exchange of nuclear materials, equipment and technology, including up-to-date developments, consistent with the objectives and safeguards requirements of the Treaty. The Conference reaffirms the undertaking of the Parties to the Treaty in a position to do so to co-operate in contributing, alone or together with other States or international organizations, to the further development of the applications of nuclear energy for peaceful purposes, especially in the territories of non-nuclear-weapon States Party to the Treaty, with due consideration for the needs of the developing areas of the world. Recognizing, in the context of Article IV, 2, those growing needs of developing States the Conference considers it necessary to continue and increase assistance to them in this field bilaterally and through such multilateral channels as the IAEA and the United Nations Development Programme.

The Conference is of the view that, in order to implement as fully as possible Article IV of the Treaty, developed States Party to the Treaty should consider taking measures, making contributions and establishing programmes, as soon as possible, for the provision of special assistance in the peaceful uses of nuclear energy for developing States Party to the Treaty.

The Conference recommends that, in reaching decisions on the provision of equipment, materials, services and scientific and technological information for the peaceful uses of nuclear energy, on concessional and other appropriate financial arrangements and on the furnishing of technical assistance in the nuclear field, including co-operation related to the continuous operation of peaceful nuclear facilities, States Party to the Treaty should give weight to adherence to the Treaty by recipient States. The Conference recommends, in this connexion, that any special measures of co-operation to meet the growing needs of developing States Party to the Treaty might include increased and supplemental voluntary aid provided bilaterally or through multilateral channels such as the IAEA's facilities for administering funds-in-trust and gifts-in-kind.

The Conference further recommends that States Party to the Treaty in a position to do so, meet, to the fullest extent possible, "technically sound" requests for technical assistance, submitted to the IAEA by developing States Party to the Treaty, which the IAEA is unable to finance from its own resources, as well as such "technically sound" requests as may be made by developing States Party to the Treaty which are not Members of the IAEA.

The Conference recognizes that regional or multinational nuclear fuel cycle centres may be an advantageous way to satisfy, safely and economically, the needs of many States in the course of initiating or expanding nuclear power programmes, while at the same time facilitating physical protection and the application of IAEA safeguards, and contributing to the goals of the Treaty.

The Conference welcomes the IAEA's studies in this area, and recommends that they be continued as expeditiously as possible. It considers that such studies should include, among other aspects, identification of the complex practical and organizational difficulties which will need to be dealt with in connexion with such projects.

The Conference urges all Parties to the Treaty in a position to do so to co-operate in these studies, particularly by providing to the IAEA where possible economic data concerning construction and operation of facilities such as chemical reprocessing plants, plutonium fuel fabrication plants, waste management installations, and longer-term spent fuel storage, and by assistance to the IAEA to enable it to undertake feasibility studies concerning the establishment of regional nuclear fuel cycle centres in specific geographic regions.

The Conference hopes that, if these studies lead to positive findings, and if the establishment of regional or multinational nuclear fuel cycle centres is undertaken, Parties to the Treaty in a position to do so, will co-operate in, and provide assistance for, the elaboration and realization of such projects.

REVIEW OF ARTICLE V

The Conference reaffirms the obligation of Parties to the Treaty to take appropriate measures to ensure that potential benefits from any peaceful applications of nuclear explosions are made available to non-nuclear-weapon States Party to the Treaty in full accordance with the provision of Article V and other applicable international obligations. In this connexion, the Conference also reaffirms that such services should be provided to non-nuclear-weapon States Party to the Treaty on a non-discriminatory basis and that the charge to such Parties for the explosive devices used should be as low as possible and exclude any charge for research and development.

The Conference notes that any potential benefits could be made available to non-nuclear-weapon States not Party to the Treaty by way of nuclear explosion services provided by nuclear-weapon States, as defined by the Treaty, and conducted under the appropriate international observation and international procedures called for in Article V and in accordance with other applicable international obligations. The Conference considers it imperative that access to potential benefits of nuclear explosions for peaceful purposes not lead to any proliferation of nuclear explosive capability.

The Conference considers the IAEA to be the appropriate international body, referred to in Article V of the Treaty, through which potential benefits from peaceful applications of nuclear explosions could be made available to any non-nuclear-weapon State. Accordingly, the Conference urges the IAEA to expedite work on identifying and examining the important legal issues involved in, and to commence consideration of, the structure and content of the special international agreement or agreements contemplated in Article V of the Treaty, taking into account the views of the Conference of the Committee on Disarmament (CCD) and the United Nations General Assembly and enabling States Party to the Treaty but not Members of the IAEA which would wish to do so to participate in such work.

The Conference notes that the technology of nuclear explosions for peaceful purposes is still at the stage of development and study and that there are a number of interrelated international legal and other aspects of such explosions which still need to be investigated.

The Conference commends the work in this field that has been carried out within the IAEA and looks forward to the continuance of such work pursuant to United Nations General Assembly resolution 3261 D (XXIX). It emphasizes that the IAEA should play the central role in matters relating to the provision of services for the application of nuclear explosions for peaceful purposes. It believes that the IAEA should broaden its consideration of this subject to encompass, within its area of competence, all aspects and implications of the practical applications of nuclear explosions for peaceful purposes. To this end it urges the IAEA to set up appropriate machinery within which intergovernmental discussion can take place and through which advice can be given on the Agency's work in this field.

The Conference attaches considerable importance to the consideration by the CCD, pursuant to United Nations General Assembly resolution 3261 D (XXIX) and taking due account of the views of the IAEA, of the arms control implications of nuclear explosions for peaceful purposes.

The Conference notes that the thirtieth session of the United Nations General Assembly will receive reports pursuant to United Nations General Assembly resolution 3261 D (XXIX) and will provide an opportunity for States to discuss questions related to the application of nuclear explosions for peaceful purposes. The Conference further notes that the results of discussion in the United Nations General Assembly at its thirtieth session will be available to be taken into account by the IAEA and the CCD for their further consideration.

REVIEW OF ARTICLE VI

The Conference recalls the provisions of Article VI of the Treaty under which all Parties undertook to pursue negotiations in good faith on effective measures relating

- to the cessation of the nuclear arms race at an early date and
- to nuclear disarmament and
- to a treaty on general and complete disarmament under strict and effective international control.

While welcoming the various agreements on arms limitation and disarmament elaborated and concluded over the last few years as steps contributing to the implementation of Article VI of the Treaty, the Conference expresses its serious concern that the arms race, in particular the nuclear arms race, is continuing unabated.

The Conference therefore urges constant and resolute efforts by each of the Parties to the Treaty, in particular by the nuclear-weapon States, to achieve an early and effective implementation of Article VI of the Treaty.

The Conference affirms the determination expressed in the preamble to the 1963 Partial Test Ban Treaty and reiterated in the preamble to the Non-Proliferation Treaty to achieve the discontinuance of all test explosions of nuclear weapons for all time. The Conference expresses the view that the conclusion of a treaty banning all nuclear weapons tests is one of the most important measures to halt the nuclear arms race. It expresses the hope that the nuclear-weapon States Party to the Treaty will take the lead in reaching an early solution of the technical and political difficulties on this issue. It appeals to these States to make every effort to reach agreement on the conclusion of an effective comprehensive test ban. To this end, the desire was expressed by a considerable number of delegations at the Conference that the nuclear-weapon States Party to the Treaty should as soon as possible enter into an agreement, open to all States and containing appropriate provisions to ensure its effectiveness, to halt all nuclear weapons tests of adhering States for a specified time, whereupon the terms of such an agreement would be reviewed in the light of the opportunity, at that time, to achieve a universal and permanent cessation of all nuclear weapons tests. The Conference calls upon the nuclear-weapon States signatories of the Treaty on the Limitation of Underground Nuclear Weapons tests, meanwhile, to limit the number of their underground nuclear weapons tests to a minimum. The Conference believes that such steps would constitute an incentive of particular value to negotiations for the conclusion of a treaty banning all nuclear weapons test explosions for all time.

The Conference appeals to the nuclear-weapon States Parties to the negotiations on the limitation of strategic arms to endeavour to conclude at the earliest possible date the new agreement that was outlined by their leaders in November 1974. The Conference looks forward to the commencement of follow-on negotiations on further limitations of, and significant reductions in, their nuclear weapons systems as soon as possible following the conclusion of such an agreement.

The Conference notes that, notwithstanding earlier progress, the CCD has recently been unable to reach agreement on new substantive measures to advance the objectives of Article VI of the Treaty. It urges, therefore, all members of the CCD Party to the Treaty, in particular the nuclear-weapon States Party, to increase their efforts to achieve effective disarmament agreements on all subjects on the agenda of the CCD.

The Conference expresses the hope that all States Party to the Treaty, through the United Nations and the CCD and other negotiations in which they participate, will work with determination towards the conclusion of arms limitation and disarmament agreements which will contribute to the goal of general and complete disarmament under strict and effective international control.

The Conference expresses the view that, disarmament being a matter of general concern, the provision of information to all governments and peoples on the situation in the field of the arms race and disarmament is of great importance for the attainment of the aims of Article VI. The Conference therefore invites the United Nations to consider ways and means of improving its existing facilities for collection, compilation and dissemination of information on disarmament issues, in order to keep all governments as well as world public opinion properly informed on progress achieved in the realization of the provisions of Article VI of the Treaty.

REVIEW OF ARTICLE VII AND THE SECURITY OF NON-NUCLEAR WEAPON STATES

Recognizing that all States have need to ensure their independence, territorial integrity and sovereignty, the Conference emphasizes the particular importance of assuring and strengthening the security of non-nuclear-weapon States Parties which have renounced the acquisition of nuclear weapons. It acknowledges that States Parties find themselves in different security situations and therefore that various appropriate means are necessary to meet the security concerns of States Parties.

The Conference underlines the importance of adherence to the Treaty by non-nuclear-weapon States as the best means of reassuring one another of their renunciation of nuclear weapons and as one of the effective means of strengthening their mutual security.

The Conference takes note of the continued determination of the Depositary States to honour their statements, which were welcomed by the United Nations Security Council in resolution 255 (1968), that, to ensure the security of the non-nuclear-weapon States Party to the Treaty, they will provide or support immediate assistance, in accordance with the Charter, to any non-nuclear-weapon State Party to the Treaty which is a victim of an act or an object of a threat of aggression in which nuclear weapons are used.

The Conference, bearing in mind Article VII of the Treaty, considers that the establishment of internationally recognized nuclear-weapon-free zones on the initiative and with the agreement of the directly concerned States of the zone, represents an effective means of curbing the spread of nuclear weapons, and could contribute significantly to the security of those States. It welcomes the steps which have been taken toward the establishment of such zones.

The Conference recognizes that for the maximum effectiveness of any Treaty arrangements for establishing a nuclear-weapon-free zone the co-operation of the nuclear-weapon States is necessary. At the Conference it was urged by a considerable number of delegations that nuclear-weapon States should provide, in an appropriate manner, binding security assurances to those States which become fully bound by the provisions of such regional arrangements.

At the Conference it was also urged that determined efforts must be made especially by the nuclear weapon States Party to the Treaty, to ensure the security of all non-nuclear-weapon States Parties. To this end the Conference urges all States, both nuclear-weapon States and non-nuclear-weapon States to refrain, in accordance with the Charter of the United Nations, from the threat or the use of force in relations between States, involving either nuclear or non-nuclear-weapons. Additionally, it stresses the responsibility of all Parties to the Treaty and especially the nuclear-weapon States, to take effective steps to strengthen the security of non-nuclear-weapon States and to promote in all appropriate fora the consideration of all practical means to this end, taking into account the views expressed at this Conference.

REVIEW OF ARTICLE VIII

The Conference invites States Party to the Treaty which are Members of the United Nations to request the Secretary-General of the United Nations to include the following item in the provisional agenda of the thirty-first session of the General Assembly: "Implementation of the conclusion of the first Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons".

The States Party to the Treaty participating in the Conference propose to the Depositary Governments that a second Conference to review the operation of the Treaty be convened in 1980.

The Conference accordingly invites States Party to the Treaty which are Members of the United Nations to request the Secretary-General of the United Nations to include the following item in the provisional agenda of the thirty-third session of the General Assembly: "Implementation of the conclusions of the first Review Conference of the Parties to the Treaty on the

Non-Proliferation of Nuclear Weapons and establishment of a preparatory committee for the second Conference."

REVIEW OF ARTICLE IX

The five years that have passed since the entry into force of the Treaty have demonstrated its wide international acceptance. The Conference welcomes the recent progress towards achieving wider adherence. At the same time, the Conference notes with concern that the Treaty has not as yet achieved universal adherence. Therefore, the Conference expresses the hope that States that have not already joined the Treaty should do so at the earliest possible date.

Appendix 9B

Preliminary list of announced and presumed nuclear explosions in 1975

Note:

1. The following sources have been used in compiling the list:
(*a*) Research Institute of the Swedish National Defence,
(*b*) US Energy Research and Development Administration (ERDA),
(*c*) US Geological Survey,
(*d*) Press reports.

2. The event marked with an asterisk * may be part of a programme for peaceful uses of nuclear explosions in view of its location outside the usual weapon testing sites.

3. m_b (body wave magnitudes), M_s (surface wave magnitudes) indicate the size of the event; the data have been provided by the Hagfors Observatory of the Research Institute of the Swedish National Defence.

4. The yields of explosions are ERDA announcements or press reports.

5. In the case of very weak events, it is impossible to distinguish, through seismological methods only, between chemical and nuclear explosions.

Date *GMT*	Latitude *deg*	Longitude *deg*	Region	m_b	M_s	Yield *kt*
USA						
28 Feb	37.106 N	116.056 W	S Nevada	6.0	4.3	20–200
7 Mar	37.134 N	116.084 W	S Nevada	5.6		20–200
5 Apr	37.188 N	116.214 W	S Nevada	5.0		<20
24 Apr	37.116 N	116.087 W	S Nevada			20–200
30 Apr	37.109 N	116.029 W	S Nevada	5.4		20–200
14 May	37.0 N	116.3 W	S Nevada	6.3	4.7	200–1 000
3 Jun	37.1 N	116.4 W	S Nevada	6.1	4.5	20–200
3 Jun	37.0 N	115.9 W	S Nevada	5.9	4.2	20–200
19 Jun	37.2 N	116.2 W	S Nevada	6.3	5.0	200–1 000
26 Jun	37.1 N	116.3 W	S Nevada	6.5	5.2	200–1 000
6 Sep	36.8 N	116.2 W	S Nevada			<20
24 Oct	37.0 N	115.9 W	S Nevada	5.1		<20
28 Oct	37.0 N	116.4 W	S Nevada	6.4	5.3	200–1 000
20 Nov	37.2 N	116.3 W	S Nevada	6.4	4.6	200–1 000
26 Nov	37.3 N	115.4 W	S Nevada			<20
20 Dec	37.2 N	116.1 W	S Nevada	5.9		20–200
USSR						
20 Feb	49.820 N	78.078 E	E Kazakh	6.1		
11 Mar	49.787 N	78.251 E	E Kazakh	5.9		
25 Apr	47.5 N	47.5 E	W Russia*	4.9		
27 Apr	49.990 N	78.984 E	E Kazakh	6.7	3.9	
8 Jun	49.764 N	78.089 E	E Kazakh	6.0	3.6	
30 Jun	50.3 N	78.8 E	E Kazakh	5.9		
7 Aug	49.813 N	78.240 E	E Kazakh	5.4		20–200
23 Aug	73.4 N	54.3 E	Novaya Zemlya		5.4	Multimegaton
5 Oct			E Kazakh	4.6		
18 Oct	71.0 N	53.6 E	Novaya Zemlya		5.2	
21 Oct	73.4 N	54.3 E	Novaya Zemlya		5.3	Multimegaton
29 Oct	50.0 N	79.0 E	E Kazakh	6.7	3.6	20–200
13 Dec	49.9 N	78.4 E	E Kazakh	5.2		
25 Dec	50.1 N	79.1 E	E Kazakh	6.9		
France						
5 Jun			Fangataufa			10
26 Nov			Fangataufa			
China						
27 Oct	41 N	88 E	Lop Nor	5.0		<20

Appendix 9C

Nuclear explosions, 1945–75 (announced and presumed)

a atmospheric
u underground and underwater (the latter are given within parentheses)

Year	USA a	USA u	USSR a	USSR u	United Kingdom a	United Kingdom u	France a	France u	China a	China u	India a	India u	Total
I. 1945–5 August 1963 (the signing of the Partial Test Ban Treaty)													
1945	3	0											3
1946	1	1 (1)											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	2	0	2	0							15
1954	6	0	2	0	0	0							8
1955	13	2 (1)	4	0	0	0							19
1956	14	0	7	0	6	0							27
1957	26	2	13	0	7	0							48
1958	53	13 (2)	26	0	5	0							97
	155	19 (4)	57	0	21	0							252
			+33[a]										33[a]
1945–1958	155	19 (4)	90	0	21	0							285
1959	0	0	0	0	0	0							0
1960	0	0	0	0	0	0	3	0					3
1961	0	9	30	2 (1)	0	0	1	1					43
1962	38	50 (1)	41	1	0	2	0	1					133
1963 –5 Aug 1963	0	11	0	0	0	0	0	2					13
1959 – 5 Aug 1963	38	70 (1)	71	3 (1)	0	2	2	4					192
1945–1958	155	19 (4)	90	0	21	0	0	0					285
1945–5 Aug 1963	*193*	*89 (5)*	*161*	*3 (1)*	*21*	*2*	*4*	*4*					*477*
II. 5 August 1963–31 December 1975													
5 Aug 1963 –Dec 1963	0	14	0	0	0	0	0	1					15
1964	0	28	0	6	0	1	0	3	1	0			39
1965	0	28	0	9	0	1	0	4	1	0			43
1966	0	40	0	14	0	0	5	1	3	0			63
1967	0	28	0	14	0	0	3	0	2	0			47
1968	0	37[b]	0	12	0	0	5	0	1	0			55
1969	0	28	0	15	0	0	0	0	1	1			45
1970	0	30	0	13	0	0	8	0	1	0			52
1971	0	12	0	18	0	0	5	0	1	0			36
1972	0	7	0	22	0	0	3	0	2	0			34
1973	0	9	0	14	0	0	5	0	1	0			29
1974	0	6[c]	0	20	0	1	7	0	1	0	0	1	36[f]
1975	0	16	0	14	0	0	0	2	0	1	0	0	33
5 Aug 1963–1975	*0*	*283*	*0*	*171*	*0*	*3*	*41*	*11*	*15*	*2*	*0*	*1*	*527[f]*
		+23[d]											*23[d]*
		+18[e]											*18[e]*

Year	USA		USSR		United Kingdom		France		China		India		Total
	a	u	a	u	a	u	a	u	a	u	a	u	
III. 1945–31 December 1975													
1945–5 Aug 1963	*193*	*89(5)*	*161*	*3(1)*	*21*	*2*	*4*	*4*	*0*	*0*	*0*	*0*	*477*
5 Aug 1963–1975	*0*	*283*	*0*	*171*	*0*	*3*	*41*	*11*	*15*	*2*	*0*	*1*	*527*[f]
		+23[d]											*23*[d]
		+18[e]											*18*[e]
1945–1975	**193**	**413 (5)**	**161**	**174(1)**	**21**	**5**	**45**	**15**	**15**	**2**	**0**	**1**	**1 045**[f]

[a] Up to 1958. The dates of these explosions are unknown.
[b] Including five devices used simultaneously in the same test (Buggy), counted here as five.
[c] One of these explosions may have been a British explosion conducted in Nevada, USA.
[d] Explosions conducted between 15 September 1961 and 20 August 1963. Their dates are not specified in the lists available.
[e] Explosions conducted from 1970 to 1973. Their dates are not specified in the lists available.
[f] The data for 1975 are preliminary.

Appendix 9D

Bilateral arms control agreements between the USA and the USSR, as of 31 December 1975

Summary of the relevant provisions of the agreements

Memorandum of understanding regarding the establishment of a direct communications link ("Hot Line" Agreement)

Establishes a direct communications link between the governments of the USA and the USSR for use in time of emergency. An annex attached to the memorandum provides for two circuits, namely a duplex wire telegraph circuit and a duplex radio telegraph circuit, as well as two terminal points with telegraph-teleprinter equipment between which communications are to be exchanged.

Signed at Geneva on 20 June 1963.

Entered into force on 20 June 1963.

Agreement on measures to improve the USA-USSR direct communications link ("Hot Line" Modernization Agreement)

Establishes, for the purpose of increasing the reliability of the direct communications link set up pursuant to the Memorandum of understanding of 20 June 1963, two additional circuits between the USA and the USSR each using a satellite communications system (the US circuit being arranged through Intelsat and the Soviet circuit through the Molniya II system), and a system of terminals (more than one) in the territory of each party. Matters relating to the implementation of these improvements are set forth in an annex to the agreement.

Signed at Washington on 30 September 1971.

Entered into force on 30 September 1971.

Agreement on measures to reduce the risk of outbreak of nuclear war between the USA and the USSR (Nuclear Accidents Agreement)

Provides for immediate notification in the event of an accidental, unauthorized incident involving a possible detonation of a nuclear weapon (the party whose nuclear weapon is involved should take necessary measures to render harmless or destroy such weapon), immediate notification in the event of detection by missile warning systems of unidentified objects, or in the event of signs of interference with these systems or with related communications facilities, as well as advance notification of planned missile launches extending beyond the national territory in the direction of the other party.

Signed at Washington on 30 September 1971.

Entered into force on 30 September 1971.

Agreement on the prevention of incidents on and over the high seas

Provides for measures to assure the safety of navigation of the ships of the armed forces of the USA and the USSR on the high seas and flight of their military aircraft over the high seas including rules of conduct for ships engaged in surveillance of other ships, as well as ships engaged in launching or landing aircraft. The parties also undertake to give notification of actions on the high seas which represent a danger to navigation or to aircraft in flight, and exchange information concerning instances of collisions, instances which result in damage, or other incidents at sea between their ships and aircraft.

Signed at Moscow on 25 May 1972.

Entered into force on 25 May 1972.

Treaty on the limitation of anti-ballistic missile systems (SALT ABM Treaty)

Prohibits the deployment of ABM systems for the defence of the whole territory of the USA and the USSR or of an individual region, except as expressly permitted. Permitted ABM deployments are limited to two areas in each country—one for the defence of the national capital, and the other for the defence of some intercontinental ballistic missiles (ICBMs). No more than 100 ABM launchers and 100 ABM interceptor missiles may be deployed in each ABM deployment area. ABM radars should not exceed specified numbers and are subject to qualitative restriction. National technical means of verification will be used to provide assurance of compliance with the provisions of the treaty.

Signed at Moscow on 26 May 1972.

Entered into force on 3 October 1972.

Interim agreement on certain measures with respect to the limitation of strategic offensive arms (SALT Interim Agreement)

Provides for a freeze for up to five years of the aggregate number of fixed land-based intercontinental ballistic missile (ICBM) launchers and ballistic missile launchers on modern submarines. The parties are free to choose the mix, except that conversion of land-based launchers for light ICBMs, or for

ICBMs of older types, into land-based launchers for modern "heavy" ICBMs is prohibited.

A protocol which is an integral part of the Interim Agreement specifies that the USA may have not more than 710 ballistic missile launchers on submarines and 44 modern ballistic submarines, while the USSR may have not more than 950 ballistic missile launchers on submarines and 62 modern ballistic missile submarines. Up to those levels, additional SLBMs—in the USA over 656 ballistic missile launchers on nuclear-powered submarines and in the USSR over 740 ballistic missile launchers on nuclear-powered submarines, operational and under construction—may become operational as replacements for equal numbers of ballistic missile launchers of types deployed prior to 1964, or of ballistic missile launchers on older submarines.

Signed at Moscow on 26 May 1972.

Entered into force on 3 October 1972.

Protocol to the Agreement on the prevention of incidents on and over the high seas, signed on 25 May 1972

Provides that ships and aircraft of the parties shall not make simulated attacks by aiming guns, missile launchers, torpedo tubes and other weapons at non-military ships of the other party, nor launch nor drop any objects near non-military ships of the other party in such a manner as to be hazardous to these ships or to constitute a hazard to navigation.

Signed at Washington on 22 May 1973.

Entered into force on 22 May 1973.

Agreement on the prevention of nuclear war

Provides that the parties will act in such a manner as to exclude the outbreak of nuclear war between them and between either of the parties and other countries. Each party will refrain from the threat or use of force against the other party, against the allies of the other party and against other countries in circumstances which may endanger international peace and security. If at any time relations between the parties or between either party and other countries appear to involve the risk of a nuclear conflict, or if relations between countries not parties to this agreement appear to involve the risk of nuclear war between the USSR and the USA or between either party and other countries, the Soviet Union and the United States, acting in accordance with the provisions of this agreement, shall immediately enter into urgent consultations with each other and make every effort to avert this risk.

Signed at Washington on 22 June 1973.

Entered into force on 22 June 1973.

Protocol to the Treaty on the limitation of anti-ballistic missile systems (SALT ABM Treaty)

Provides that each party shall be limited to a single area for deployment of anti-ballistic missile systems or their components instead of two such areas as allowed by the ABM treaty. Each party will have the right to dismantle or destroy its ABM system and the components thereof in the area where they were deployed at the time of signing the Protocol and to deploy an ABM system or its components in the alternative area permitted by the ABM treaty, provided that, prior to initiation of construction, notification is given during the year beginning 3 October 1977, and ending 2 October 1978, or during any year which commences at five-year intervals thereafter, those being the years for periodic review of the ABM treaty. This right may be exercised only once. The deployment of an ABM system within the area selected shall remain limited by the levels and other requirements established by the ABM treaty.

Signed at Moscow on 3 July 1974.

Treaty on the limitation of underground nuclear weapon tests (Threshold Test Ban Treaty—TTBT)

Prohibits the carrying out of any underground nuclear-weapon test having a yield exceeding 150 kilotons, beginning 31 March 1976. Each party undertakes to limit the number of its underground nuclear-weapon tests to a minimum. The provisions of the treaty do not extend to underground nuclear explosions for peaceful purposes which shall be governed by an agreement to be concluded at the earliest possible time. National technical means of verification will be used to provide assurance of compliance and a protocol, which is an integral part of the treaty, specifies the data that have to be exchanged between the parties to ensure such verification.

Signed at Moscow on 3 July 1974.

Appendix 9E

Multilateral agreements related to disarmament, as of 31 December 1975

I. *Summary of the relevant provisions of the agreements*

Antarctic Treaty

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, the carrying out of military manoeuvres, or the testing of any type of weapons, as well as any nuclear explosions.

Signed at Washington on 1 December 1959.
Entered into force on 23 June 1961.
The depositary government: USA.

Treaty banning nuclear weapon tests in the atmosphere, in outer space and under water (Partial Test Ban Treaty—PTBT)

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.

Signed at Moscow on 5 August 1963.
Entered into force on 10 October 1963.
The depositary governments: UK, USA, USSR.

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)

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 stationing 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.

Signed at London, Moscow and Washington on 27 January 1967.

Entered into force on 10 October 1967.

The depositary governments: UK, USA, USSR.

Treaty for the prohibition of nuclear weapons in Latin America (Treaty of Tlatelolco)

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 International Atomic Energy Agency (IAEA) for the application of safeguards to their nuclear activities.

Under *Additional Protocol I,* annexed to the treaty, 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,* annexed to the treaty, the nuclear-weapon states undertake to respect the statute of military denuclearization of Latin America as defined in the treaty, not to contribute to acts involving a violation of the treaty, and not to use or threaten to use nuclear weapons against the parties to the treaty.

Signed at Mexico City on 14 February 1967.

The treaty enters into force for each state that has ratified it when the requirements specified in the treaty have been met, that is, that all states in the region which were in existence when the treaty was opened for signature, deposit the instruments of ratification, that Additional Protocols I and II be signed and ratified by those states to which they apply (see above), and that agreements on safeguards be concluded with the IAEA. The signatory states have the right to waive, wholly or in part, those requirements.

The Additional Protocols enter into force for the states that have ratified them on the date of the deposit of their instruments of ratification.

The depositary government: Mexico.

Treaty on the non-proliferation of nuclear weapons (Non-Proliferation Treaty—NPT)

Prohibits the transfer by nuclear-weapon states to any recipient whatsoever of nuclear weapons or other nuclear explosive devices or of control over them. 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 safeguards 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 on effective measures relating to cessation of the nuclear arms race and to nuclear disarmament, and on a treaty on general and complete disarmament.

Signed at London, Moscow and Washington on 1 July 1968.

Entered into force on 5 March 1970.

The depositary governments: UK, USA, USSR.

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)

Prohibits emplanting or emplacement on the sea-bed and the ocean floor and in the subsoil thereof beyond the outer limit of a sea-bed zone (coterminous with the 12-mile outer limit of the zone referred to in the 1958 Geneva Convention on the Territorial Sea and the Contiguous Zone) of 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.

Signed at London, Moscow and Washington on 11 February 1971.

Entered into force on 18 May 1972.

The depositary governments: UK, USA, USSR.

Convention on the prohibition of the development, production and stockpiling of bacteriological (biological) and toxin weapons and on their destruction (BW Convention)

Prohibits the development, production, stockpiling, 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 for 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.

Signed at London, Moscow and Washington on 10 April 1972.

Entered into force on 26 March 1975.

The depositary governments: UK, USA, USSR.

II. *List of states which have signed, ratified, acceded or succeeded to multilateral agreements related to disarmament, as of 31 December 1975*

Total number of parties

Antarctic Treaty	19
Partial Test Ban Treaty	106
Outer Space Treaty	71
Treaty of Tlatelolco	20
Non-Proliferation Treaty	97
Sea-Bed Treaty	58
BW Convention	64

Note

1. Abbreviations used in the list:

S: signature
R: deposit of instruments of ratification, accession or succession. Place of signature and/or deposit of the instrument of ratification, accession or succession:
L: London
M: Moscow
W: Washington
P.I: Additional Protocol I to the Treaty of Tlatelolco
P.II: Additional Protocol II to the Treaty of Tlatelolco
S.A.: Safeguards agreement concluded with the International Atomic Energy Agency (IAEA) under the Non-Proliferation Treaty or the Treaty of Tlatelolco.

2. The footnotes at the end of the table are grouped separately for each agreement.

	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty
Afghanistan		S: 8 Aug 1963 LW 9 Aug 1963 M R: 12 Mar 1964 L 13 Mar 1964 W 23 Mar 1964 M	S: 27 Jan 1967 W 30 Jan 1967 M
Algeria		S: 14 Aug 1963 LW 19 Aug 1963 M	
Argentina	S: 1 Dec 1959 R: 23 Jun 1961	S: 8 Aug 1963 W 9 Aug 1963 LM	S: 27 Jan 1967 W 18 Apr 1967 M R: 26 Mar 1969 MW
Australia	S: 1 Dec 1959 R: 23 Jun 1961	S: 8 Aug 1963 LMW R: 12 Nov 1963 LMW	S: 27 Jan 1967 W R: 10 Oct 1967 LMW
Austria		S: 11 Sep 1963 MW 12 Sep 1963 L R: 17 Jul 1964 LMW	S: 20 Feb 1967 LMW R: 26 Feb 1968 LMW
Bahamas			
Barbados			R: 12 Sep 1968 W
Belgium	S: 1 Dec 1959 R: 26 Jul 1960	S: 8 Aug 1963 LMW R: 1 Mar 1966 LMW	S: 27 Jan 1967 LM 2 Feb 1967 W R: 30 Mar 1973 W 31 Mar 1973 LM
Benin (Dahomey)		S:[3] 27 Aug 1963 W 3 Sep 1963 L 9 Oct 1963 M R: 15 Dec 1964 W 23 Dec 1964 M 22 Apr 1965 L	

Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention
	S: 1 Jul 1968 LMW R: 4 Feb 1970 W 5 Feb 1970 M 5 Mar 1970 L	S: 11 Feb 1971 LMW R: 22 Apr 1971 M 23 Apr 1971 L 21 May 1971 W	S: 10 Apr 1972 LMW R: 26 Mar 1975 L
S:[1] 27 Sep 1967		S:[1] 3 Sep 1971 LMW	S: 1 Aug 1972 M 3 Aug 1972 L 7 Aug 1972 W
	S:[1] 27 Feb 1970 LMW R: 23 Jan 1973 LMW S.A.: 10 Jul 1974	S: 11 Feb 1971 LMW R: 23 Jan 1973 LMW	S: 10 Apr 1972 LMW
	S: 1 Jul 1968 LMW R: 27 Jun 1969 LMW S.A.:[2] 23 Jul 1972	S: 11 Feb 1971 LMW R: 10 Aug 1972 LMW	S: 10 Apr 1972 LMW R:[1] 10 Aug 1973 LMW
	R:[11] 10 Jul 1973 L		
S: 18 Oct 1968 R:[2] 25 Apr 1969	S: 1 Jul 1968 W		S: 16 Feb 1973 W R: 16 Feb 1973 W
	S: 20 Aug 1968 LMW R: 2 May 1975 LW 4 May 1975 M S.A.:[3,8] 5 Apr 1973	S: 11 Feb 1971 LMW R: 20 Nov 1972 LMW	S: 10 Apr 1972 LMW
	S: 1 Jul 1968 W R: 31 Oct 1972 W	S: 18 Mar 1971 W	S: 10 Apr 1972 W R: 25 Apr 1975 W

	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty
Bolivia		S: 8 Aug 1963 W 21 Aug 1963 L 20 Sep 1963 M R: 4 Aug 1965 MW 25 Jan 1966 L	S: 27 Jan 1967 W
Botswana		R:[1] 5 Jan 1968 M 14 Feb 1968 L 4 Mar 1968 W	S: 27 Jan 1967 W
Brazil	R: 16 May 1975	S: 8 Aug 1963 LW 9 Aug 1963 M R: 15 Dec 1964 M 15 Jan 1965 W 4 Mar 1965 L	S: 30 Jan 1967 M 2 Feb 1967 LW R:[1] 5 Mar 1969 LMW
Bulgaria		S: 8 Aug 1963 LMW R: 13 Nov 1963 W 21 Nov 1963 M 2 Dec 1963 L	S: 27 Jan 1967 LMW R: 28 Mar 1967 M 11 Apr 1967 W 19 Apr 1967 L
Burma		S: 14 Aug 1963 LMW R: 15 Nov 1963 LMW	S: 22 May 1967 LMW R: 18 Mar 1970 LMW
Burundi		S: 4 Oct 1963 W	S: 27 Jan 1967 W
Byelorussia		S: 8 Oct 1963 M R:[2] 16 Dec 1963 M	S:[2] 10 Feb 1967 M R: 31 Oct 1967 M
Cambodia			
Canada		S: 8 Aug 1963 LMW R: 28 Jan 1964 LMW	S: 27 Jan 1967 LMW R: 10 Oct 1967 LMW

Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention
S: 14 Feb 1967 R:[3] 18 Feb 1969 S.A.:[15]	S: 1 Jul 1968 W R: 26 May 1970 W S.A.:[5,6,8] 23 Aug 1974	S: 11 Feb 1971 LMW	S: 10 Apr 1972 W R: 30 Oct 1975 W
	S: 1 Jul 1968 W R: 28 Apr 1969 L	S: 11 Feb 1971 W R: 10 Nov 1972 W	S: 10 Apr 1972 W
S:[3] 9 May 1967 R:[4] 29 Jan 1968		S:[2] 3 Sep 1971 LMW	S: 10 Apr 1972 LMW R: 27 Feb 1973 LMW
	S: 1 Jul 1968 LMW R: 5 Sep 1969 W 18 Sep 1969 M 3 Nov 1969 L S.A.: 29 Feb 1972	S: 11 Feb 1971 LMW R: 16 Apr 1971 M 7 May 1971 W 26 May 1971 L	S: 10 Apr 1972 LMW R: 2 Aug 1972 L 13 Sep 1972 W 19 Sep 1972 M
		S: 11 Feb 1971 LMW	S: 10 Apr 1972 LMW
	R: 19 Mar 1971 M	S: 11 Feb 1971 MW	S: 10 Apr 1972 MW
		S: 3 Mar 1971 M R: 14 Sep 1971 M	S: 10 Apr 1972 M R: 26 Mar 1975 MW
	R: 2 Jun 1972 W	S: 11 Feb 1971 W	S: 10 Apr 1972 W
	S: 23 Jul 1968 LW 29 Jul 1968 M R: 8 Jan 1969 LMW S.A.: 21 Feb 1972	S: 11 Feb 1971 LMW R:[3] 17 May 1972 LMW	S: 10 Apr 1972 LMW R: 18 Sep 1972 LMW

	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty
Central African Republic		R: 22 Dec 1964 W 24 Aug 1965 L 25 Sep 1965 M	S: 27 Jan 1967 W
Chad		S: 26 Aug 1963 W R: 1 Mar 1965 W	
Chile	S: 1 Dec 1959 R: 23 Jun 1961	S: 8 Aug 1963 W 9 Aug 1963 LM R: 6 Oct 1965 L	S: 27 Jan 1967 W 3 Feb 1967 L 20 Feb 1967 M
China			
Colombia		S: 16 Aug 1963 MW 20 Aug 1963 L	S: 27 Jan 1967 W
Costa Rica		S: 9 Aug 1963 L 13 Aug 1963 W 23 Aug 1963 M R: 10 Jul 1967 W	
Cuba			
Cyprus		S: 8 Aug 1963 LMW R: 15 Apr 1965 L 21 Apr 1965 M 7 May 1965 W	S: 27 Jan 1967 W 15 Feb 1967 M 16 Feb 1967 L R: 5 Jul 1972 LW 20 Sep 1972 M

Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention
	R: 25 Oct 1970 W	S: 11 Feb 1971 W	S: 10 Apr 1972 W
	S: 1 Jul 1968 LM R: 10 Mar 1971 W 11 Mar 1971 M 23 Mar 1971 L		
S: 14 Feb 1967 R:[10] 9 Oct 1974			S: 10 Apr 1972 LMW
P.II:[5] S: 21 Aug 1973 R: 12 Jun 1974			
S: 14 Feb 1967 R:[2] 4 Aug 1972	S: 1 Jul 1968 W	S: 11 Feb 1971 W	S: 10 Apr 1972 W
S: 14 Feb 1967 R:[2] 25 Aug 1969 S.A.:[15]	S: 1 Jul 1968 W R: 3 Mar 1970 W S.A.:[5,6,8] 12 Jul 1973	S: 11 Feb 1971 W	S: 10 Apr 1972 W R: 17 Dec 1973 W
			S: 12 Apr 1972 M
	S: 1 Jul 1968 LMW R: 10 Feb 1970 M 16 Feb 1970 W 5 Mar 1970 L S.A.:[5] 26 Jan 1973	S: 11 Feb 1971 LMW R: 17 Nov 1971 LM 30 Dec 1971 W	S: 10 Apr 1972 LW 14 Apr 1972 M R: 6 Nov 1973 L 13 Nov 1973 W 21 Nov 1973 M

	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty
Czechoslovakia	R: 14 Jun 1962	S: 8 Aug 1963 LMW R: 14 Oct 1963 LM 17 Oct 1963 W	S: 27 Jan 1967 LMW R: 11 May 1967 L 18 May 1967 M 22 May 1967 W
Democratic Yemen			
Denmark	R: 20 May 1965	S: 9 Aug 1963 LMW R: 15 Jan 1964 LMW	S: 27 Jan 1967 LMW R: 10 Oct 1967 LMW
Dominican Republic		S: 16 Sep 1963 W 17 Sep 1963 L 19 Sep 1963 M R: 3 Jun 1964 M 18 Jun 1964 L 22 Jul 1964 W	S: 27 Jan 1967 W R: 21 Nov 1968 W
Ecuador		S: 27 Sep 1963 W 1 Oct 1963 LM R: 6 May 1964 W 8 May 1964 L 13 Nov 1964 M	S: 27 Jan 1967 W 16 May 1967 L 7 Jun 1967 M R: 7 Mar 1969 W
Egypt		S:[4] 8 Aug 1963 LMW R: 10 Jan 1964 LMW	S: 27 Jan 1967 MW R: 10 Oct 1967 W 23 Jan 1968 M
El Salvador		S: 21 Aug 1963 W 22 Aug 1963 L 23 Aug 1963 M R: 3 Dec 1964 W 7 Dec 1964 L 9 Feb 1965 M	S: 27 Jan 1967 W R: 15 Jan 1969 W
Equatorial Guinea			

Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention
	S: 1 Jul 1968 LMW R: 22 Jul 1969 LMW S.A.: 3 Mar 1972	S: 11 Feb 1971 LMW R: 11 Jan 1972 LMW	S: 10 Apr 1972 LMW R: 30 Apr 1973 LMW
	S: 14 Nov 1968 M	S: 23 Feb 1971 M	S: 26 Apr 1972 M
	S: 1 Jul 1968 LMW R: 3 Jan 1969 LMW S.A.:[9,10] 1 Mar 1972	S: 11 Feb 1971 LMW R: 15 Jun 1971 LMW	S: 10 Apr 1972 LMW R: 1 Mar 1973 LMW
S: 28 Jul 1967 R:[2] 14 Jun 1968 S.A.:[15]	S: 1 Jul 1968 W R: 24 Jul 1971 W S.A.:[5,6] 11 Oct 1973	S: 11 Feb 1971 W R: 11 Feb 1972 W	S: 10 Apr 1972 W R: 23 Feb 1973 W
S: 14 Feb 1967 R:[2] 11 Feb 1969 S.A.:[15]	S: 9 Jul 1968 W R: 7 Mar 1969 W S.A.:[5,6] 10 Mar 1975		S: 14 Jun 1972 W R: 12 Mar 1975 W
	S: 1 Jul 1968 LM		S: 10 Apr 1972 LM
S: 14 Feb 1967 R:[2] 22 Apr 1968 S.A.:[15]	S: 1 Jul 1968 W R: 11 Jul 1972 W S.A.:[5,6] 22 Apr 1975		S: 10 Apr 1972 W
		S: 4 Jun 1971 W	

	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty
Ethiopia		S: 9 Aug 1963 LW 19 Sep 1963 M	S: 27 Jan 1967 LW 10 Feb 1967 M
Fiji		R:[1] 14 Jul 1972 M 18 Jul 1972 W 14 Aug 1972 L	R:[3] 18 Jul 1972 W 14 Aug 1972 L 29 Aug 1972 M
Finland		S: 8 Aug 1963 LMW R: 9 Jan 1964 LMW	S: 27 Jan 1967 LMW R: 12 Jul 1967 LMW
France	S: 1 Dec 1959 R: 16 Sep 1960		S: 25 Sep 1967 LMW R: 5 Aug 1970 LMW
Gabon		S: 10 Sep 1963 W R: 20 Feb 1964 W 4 Mar 1964 L 9 Mar 1964 M	
Gambia		R:[1] 27 Apr 1965 MW 6 May 1965 L	S: 2 Jun 1967 L
German Democratic Republic	R:[3] 19 Nov 1974	S: 8 Aug 1963 M R:[5] 30 Dec 1963 M	S: 27 Jan 1967 M R:[4] 2 Feb 1967 M
Germany, Federal Republic of		S: 19 Aug 1963 LMW R:[6] 1 Dec 1964 LW	S: 27 Jan 1967 LMW R:[5] 10 Feb 1971 LW

Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention
	S: 5 Sep 1968 LMW R: 5 Feb 1970 M 5 Mar 1970 LW	S: 11 Feb 1971 LMW	S: 10 Apr 1972 LMW R: 26 May 1975 LM 26 Jun 1975 W
	R:[11] 18 Jul 1972 W 14 Aug 1972 L 29 Aug 1972 M S.A.:[5] 22 Mar 1973		S: 22 Feb 1973 L R: 4 Sep 1973 W 1 Oct 1973 L
	S: 1 Jul 1968 LMW R: 5 Feb 1969 LMW S.A.: 9 Feb 1972	S: 11 Feb 1971 LMW R: 8 Jun 1971 LMW	S: 10 Apr 1972 LMW R: 4 Feb 1974 LMW
P.II:[6] S: 18 Jul 1973 R: 22 Mar 1974			
	R: 19 Feb 1974 W		S: 10 Apr 1972 L
	S: 4 Sep 1968 L 20 Sep 1968 W 24 Sep 1968 M R: 12 May 1975 W	S: 18 May 1971 L 21 May 1971 M 29 Oct 1971 W	S: 2 Jun 1972 M 8 Aug 1972 L 9 Nov 1972 W
	S: 1 Jul 1968 M R:[12] 31 Oct 1969 M S.A.: 7 Mar 1972	S:[4] 11 Feb 1971 M R: 27 Jul 1971 M	S: 10 Apr 1972 M R: 28 Nov 1972 M
	S: 28 Nov 1969 LMW R:[13] 2 May 1975 LW S.A.:[3,8] 5 Apr 1973	S:[5] 8 Jun 1971 LMW R:[5] 18 Nov 1975 LW	S: 10 Apr 1972 LMW

	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty
Ghana		S: 8 Aug 1963 M 9 Aug 1963 W 4 Sep 1963 L R: 27 Nov 1963 L 9 Jan 1964 W 31 May 1965 M	S: 27 Jan 1967 W 15 Feb 1967 M 3 Mar 1967 L
Greece		S: 8 Aug 1963 W 9 Aug 1963 LM R: 18 Dec 1963 LMW	S: 27 Jan 1967 W R: 19 Jan 1971 L
Grenada			
Guatemala		S: 23 Sep 1963 W R:[3] 6 Jan 1964 W	
Guinea			
Guyana			S: 3 Feb 1967 W
Haiti		S: 9 Oct 1963 W	S: 27 Jan 1967 W
Holy See			S: 5 Apr 1967 L

Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention
	S: 1 Jul 1968 MW 24 Jul 1968 L R: 4 May 1970 L 5 May 1970 W 11 May 1970 M S.A.:[5] 17 Feb 1975	S: 11 Feb 1971 LMW R: 9 Aug 1972 W	S: 10 Apr 1972 MW R: 6 Jun 1975 L
	S: 1 Jul 1968 MW R: 11 Mar 1970 W S.A.:[2,7] 1 Mar 1972	S: 11 Feb 1971 M 12 Feb 1971 W	S: 10 Apr 1972 L 12 Apr 1972 W 14 Apr 1972 M R: 10 Dec 1975 W
R:[2] 29 Apr 1975	R:[11] 2 Sep 1975 L		
S: 14 Feb 1967 R:[2] 6 Feb 1970	S: 26 Jul 1968 W R: 22 Sep 1970 W	S: 11 Feb 1971 W	S: 9 May 1972 W R: 19 Sep 1973 W
		S: 11 Feb 1971 MW	
			S: 3 Jan 1973 W
S: 14 Feb 1967 R:[2] 23 May 1969 S.A.:[15]	S: 1 Jul 1968 W R: 2 Jun 1970 W S.A.:[5,6,8] 6 Jan 1975		S: 10 Apr 1972 W
	R:[14] 25 Feb 1971 LMW S.A.:[5] 1 Aug 1972		

	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty
Honduras		S: 8 Aug 1963 W 15 Aug 1963 L 16 Aug 1963 M R: 2 Oct 1964 W 2 Dec 1964 L	S: 27 Jan 1967 W
Hungary		S: 8 Aug 1963 LMW R: 21 Oct 1963 L 22 Oct 1963 W 23 Oct 1963 M	S: 27 Jan 1967 LMW R: 26 Jun 1967 LMW
Iceland		S: 12 Aug 1963 LMW R: 29 Apr 1964 LMW	S: 27 Jan 1967 LMW R: 5 Feb 1968 LMW
India		S: 8 Aug 1963 LMW R: 10 Oct 1963 L 14 Oct 1963 M 18 Oct 1963 W	S: 3 Mar 1967 LMW
Indonesia		S: 23 Aug 1963 LMW R: 20 Jan 1964 M 27 Jan 1964 W 8 May 1964 L	S: 27 Jan 1967 W 30 Jan 1967 M 14 Feb 1967 L
Iran		S: 8 Aug 1963 LMW R: 5 May 1964 LMW	S: 27 Jan 1967 L
Iraq		S: 13 Aug 1963 LMW R: 30 Nov 1964 L 1 Dec 1964 W 3 Dec 1964 M	S: 27 Feb 1967 LW 9 Mar 1967 M R: 4 Dec 1968 M 23 Sep 1969 L
Ireland		S: 8 Aug 1963 LW 9 Aug 1963 M R: 18 Dec 1963 LW 20 Dec 1963 M	S: 27 Jan 1967 LW R: 17 Jul 1968 W 19 Jul 1968 L

Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention
S: 14 Feb 1967 R:[2] 23 Sep 1968 S.A.:[15]	S: 1 Jul 1968 W R: 16 May 1973 W S.A.:[5,6] 18 Apr 1975	S: 11 Feb 1971 W	S: 10 Apr 1972 W
	S: 1 Jul 1968 LMW R: 27 May 1969 LMW S.A.: 30 Mar 1972	S: 11 Feb 1971 LMW R: 13 Aug 1971 LMW	S: 10 Apr 1972 LMW R: 27 Dec 1972 LMW
	S: 1 Jul 1968 LMW R: 18 Jul 1969 LMW S.A.:[5] 16 Oct 1974	S: 11 Feb 1971 LMW R: 30 May 1972 LMW	S: 10 Apr 1972 LMW R: 15 Feb 1973 LMW
		R:[6] 20 Jul 1973 LMW	S:[2] 15 Jan 1973 LMW R:[2] 15 Jul 1974 LMW
	S:[15] 2 Mar 1970 LMW		S: 20 Jun 1972 MW 21 Jun 1972 L
	S: 1 Jul 1968 LMW R: 2 Feb 1970 W 10 Feb 1970 M 5 Mar 1970 L S.A.:[2] 15 May 1974	S: 11 Feb 1971 LMW R: 26 Aug 1971 LW 6 Sep 1972 M	S: 10 Apr 1972 MW 16 Nov 1972 L R: 22 Aug 1973 LW 27 Aug 1973 M
	S: 1 Jul 1968 M R: 29 Oct 1969 M S.A.: 29 Feb 1972	S: 22 Feb 1971 M R:[7] 13 Sep 1972 M	S: 11 May 1972 M
	S: 1 Jul 1968 MW 4 Jul 1968 L R: 1 Jul 1968 W 2 Jul 1968 M 4 Jul 1968 L S.A.:[5,9] 29 Feb 1972	S: 11 Feb 1971 LW R: 19 Aug 1971 LW	S:[3] 10 Apr 1972 LW R: 27 Oct 1972 LW

	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty
Israel		S: 8 Aug 1963 LMW R: 15 Jan 1964 LW 28 Jan 1964 M	S: 27 Jan 1967 LMW
Italy		S: 8 Aug 1963 LMW R: 10 Dec 1964 LMW	S: 27 Jan 1967 LMW R: 4 May 1972 LMW
Ivory Coast		S: 5 Sep 1963 W R: 5 Feb 1965 W	
Jamaica		S: 13 Aug 1963 LMW	S: 29 Jun 1967 LMW R: 6 Aug 1970 W 10 Aug 1970 L 21 Aug 1970 M
Japan	S: 1 Dec 1959 R: 4 Aug 1960	S: 14 Aug 1963 LMW R: 15 Jun 1964 LMW	S: 27 Jan 1967 LMW R: 10 Oct 1967 LMW
Jordan		S: 12 Aug 1963 LW 19 Aug 1963 M R: 29 May 1964 L 7 Jul 1964 M 10 Jul 1964 W	S: 2 Feb 1967 W
Kenya		R: 10 Jun 1965 L 11 Jun 1965 W 30 Jun 1965 M	
Korea, South		S: 30 Aug 1963 LW R:[3] 24 Jul 1964 LW	S: 27 Jan 1967 W R:[6] 13 Oct 1967 W

Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention
	S: 28 Jan 1969 LMW R:[16] 2 May 1975 LW 4 May 1975 M S.A.:[3,8] 5 Apr 1973	S: 11 Feb 1971 LMW R:[8] 3 Sep 1974 LMW	S: 10 Apr 1972 LMW R: 30 May 1975 LMW
	S: 1 Jul 1968 W R: 6 Mar 1973 W	R: 14 Jan 1972 W	S: 23 May 1972 W
S: 26 Oct 1967 R:[2] 26 Jun 1969	S: 14 Apr 1969 LMW R: 5 Mar 1970 LMW	S: 11 Oct 1971 LW 14 Oct 1971 M	R: 13 Aug 1975 L
	S:[17] 3 Feb 1970 LMW	S: 11 Feb 1971 LMW R: 21 Jun 1971 LMW	S: 10 Apr 1972 LMW
	S: 10 Jul 1968 W R: 11 Feb 1970 W S.A.:[8] 5 Dec 1974	S: 11 Feb 1971 LMW R: 17 Aug 1971 W 30 Aug 1971 M 1 Nov 1971 L	S: 10 Apr 1972 W 17 Apr 1972 L 24 Apr 1972 M R: 30 May 1975 M 2 Jun 1975 W 27 Jun 1975 L
	S: 1 Jul 1968 W R: 11 Jun 1970 M		R:[10]
	S:[18] 1 Jul 1968 W R:[4] 23 Apr 1975 W S.A.: 14 Nov 1975	S:[7] 11 Feb 1971 LW	S:[4] 10 Apr 1972 LW

	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty
Kuwait		S:[7] 20 Aug 1963 LMW R: 20 May 1965 W 21 May 1965 L 17 Jun 1965 M	R:[7] 7 Jun 1972 W 20 Jun 1972 L 4 Jul 1972 M
Laos		S: 12 Aug 1963 LMW R: 10 Feb 1965 L 12 Feb 1965 W 7 Apr 1965 M	S: 27 Jan 1967 W 30 Jan 1967 L 2 Feb 1967 M R: 27 Nov 1972 M 29 Nov 1972 W 15 Jan 1973 L
Lebanon		S: 12 Aug 1963 W 13 Aug 1963 LM R: 14 May 1965 W 20 May 1965 L 4 Jun 1965 M	S: 23 Feb 1967 LMW R: 31 Mar 1969 LM 30 Jun 1969 W
Lesotho			S: 27 Jan 1967 W
Liberia		S: 8 Aug 1963 W 16 Aug 1963 L 27 Aug 1963 M R: 19 May 1964 W 22 May 1964 L 16 Jun 1964 M	
Libya		S: 9 Aug 1963 L 16 Aug 1963 MW R: 15 Jul 1968 L	R: 3 Jul 1968 W
Luxembourg		S: 13 Aug 1963 L 3 Sep 1963 W 13 Sep 1963 M R: 10 Feb 1965 LMW	S: 27 Jan 1967 MW 31 Jan 1967 L
Madagascar		S: 23 Sep 1963 W R: 15 Mar 1965 W	R:[8] 22 Aug 1968 W

Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention
	S: 15 Aug 1968 MW 22 Aug 1968 L		S: 14 Apr 1972 MW 27 Apr 1972 L R:[5] 18 Jul 1972 W 26 Jul 1972 L 1 Aug 1972 M
	S: 1 Jul 1968 LMW R: 20 Feb 1970 M 5 Mar 1970 LW	S: 11 Feb 1971 LW 15 Feb 1971 M R: 19 Oct 1971 L 22 Oct 1971 M 3 Nov 1971 W	S: 10 Apr 1972 LMW R: 20 Mar 1973 M 22 Mar 1973 W 25 Apr 1973 L
	S: 1 Jul 1968 LMW R: 15 Jul 1970 LM 20 Nov 1970 W S.A.:[5] 5 Mar 1973	S: 11 Feb 1971 LMW	S: 10 Apr 1972 LW 21 Apr 1972 M R: 26 Mar 1975 L 13 Jun 1975 W
	S: 9 Jul 1968 W R: 20 May 1970 W S.A.:[5] 12 Jun 1973	S: 8 Sep 1971 W R: 3 Apr 1973 W	S: 10 Apr 1972 W
	S: 1 Jul 1968 W R: 5 Mar 1970 W	S: 11 Feb 1971 W	S: 10 Apr 1972 W 14 Apr 1972 L
	S: 18 Jul 1968 L 19 Jul 1968 W 23 Jul 1968 M R: 26 May 1975 LMW		
	S: 14 Aug 1968 LMW R: 2 May 1975 LW 4 May 1975 M S.A.:[3,8] 5 Apr 1973	S: 11 Feb 1971 LMW	S: 10 Apr 1972 LM 12 Apr 1972 W
	S: 22 Aug 1968 W R: 8 Oct 1970 W S.A.:[5] 14 Jun 1973	S: 14 Sep 1971 W	S: 13 Oct 1972 L

	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty
Malawi		R:[1] 26 Nov 1964 MW 7 Jan 1965 L	
Malaysia		S: 8 Aug 1963 W 12 Aug 1963 L 21 Aug 1963 M R: 15 Jul 1964 M 16 Jul 1964 LW	S: 20 Feb 1967 W 21 Feb 1967 L 3 May 1967 M
Maldives			
Mali		S: 23 Aug 1963 LMW	R: 11 Jun 1968 M
Malta		R:[1] 25 Nov 1964 MW 1 Dec 1964 L	
Mauritania		S: 13 Sep 1963 W 17 Sep 1963 L 8 Oct 1963 M R: 6 Apr 1964 W 15 Apr 1964 L 28 Apr 1964 M	
Mauritius		R:[1] 30 Apr 1969 MW 12 May 1969 L	R:[3] 16 Apr 1969 W 21 Apr 1969 L 13 May 1969 M
Mexico		S: 8 Aug 1963 LMW R: 27 Dec 1963 LMW	S: 27 Jan 1967 LMW R: 31 Jan 1968 LMW

Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention
			S: 10 Apr 1972 W
	S: 1 Jul 1968 LMW R: 5 Mar 1970 LMW S.A.:[5] 29 Feb 1972	S: 20 May 1971 LMW R: 21 Jun 1972 LMW	S: 10 Apr 1972 LMW
	S: 11 Sep 1968 W R: 7 Apr 1970 W		
	S: 14 Jul 1969 W 15 Jul 1969 M R: 10 Feb 1970 M 5 Mar 1970 W	S: 11 Feb 1971 W 15 Feb 1971 M	S: 10 Apr 1972 W
	S: 17 Apr 1969 W R: 6 Feb 1970 W	S: 11 Feb 1971 LW R: 4 May 1971 W	S: 11 Sep 1972 L R: 7 Apr 1975 L
	S: 1 Jul 1968 W R: 8 Apr 1969 W 14 Apr 1969 L 25 Apr 1969 M S.A.:[5] 31 Jan 1973	S: 11 Feb 1971 W R: 23 Apr 1971 W 3 May 1971 L 18 May 1971 M	S: 10 Apr 1972 W R: 7 Aug 1972 W 11 Jan 1973 L 15 Jan 1973 M
S:[7] 14 Feb 1967 R:[2] 20 Sep 1967 S.A.: 6 Sep 1968	S:[10] 26 Jul 1968 LMW R: 21 Jan 1969 LMW S.A.:[6] 14 Sep 1973		S:[6] 10 Apr 1972 LMW R: 8 Apr 1974 LMW

	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty
Mongolia		S: 8 Aug 1963 LM R: 1 Nov 1963 M 7 Nov 1963 L	S: 27 Jan 1967 M R: 10 Oct 1967 M
Morocco		S: 27 Aug 1963 MW 30 Aug 1963 L R: 1 Feb 1966 L 18 Feb 1966 M 21 Feb 1966 W	R: 21 Dec 1967 LM 22 Dec 1967 W
Nepal		S: 26 Aug 1963 LM 30 Aug 1963 W R: 7 Oct 1964 LMW	S: 3 Feb 1967 MW 6 Feb 1967 L R: 10 Oct 1967 L 16 Oct 1967 M 22 Nov 1967 W
Netherlands	R:[1] 30 Mar 1967	S: 9 Aug 1963 LMW R:[8] 14 Sep 1964 LMW	S: 10 Feb 1967 LMW R:[9] 10 Oct 1969 LMW
New Zealand	S: 1 Dec 1959 R: 1 Nov 1960	S: 8 Aug 1963 LMW R: 10 Oct 1963 LW 16 Oct 1963 M	S: 27 Jan 1967 LMW R: 31 May 1968 LMW
Nicaragua		S: 13 Aug 1963 LW 16 Aug 1963 M R: 26 Jan 1965 L 26 Feb 1965 MW	S: 27 Jan 1967 W 13 Feb 1967 L
Niger		S: 24 Sep 1963 LW R: 3 Jul 1964 M 6 Jul 1964 L 9 Jul 1964 W	S: 1 Feb 1967 W R: 17 Apr 1967 L 3 May 1967 W
Nigeria		S: 30 Aug 1963 M 2 Sep 1963 L 4 Sep 1963 W R: 17 Feb 1967 L 25 Feb 1967 M 28 Feb 1967 W	R: 14 Nov 1967 L

Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention
	S: 1 Jul 1968 M R: 14 May 1969 M S.A.:[5] 5 Sep 1972	S: 11 Feb 1971 LM R: 8 Oct 1971 M 15 Nov 1971 L	S: 10 Apr 1972 LMW R: 5 Sep 1972 W 14 Sep 1972 L 20 Oct 1972 M
	S: 1 Jul 1968 LMW R: 27 Nov 1970 M 30 Nov 1970 L 16 Dec 1970 W S.A.:[5] 18 Feb 1975	S: 11 Feb 1971 MW 18 Feb 1971 L R: 26 Jul 1971 L 5 Aug 1971 W 18 Jan 1972 M	S: 2 May 1972 L 3 May 1972 W 5 Jun 1972 M
	S: 1 Jul 1968 LMW R: 5 Jan 1970 W 9 Jan 1970 M 3 Feb 1970 L S.A.:[5] 22 Jun 1972	S: 11 Feb 1971 MW 24 Feb 1971 L R: 6 Jul 1971 L 29 Jul 1971 M 9 Aug 1971 W	S: 10 Apr 1972 LMW
P.I:[8] S: 15 Mar 1968 R: 26 Jul 1971	S: 20 Aug 1968 LMW R:[25] 2 May 1975 LMW S.A.:[3,8,20] 5 Apr 1973	S: 11 Feb 1971 LMW	S: 10 Apr 1972 LMW
	S: 1 Jul 1968 LMW R: 10 Sep 1969 LMW S.A.:[5] 29 Feb 1972	S: 11 Feb 1971 LMW R: 24 Feb 1972 LMW	S: 10 Apr 1972 LMW R: 13 Dec 1972 W 18 Dec 1972 L 10 Jan 1973 M
S: 15 Feb 1967 R:[2,9] 24 Oct 1968 S.A.:[15]	S: 1 Jul 1968 LW R: 6 Mar 1973 W S.A.:[5,6,8] 28 Feb 1975	S: 11 Feb 1971 W R: 7 Feb 1973 W	S: 10 Apr 1972 LW R: 7 Aug 1975 W
		S: 11 Feb 1971 W R: 9 Aug 1971 W	S: 21 Apr 1972 W R: 23 Jun 1972 W
	S: 1 Jul 1968 LMW R: 27 Sep 1968 L 7 Oct 1968 W 14 Oct 1968 M		S: 3 Jul 1972 M 10 Jul 1972 L 6 Dec 1972 W R: 3 Jul 1973 W 9 Jul 1973 L 20 Jul 1973 M

	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty
Norway	S: 1 Dec 1959 R: 24 Aug 1960	S: 9 Aug 1963 LMW R: 21 Nov 1963 LMW	S: 3 Feb 1967 LMW R: 1 Jul 1969 LMW
Pakistan		S: 14 Aug 1963 LMW	S: 12 Sep 1967 LMW R: 8 Apr 1968 LMW
Panama		S: 20 Sep 1963 W R: 24 Feb 1966 W	S: 27 Jan 1967 W
Paraguay		S: 15 Aug 1963 LW 21 Aug 1963 M	
Peru		S: 23 Aug 1963 LMW R: 20 Jul 1964 W 4 Aug 1964 L 21 Aug 1964 M	S: 30 Jun 1967 W
Philippines		S: 8 Aug 1963 LW 14 Aug 1963 M R:[3] 10 Nov 1965 L 15 Nov 1965 W 8 Feb 1966 M	S: 27 Jan 1967 LW 29 Apr 1967 M
Poland	R: 8 Jun 1961	S: 8 Aug 1963 LMW R: 14 Oct 1963 LMW	S: 27 Jan 1967 LMW R: 30 Jan 1968 LMW
Portugal		S: 9 Oct 1963 LW	

Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention
	S: 1 Jul 1968 LMW R: 5 Feb 1969 LMW S.A.: 1 Mar 1972	S: 11 Feb 1971 LMW R: 28 Jun 1971 LM 29 Jun 1971 W	S: 10 Apr 1972 LMW R: 1 Aug 1973 LW 23 Aug 1973 M
			S: 10 Apr 1972 LMW R: 25 Sep 1974 M 3 Oct 1974 LW
S: 14 Feb 1967 R:[2] 11 Jun 1971	S: 1 Jul 1968 W	S: 11 Feb 1971 W R: 20 Mar 1974 W	S: 2 May 1972 W R: 20 Mar 1974 W
S: 26 Apr 1967 R:[2] 19 Mar 1969	S: 1 Jul 1968 W R: 4 Feb 1970 W 5 Mar 1970 L	S: 23 Feb 1971 W	
S: 14 Feb 1967 R:[2] 4 Mar 1969	S: 1 Jul 1968 W R: 3 Mar 1970 W		S: 10 Apr 1972 LMW
	S: 1 Jul 1968 W 18 Jul 1968 M R: 5 Oct 1972 W 16 Oct 1972 L 20 Oct 1972 M S.A.:[2] 16 Oct 1974		S: 10 Apr 1972 LW 21 Jun 1972 M R: 21 May 1973 W
	S: 1 Jul 1968 LMW R: 12 Jun 1969 LMW S.A.: 11 Oct 1972	S: 11 Feb 1971 LMW R: 15 Nov 1971 LMW	S: 10 Apr 1972 LMW R: 25 Jan 1973 LMW
		R: 24 Jun 1975 LMW	S: 29 Jun 1972 W R: 15 May 1975 LMW

	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty
Qatar			
Romania	R:[2] 15 Sep 1971	S: 8 Aug 1963 LMW R: 12 Dec 1963 LMW	S: 27 Jan 1967 LMW R: 9 Apr 1968 LMW
Rwanda		S: 19 Sep 1963 W R: 22 Oct 1963 L 16 Dec 1963 M 27 Dec 1963 W	S: 27 Jan 1967 W
San Marino		S: 17 Sep 1963 W 20 Sep 1963 L 24 Sep 1963 M R: 3 Jul 1964 L 9 Jul 1964 W 27 Nov 1964 M	S: 21 Apr 1967 W 24 Apr 1967 L 6 Jun 1967 M R: 29 Oct 1968 W 21 Nov 1968 M 3 Feb 1969 L
Saudi Arabia			
Senegal		S: 20 Sep 1963 W 23 Sep 1963 L 9 Oct 1963 M R: 6 May 1964 L 12 May 1964 M 2 Jun 1964 W	
Sierra Leone		S: 4 Sep 1963 L 9 Sep 1963 M 11 Sep 1963 W R: 21 Feb 1964 L 4 Mar 1964 W 29 Apr 1964 M	S: 27 Jan 1967 LM 16 May 1967 W R: 13 Jul 1967 M 14 Jul 1967 W 25 Oct 1967 L
Singapore		R:[1] 12 Jul 1968 MW 23 Jul 1968 L	

Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention
		R: 12 Nov 1974 L	S: 14 Nov 1972 L R: 17 Apr 1975 L
	S: 1 Jul 1968 LMW R: 4 Feb 1970 LMW S.A.: 27 Oct 1972	S: 11 Feb 1971 LMW R:[9] 10 Jul 1972 LMW	S: 10 Apr 1972 LMW
	R: 20 May 1975 LMW	S: 11 Feb 1971 W R: 20 May 1975 LMW	S: 10 Apr 1972 MW R: 20 May 1975 LMW
	S:[18] 1 Jul 1968 W 29 Jul 1968 L 21 Nov 1968 M R: 10 Aug 1970 L 20 Aug 1970 M 31 Aug 1970 W		S: 12 Sep 1972 W 30 Jan 1973 M 21 Mar 1973 L R: 11 Mar 1975 L 17 Mar 1975 W 27 Mar 1975 M
		S: 7 Jan 1972 W R: 23 Jun 1972 W	S: 12 Apr 1972 W R: 24 May 1972 W
	S: 1 Jul 1968 MW 26 Jul 1968 L R: 17 Dec 1970 M 22 Dec 1970 W 15 Jan 1971 L	S: 17 Mar 1971 W	S: 10 Apr 1972 W R: 26 Mar 1975 W
	R: 26 Feb 1975 LMW	S: 11 Feb 1971 L 12 Feb 1971 M 24 Feb 1971 W	S: 7 Nov 1972 W 24 Nov 1972 L
	S: 5 Feb 1970 LMW	S: 5 May 1971 LMW	S: 19 Jun 1972 LMW R: 2 Dec 1975 LMW

	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty
Somalia		S: 19 Aug 1963 MW	S: 2 Feb 1967 W
South Africa	S: 1 Dec 1959 R: 21 Jun 1960	R: 10 Oct 1963 LW 22 Nov 1963 M	S: 1 Mar 1967 W R: 30 Sep 1968 W 8 Oct 1968 L
Spain		S: 13 Aug 1963 W 14 Aug 1963 L R: 17 Dec 1964 LW	R: 27 Nov 1968 L 7 Dec 1968 W
Sri Lanka		S: 22 Aug 1963 LW 23 Aug 1963 M R: 5 Feb 1964 W 12 Feb 1964 M 13 Feb 1964 L	S: 10 Mar 1967 L
Sudan		S: 9 Aug 1963 LMW R: 4 Mar 1966 LW 28 Mar 1966 M	
Swaziland		R: 29 May 1969 LW 3 Jun 1969 M	
Sweden		S: 12 Aug 1963 LMW R: 9 Dec 1963 LMW	S: 27 Jan 1967 LMW R: 11 Oct 1967 LMW
Switzerland		S: 26 Aug 1963 LMW R: 16 Jan 1964 LMW	S: 27 Jan 1967 LW 30 Jan 1967 M R: 18 Dec 1969 LMW

Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention
	S: 1 Jul 1968 LMW R: 5 Mar 1970 L 12 Nov 1970 W		S: 3 Jul 1972 M
		S: 11 Feb 1971 W R: 14 Nov 1973 W 26 Nov 1973 L	S: 10 Apr 1972 W R: 3 Nov 1975 W
			S: 10 Apr 1972 LW
	S: 1 Jul 1968 LMW		S: 10 Apr 1972 LMW
	S: 24 Dec 1968 M R: 31 Oct 1973 W 22 Nov 1973 M 10 Dec 1973 L S.A.:[8] 26 Feb 1975	S: 11 Feb 1971 L 12 Feb 1971 M	
	S: 24 Jun 1969 L R: 11 Dec 1969 L 16 Dec 1969 W 12 Jan 1970 M S.A.:[5] 28 Jul 1975	S: 11 Feb 1971 W R: 9 Aug 1971 W	
	S: 19 Aug 1968 LMW R: 9 Jan 1970 LMW S.A.: 14 Apr 1975	S: 11 Feb 1971 LMW R: 28 Apr 1972 LMW	S: 27 Feb 1975 LMW R:[11]
	S:[21] 27 Nov 1969 LMW	S: 11 Feb 1971 LMW	S:[7] 10 Apr 1972 LMW

	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty
Syria		S: 13 Aug 1963 LMW R: 1 Jun 1964 LMW	R:[10] 14 Nov 1968 M
Taiwan		S: 23 Aug 1963 W R: 18 May 1964 W	S: 27 Jan 1967 W R: 24 Jul 1970 W
Thailand		S: 8 Aug 1963 LMW R: 15 Nov 1963 L 21 Nov 1963 M 29 Nov 1963 W	S: 27 Jan 1967 LMW R: 5 Sep 1968 L 9 Sep 1968 M 10 Sep 1968 W
Togo		S: 18 Sep 1963 W R: 7 Dec 1964 W	S: 27 Jan 1967 W
Tonga		R:[1] 22 Jun 1971 M 7 Jul 1971 W	R:[3] 22 Jun 1971 L 7 Jul 1971 W 24 Aug 1971 M
Trinidad & Tobago		S: 12 Aug 1963 LW 13 Aug 1963 M R: 14 Jul 1964 W 16 Jul 1964 L 6 Aug 1964 M	S: 24 Jul 1967 L 17 Aug 1967 M 28 Sep 1967 W
Tunisia		S: 8 Aug 1963 W 12 Aug 1963 L 13 Aug 1963 M R: 26 May 1965 LM 3 Jun 1965 W	S: 27 Jan 1967 LW 15 Feb 1967 M R: 28 Mar 1968 L 4 Apr 1968 M 17 Apr 1968 W
Turkey		S: 9 Aug 1963 LMW R: 8 Jul 1965 LMW	S: 27 Jan 1967 LMW R: 27 Mar 1968 LMW

Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention
	S: 1 Jul 1968 M R:[18] 24 Sep 1969 M		S: 14 Apr 1972 M
	S: 1 Jul 1968 W R: 27 Jan 1970 W	S: 11 Feb 1971 W R: 22 Feb 1972 W	S: 10 Apr 1972 W R:[8] 9 Feb 1973 W
	R: 7 Dec 1972 L S.A.: 16 May 1974		S: 17 Jan 1973 W R: 28 May 1975 W
	S: 1 Jul 1968 W R: 26 Feb 1970 W	S: 2 Apr 1971 W R: 28 Jun 1971 W	S: 10 Apr 1972 W
	R:[11] 7 Jul 1971 LW 24 Aug 1971 M		
S: 27 Jun 1967 R:[2] 3 Dec 1970	S: 20 Aug 1968 W 22 Aug 1968 L		
	S: 1 Jul 1968 LMW R: 26 Feb 1970 LMW	S: 11 Feb 1971 LMW R: 22 Oct 1971 M 28 Oct 1971 L 29 Oct 1971 W	S: 10 Apr 1972 LMW R: 18 May 1973 W 30 May 1973 M 6 Jun 1973 L
	S: 28 Jan 1969 LMW	S: 25 Feb 1971 LMW R: 19 Oct 1972 W 25 Oct 1972 L 30 Oct 1972 M	S: 10 Apr 1972 LMW R: 25 Oct 1974 M 4 Nov 1974 L 5 Nov 1974 W

	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty
Uganda		S: 29 Aug 1963 LW R: 24 Mar 1964 L 2 Apr 1964 W	R: 24 Apr 1968 W
Ukraine		S: 8 Oct 1963 M R:[2] 30 Dec 1963 M	S:[2] 10 Feb 1967 M R: 31 Oct 1967 M
Union of Soviet Socialist Republics	S: 1 Dec 1959 R: 2 Nov 1960	S: 5 Aug 1963 M R: 10 Oct 1963 LMW	S: 27 Jan 1967 LMW R: 10 Oct 1967 LMW
United Arab Emirates			
United Kingdom	S: 1 Dec 1959 R: 31 May 1960	S: 5 Aug 1963 M R:[9] 10 Oct 1963 LMW	S: 27 Jan 1967 LMW R:[11] 10 Oct 1967 LMW
United Republic of Cameroon		S:[3] 27 Aug 1963 W 6 Sep 1963 L	S: 27 Jan 1967 W
United Republic of Tanzania		S: 16 Sep 1963 L 18 Sep 1963 W 20 Sep 1963 M R: 6 Feb 1964 L	
United States	S: 1 Dec 1959 R: 18 Aug 1960	S: 5 Aug 1963 M R: 10 Oct 1963 LMW	S: 27 Jan 1967 LMW R: 10 Oct 1967 LMW
Upper Volta		S: 30 Aug 1963 W	S: 3 Mar 1967 W R: 18 Jun 1968 W

Treaty of Tlatelolco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention
		S: 3 Mar 1971 M R: 3 Sep 1971 M	S: 10 Apr 1972 M R: 26 Mar 1975 M
	S: 1 Jul 1968 LMW R: 5 Mar 1970 LMW	S: 11 Feb 1971 LMW R: 18 May 1972 LMW	S: 10 Apr 1972 LMW R: 26 Mar 1975 LMW
			S: 28 Sep 1972 L
P.I:[11] S: 20 Dec 1967 R: 11 Dec 1969 P.II:[11] S: 20 Dec 1967 R: 11 Dec 1969	S: 1 Jul 1968 LMW R:[22] 27 Nov 1968 LW 29 Nov 1968 M	S:[10] 11 Feb 1971 LMW R: 18 May 1972 LMW	S: 10 Apr 1972 LMW R:[9] 26 Mar 1975 LMW
	S: 17 Jul 1968 W 18 Jul 1968 M R: 8 Jan 1969 W	S: 11 Nov 1971 M	
		S: 11 Feb 1971 W	S: 16 Aug 1972 L
P.II:[12] S: 1 Apr 1968 R: 12 May 1971	S: 1 Jul 1968 LMW R: 5 Mar 1970 LMW	S: 11 Feb 1971 LMW R: 18 May 1972 LMW	S: 10 Apr 1972 LMW R: 26 Mar 1975 LMW
	S: 25 Nov 1968 W 11 Aug 1969 M R: 3 Mar 1970 W		

	Antarctic Treaty	Partial Test Ban Treaty	Outer Space Treaty
Uruguay		S: 12 Aug 1963 W 27 Sep 1963 LM R: 25 Feb 1969 L	S: 27 Jan 1967 W 30 Jan 1967 M R: 31 Aug 1970 W
Venezuela		S: 16 Aug 1963 MW 20 Aug 1963 L R: 22 Feb 1965 M 3 Mar 1965 L 29 Mar 1965 W	S: 27 Jan 1967 W R: 3 Mar 1970 W
Viet-Nam, South		S: 1 Oct 1963 W	S: 27 Jan 1967 W
Western Samoa		S: 5 Sep 1963 L 6 Sep 1963 MW R: 15 Jan 1965 W 19 Jan 1965 L 8 Feb 1965 M	
Yemen		S: 13 Aug 1963 M 6 Sep 1963 W	
Yugoslavia		S: 8 Aug 1963 LMW R: 15 Jan 1964 L 31 Jan 1964 M 3 Apr 1964 W	S: 27 Jan 1967 LMW
Zaire		S: 9 Aug 1963 LW 12 Aug 1963 M R: 28 Oct 1965 W	S: 27 Jan 1967 W 29 Apr 1967 M 4 May 1967 L
Zambia		R:[1] 11 Jan 1965 MW 8 Feb 1965 L	R: 20 Aug 1973 W 21 Aug 1973 M 28 Aug 1973 L

Treaty of Tlateloco	Non-Proliferation Treaty	Sea-Bed Treaty	BW Convention
S: 14 Feb 1967 R:[3] 20 Aug 1968 S.A.:[18] 24 Sep 1971	S: 1 July 1968 W R: 31 Aug 1970 W S.A.:[8,28] 24 Sep 1971	S: 11 Feb 1971 W	
S: 14 Feb 1967 R:[2,14] 23 Mar 1970	S: 1 Jul 1968 W R: 25 Sep 1975 L 26 Sep 1975 W 3 Oct 1975 M		S: 10 Apr 1972 W
	S: 1 Jul 1968 W R: 10 Sep 1971 W S.A.:[2] 9 Jan 1974	S: 11 Feb 1971 W	S: 10 Apr 1972 W
	R: 17 Mar 1975 M 18 Mar 1975 W 26 Mar 1975 L		
	S: 23 Sep 1968 M	S: 23 Feb 1971 M	S: 10 Apr 1972 W 17 Apr 1972 M 10 May 1972 L
	S: 10 Jul 1968 LMW R:[24] 4 Mar 1970 W 5 Mar 1970 LM S.A.: 28 Dec 1973	S: 2 Mar 1971 LMW R:[11] 25 Oct 1973 LMW	S: 10 Apr 1972 LMW R: 25 Oct 1973 LMW
	S: 22 Jul 1968 W 26 Jul 1968 M 17 Sep 1968 L R: 4 Aug 1970 W S.A.: 9 Nov 1972		S: 10 Apr 1972 MW R: 16 Sep 1975 L
		R: 9 Oct 1972 L 1 Nov 1972 W 2 Nov 1972 M	

The Antarctic Treaty

[1] The Netherlands stated that the accession was also valid for Surinam and the Netherlands Antilles. On 25 November 1975, Surinam became an independent state.
[2] Romania stated that the provisions of the first paragraph of Article XIII of the Antarctic 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 opened for universal participation.
[3] The German Democratic Republic stated its view that Article XIII, § 1, of the Antarctic Treaty was inconsistent with the principle that all states whose policies are guided by the purposes and principles of the United Nations Charter have a right to become parties to treaties which affect the interests of all states.

The Partial Test Ban Treaty

[1] Notification of succession.
[2] The United States considers that the Byelorussian SSR and the Ukrainian SSR are already covered by the signature and deposit of ratification by the USSR.
[3] With a statement that this does not imply the recognition of any territory or régime not recognized by this state.
[4] Egypt stated that its ratification of the Treaty does not mean or imply any recognition of Israel or any treaty relations with Israel.
[5] The United States did not accept the notification of signature and deposit of ratification by the German Democratic Republic which it then did not recognize as a state. On 4 September 1974, the two countries established diplomatic relations with each other.
[6] The Federal Republic of Germany stated that the Treaty applies also to *Land* Berlin.
[7] Kuwait stated that its signature and ratification of the Treaty does not in any way imply its recognition of Israel, nor does it oblige it to apply the provisions of the Treaty in respect of the said country.
[8] The Netherlands stated that the ratification is also valid for Surinam and the Netherlands Antilles. On 25 November 1975, Surinam became an independent state.
[9] The UK stated its view that if a régime 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 the recognition of that régime by any other state.

The Outer Space Treaty

[1] The Brazilian government interprets Article 10 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.
[2] The United States considers that the Byelorussian SSR and the Ukrainian SSR are already covered by the signature and deposit of ratification by the USSR.
[3] Notification of succession.
[4] The USA stated that this did not imply recognition of the German Democratic Republic. On 4 September 1974, the two countries established diplomatic relations with each other.
[5] The Federal Republic of Germany stated that the Treaty applies also to *Land* Berlin.
[6] With a statement that this does not imply the recognition of any territory or régime not recognized by this state.
[7] 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.
[8] Madagascar acceded to the Treaty with the understanding that under Article 10 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.
[9] The Netherlands stated that the ratification is also valid for Surinam and the Netherlands Antilles. On 25 November 1975, Surinam became an independent state.
[10] 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.
[11] The United Kingdom's ratification is in respect of the United Kingdom of Great Britain and Northern Ireland, the Associated States (Antigua, Dominica, Grenada, Saint Christopher-Nevis-Anguilla and Saint Lucia) and Territories under the territorial sovereignty of the United Kingdom, as well as the State of Brunei, the Kingdom of Swaziland, the Kingdom of Tonga and the British Solomon Islands Protectorate. On depositing its instrument of ratification, the United Kingdom declared that the Treaty will not be applicable in regard to Southern Rhodesia unless and until the United Kingdom informs the other depositary governments that it is in a position to ensure that the obligations imposed

by the Treaty in respect of that territory can be fully implemented. As from 4 June 1970, the UK ceased to have responsibility for the external relations of Tonga; subsequently Tonga succeeded to the Treaty. Swaziland became independent on 6 September 1968. Grenada became independent on 7 February 1974.

The Treaty of Tlatelolco

[1] Argentina stated that it understands Article 18 as recognizing the right of the 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 § 2 of Article 28, which waived the requirements specified in § 1 of that Article, namely, that all states in the region deposit the instruments of ratification; that Additional Protocol I and Additional 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—on 6 September 1972; Grenada—on 20 June 1975; Trinidad and Tobago—on 27 June 1975.

[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.

[4] Brazil stated that it did not waive the requirements laid down in Article 28 of the Treaty. (The Treaty is therefore not yet in force for Brazil.) In ratifying the Treaty, Brazil reiterated its interpretation of Article 18, which it made upon signing.

[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 her means of transportation and delivery carrying nuclear weapons to cross the territory, territorial sea or airspace of Latin American countries. It is necessary to point out that the signing of Additional Protocol II to the Treaty for the Prohibition of Nuclear Weapons in Latin America by the Chinese Government does not imply any change whatsoever in China's principled stand on the disarmament and nuclear weapons issue and, in particular, does not affect the Chinese Government's consistent stand against the treaty on non-proliferation of nuclear weapons and the partial nuclear test ban treaty . . ."

"The Chinese Government holds that, in order that Latin America may truly become a nuclear-weapon-free zone, all nuclear countries, and particularly the super-powers, which possess huge numbers of nuclear weapons, must first of all undertake earnestly not to use or threaten to use nuclear weapons against the Latin American countries and the Latin American nuclear-weapon-free zone, and they must be asked to undertake to observe and implement the following: (1) dismantling of all foreign military bases in Latin America and refraining from establishing any new foreign military bases there; (2) prohibition of the passage of any means of transportation and delivery carrying nuclear weapons through Latin American territory, territorial sea or air space."

[6] 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 United Nations Charter; it takes note of the interpretation of the Treaty given by the Preparatory Commission 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 a legislation which is consistent with international law. The provisions of Articles 1 and 2 of the Protocol apply to the text of the Treaty of Tlatelolco 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 thereof 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 the French Republic 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 April 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.

[7] In 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 procedure established therein.

[8] The Netherlands stated that the Protocol shall not be interpreted as prejudicing the position of the Netherlands as regards its recognition or non-recognition of the rights of or claims to sovereignty of the parties to the Treaty, or of the grounds on which such claims are made. With respect to nuclear

explosions for peaceful purposes on the territory of Surinam and the Netherlands Antilles, no other rules apply than those operative for the parties to the Treaty. Upon Surinam's accession to independence on 25 November 1975, the obligations of the Netherlands under the Protocol apply only to the Netherlands Antilles.

[9] 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.

[10] The Treaty is not in force for Chile, which has not waived the requirements laid down in Article 28 of the Treaty.

[11] When signing and ratifying Additional Protocol I and Additional Protocol II, the United Kingdom 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 Additional 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 weapons purposes.

Its signing and ratification 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 re-consider the extent to which it could be regarded as committed by the provisions of Additional Protocol II.

In addition, the UK declared that its undertaking under Article 3 of Additional 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 1 of Additional Protocol I becomes effective.

[12] The United States signed and ratified Additional Protocol II with the following understandings and declarations:

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 US ratification of the Protocol could not be regarded as implying recognition of any legislation which did not, in its view, 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 United States 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.

Paragraph 4 of Article 18 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 United States will act with respect to such territories of Protocol I adherents, as are within the geographical area defined in Paragraph 2 of Article 4 of the Treaty, in the same manner as Protocol II requires it to act with respect to the territories of the parties.

[13] The Safeguards Agreement was concluded in accordance with Article III of the NPT. An additional protocol provides that the safeguards under the NPT shall also apply to Uruguay's obligations under Article 13 of the Treaty of Tlatelolco.

[14] Venezuela stated that in view of the existing controversy between Venezuela on the one hand and the United Kingdom and Guyana on the other, § 2 of Article 25 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.

[15] Safeguards under the NPT cover the Treaty of Tlatelolco.

The Non-Proliferation Treaty

[1] On signing the Treaty, Australia stated, *inter alia,* that it wanted to be assured that there was sufficient degree of support for the Treaty, regarded it as essential that the Treaty should not affect security commitments under existing treaties of mutual security, and considered that the safeguards agreement to be concluded by Australia with the IAEA in accordance with Treaty Article III must in

no way subject Australia to treatment less favourable than is accorded to other states which, individually or collectively, conclude safeguards agreements with that agency.

[2] Together with a Protocol suspending the trilateral safeguards agreement between itself, the USA and the IAEA.

[3] Together with a Protocol on cooperation in the application of safeguards between Euratom and the IAEA.

[4] 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.

[5] Together with a Protocol for states having minimal quantities of nuclear material.

[6] Covers the NPT and the Treaty of Tlatelolco.

[7] Provisionally in force.

[8] Entry into force is subject to notification that the statutory and constitutional requirements for entry into force have been met.

[9] Together with a Protocol for states that have signed a Treaty of accession to Euratom.

[10] Together with a Protocol suspending the trilateral safeguards agreement between the IAEA, Denmark and the UK; and a Protocol suspending the trilateral safeguards agreement between the IAEA, Denmark and the USA.

[11] Notification of succession.

[12] On 25 November 1969, the United States notified its non-acceptance of notification of signature and ratification by the German Democratic Republic which it then did not recognize as a state. On 4 September 1974, the two countries established diplomatic relations with each other.

[13] On depositing the instrument of ratification, the Federal Republic of 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 the FRG 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 cooperation 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 the FRG in international competition, and that it attached vital importance to the undertaking given by the United States and the United Kingdom concerning the application of safeguards to their peaceful nuclear facilities, hoping that other nuclear-weapon states would assume similar obligations.

In a separate note, the FRG 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 August, and 25 November 1975, respectively, addressed to the US Department of State, Czechoslovakia, the USSR and the German Democratic Republic stated that this declaration by the FRG had no legal effect.

[14] 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 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 under strict and effective international control.

[15] On signing the Treaty, Indonesia stated, *inter alia,* that the government of Indonesia attaches great importance to the declarations of the United States of America, the United Kingdom and the Soviet Union, 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. The Indonesian government trusts that the nuclear-weapon states will study further this question of effective measures to ensure the security of the non-nuclear-weapon states. Its decision to sign the Treaty is not to be taken in any way as a decision to ratify the Treaty. Its ratification will be considered after matters of national security, which are of deep concern to the government and people of Indonesia, have been clarified to their satisfaction.

[16] On depositing the instrument of ratification, Italy reiterated the declaration made at the time of signing: it 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 militarily nuclear 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 January 1967, and stressed that under no circumstance a claim of pertaining to such category would be recognized by the Italian government to any other state.

[17] On signing the Treaty, Japan stated, *inter alia*, that pending the ratification of the Treaty it would pay particular attention to developments in disarmament negotiations and progress in the implementation of the UN Security Council resolution on the security of non-nuclear-weapon states, and that the safeguards agreement to be concluded by Japan with the IAEA in accordance with Article III of the Treaty must not be such as would subject it to disadvantageous treatment as compared with the safeguards agreements which other parties concluded with the agency.

[18] A statement was made containing a disclaimer regarding the recognition of states party to the Treaty.

[19] 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 for the Prohibition of Nuclear Weapons in Latin America (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.

[20] Agreements were signed by the Netherlands for the Netherlands Antilles and Surinam, covering the NPT and Additional Protocol I to the Treaty of Tlatelolco (both entered into force on 5 June 1975), together with a Protocol for states having minimal quantities of nuclear material.

[21] On signing the Treaty, Switzerland stated that the Treaty would not be submitted to Parliament for approval until such time as a sufficient measure of universal support has been obtained by the Treaty.

[22] The Treaty was ratified in respect of the United Kingdom of Great Britain and Northern Ireland, the Associated States (Antigua, Dominica, Grenada, Saint Christopher-Nevis-Anguilla and Saint Lucia) and Territories under the territorial sovereignty of the United Kingdom, as well as the State of Brunei, the Kingdom of Tonga and the British Solomon Islands Protectorate. The United Kingdom recalled its view that if a régime 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 régime by any other state. The provisions of the Treaty shall not apply in regard to Southern Rhodesia unless and until the government of the United Kingdom informs the other depositary governments that it is in a position to ensure that the obligations imposed by the Treaty in respect of that territory can be fully implemented. Cameroon stated that it was unable to accept the reservation concerning Southern Rhodesia. Also Mongolia stated that the obligations assumed by the United Kingdom under the Non-Proliferation Treaty should apply equally to Southern Rhodesia. In a note addressed to the British Embassy in Moscow, the Soviet government expressed the view that the United Kingdom carries the entire responsibility for Southern Rhodesia until the people of that territory acquire genuine independence, and that this fully applies to the Non-Proliferation Treaty.

In 1970, the UK ceased to have responsibility for the external relations of Tonga; Tonga became party to the NPT in its own right. Having attained independence, Grenada became party to the NPT in its own right.

[23] Together with a Protocol relating to Article 13 of the Treaty of Tlatelolco.

[24] 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 the 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 NPT.

[25] The ratification of the Netherlands stated that the Treaty had been approved for the Kingdom in Europe, Surinam and the Netherlands Antilles. Surinam became independent on 25 November 1975. By letter of 29 November 1975, the Prime Minister of the Republic of Surinam informed the UN Secretary-General that his government "acknowledges that treaty rights and obligations of the Government of the Kingdom of the Netherlands in respect of Surinam were succeeded by the Republic of Surinam upon Independence" and that it is "desired that it be presumed that each treaty has been legally succeeded to by the Republic of Surinam and that action be based upon this presumption until a decision is reached that it should be regarded as having lapsed".

The Sea-Bed Treaty

[1] On signing the Treaty, Argentina made a declaration. It stated that it interprets the references to the freedoms of the high seas as in no way implying a pronouncement or judgment 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 the Brazilian government 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.

[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 seabed 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 seabed 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 seabed 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 seabed zone referred to in Article I and defined in Article II.

[4] The United States has not accepted the notification of signature by the German Democratic Republic.

[5] On signing the Treaty, the Federal Republic of Germany stated that its signature does not imply recognition of the German Democratic Republic under international law. On ratifying the Treaty, the Federal Republic of 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 sovereign 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 Sea-Bed Treaty is based on this position. In response to the Indian statement, the US Government expressed the view that under existing international law, the rights of coastal states over their continental shelves are exclusive only for 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.

[7] A statement was made containing a disclaimer regarding the recognition of states party to the Treaty.

[8] 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.

[9] Romania stated that it considered null and void the ratification of the Treaty by the Taiwan authorities.

[10] The instrument of ratification states that the Treaty is ratified in respect of the United Kingdom of Great Britain and Northern Ireland, the Associated States (Antigua, Dominica, Grenada, Saint Christopher-Nevis-Anguilla, Saint Lucia and Saint Vincent) and Territories under the territorial sovereignty of the United Kingdom, as well as the State of Brunei and the British Solomon Islands Protectorate. The United Kingdom recalled its view that if a régime 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 régime by any other state. Grenada became independent on 7 February 1974.

[11] On 25 February 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, § 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 January 1975, the US Secretary of State presented the view of the USA concerning the Yugoslav note, as follows: "Insofar as the note is intended to be interpretative of the treaty, the United States cannot accept it as a valid interpretation. In addition, the United States does not consider that it can have any effect on the existing law of the sea". Insofar as the note was intended to be a reservation to the treaty, the United States placed on record its formal objection to it on the grounds that it was incompatible with the object and purpose of the treaty. The United States 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 United Kingdom.

The BW Convention

[1] Considering the obligations resulting from its status as a permanently neutral state, the Republic of Austria declares a reservation to the effect that its cooperation within the framework of this Convention cannot exceed the limits determined by the status of permanent neutrality and membership with the United Nations.

[2] 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 in 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 medical or humanitarian nature and in conformity with the Charter of the United Nations. The statement was repeated at the time of the deposit of the instrument of ratification.

[3] Ireland considers that the Convention could be undermined if 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.

[4] The Republic of Korea stated that the signing of the Convention does not in any way mean or imply the recognition of any territory or régime which has not been recognized by the Republic of Korea as a state or government.

[5] 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 Convention in respect of the said country.

[6] 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.

[7] Switzerland stated that the Convention would not be submitted to the parliamentary procedure of approval preceding ratification, until such time as the convention has obtained a measure of universal support, considered necessary by the Swiss government. Switzerland reserves the right to decide for itself which means fall under the category of weapons, equipment or means of delivery designed to use biological agents or toxins, to which the Convention is applicable. With regard to Article VII of the Convention, Switzerland has made a general reservation, namely, that its cooperation within the framework of the Convention cannot go beyond its obligations resulting from its status of permanent neutrality.

[8] The USSR stated that it considered the deposit of the instrument of ratification by Taiwan as an illegal act, because the government of the Chinese People's Republic is the sole representative of China.

[9] The United Kingdom recalled its view that if a régime 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 régime by any other state. It declared that the provisions of the Convention shall not apply in regard to Southern Rhodesia unless and until the UK government informs the other depositary governments that it is in a position to ensure that the obligations imposed by the Convention in respect of that territory can be fully implemented. In a note addressed to the British Embassy in Moscow, the Soviet government expressed the view that the United Kingdom carries the entire responsibility for Southern Rhodesia until the people of that territory acquire genuine independence, and that this fully applies to the BW Convention.

[10] Kenya acceded to the Convention on 7 January 1976.

[11] Sweden ratified the Convention on 5 February 1976.

Appendix 9F

Status of the implementation of the Geneva Protocol of 17 June 1925, for the prohibition of the use in war of asphyxiating, poisonous and other gases, and of bacteriological methods of warfare, as of 31 December 1975

The text of the Protocol can be found in the SIPRI Yearbook 1969/70, p. 438, or in the SIPRI Yearbook 1974, p. 418.

Note

Some states, former non-self-governing territories, acceded to the Geneva Protocol without referring to the obligations previously undertaken on their behalf by the colonial power. In these cases, the date of the notification by the government of France, the depositary government, is indicated as the date of entry into force of the accession for the countries concerned, in accordance with paragraph 2 of the operative part of the Protocol.

Other states, former non-self-governing territories, officially informed the government of France that they consider themselves bound by the Geneva Protocol by virtue of its ratification by the power formerly responsible for their administration. In such cases of continuity of obligations under the Geneva Protocol, the date of receipt of the country's notification by the French government is indicated. In the absence of a statement to the contrary the succession is regarded as applying also to reservations attached to the ratification of the Protocol.

States which, upon attaining independence, made general statements of continuity to the treaties concluded by the power formerly responsible for their administration, but have not notified the government of France that their statements specifically applied to the Geneva Protocol, are not listed here as parties. The French government considers that a general statement of continuity, made by a country attaining independence, does not entitle the government with which an international convention has been deposited to consider that country as bound by the said convention.

Although the total number of ratifications, accessions and successions to the Geneva Protocol is 95, account should be taken of the facts that Estonia, Latvia and Lithuania, which signed and ratified the Protocol, no longer have independent status; both the Federal Republic of Germany and the German Democratic Republic are bound by ratification on behalf of Germany; and both the People's Republic of China and Taiwan are bound by accession on behalf of China.

The total number of actual parties to the Geneva Protocol, as of 31 December 1975, is 94.

I. List of signatories and ratifications

Signatory	*Deposit of ratification*
Austria	9 May 1928
Belgium	4 Dec 1928[1]
Brazil	28 Aug 1970
British Empire	9 Apr 1930[2]
Bulgaria	7 Mar 1934[3]
Canada	6 May 1930[4]
Chile	2 Jul 1935[5]
Czechoslovakia	16 Aug 1938[6]
Denmark	5 May 1930
Egypt	6 Dec 1928
El Salvador	
Estonia	28 Aug 1931[7]
Ethiopia	20 Sep 1935[8]
Finland	26 Jun 1929
France	10 May 1926[9]
Germany	25 Apr 1929[10]
Greece	30 May 1931
India	9 Apr 1930[11]
Italy	3 Apr 1928
Japan	21 May 1970
Latvia	3 Jun 1931
Lithuania	15 Jun 1933
Luxembourg	1 Sep 1936
Netherlands	31 Oct 1930[12]
Nicaragua	
Norway	27 Jul 1932
Poland	4 Feb 1929
Portugal	1 Jul 1930[13]
Romania	23 Aug 1929[14]
Serbs, Croats and Slovenes, Kingdom of the (Yugoslavia)	12 Apr 1929[15]
Siam (Thailand)	6 Jun 1931
Spain	22 Aug 1929[16]
Sweden	25 Apr 1930
Switzerland	12 Jul 1932
Turkey	5 Oct 1929
USA	10 Apr 1975[44]
Uruguay	
Venezuela	8 Feb 1928

II. List of accessions and successions

Country	*Notification*
Argentina	12 May 1969
Australia	24 May 1930[17]
Central African Republic	31 Jul 1970
China	24 Aug 1929[18]
Cuba	24 Jun 1966
Cyprus	29 Nov 1966[19]
Dominican Republic	8 Dec 1970
Ecuador	16 Sep 1970
Fiji	21 Mar 1973[20]
Gambia	5 Nov 1966[21]
Ghana	3 May 1967
Holy See	18 Oct 1966
Hungary	11 Oct 1952
Iceland	2 Nov 1967
Indonesia	21 Jan 1971[22]
Iran (Persia)	5 Nov 1929
Iraq	8 Sep 1931[23]
Ireland (Irish Free State)	29 Aug 1930[24]
Israel	20 Feb 1969[25]
Ivory Coast	27 Jul 1970
Jamaica	28 Jul 1970[26]
Kenya	6 Jul 1970
Kuwait	15 Dec 1971[27]
Lebanon	17 Apr 1969
Lesotho	10 Mar 1972[28]
Liberia	17 Jun 1927
Libya	29 Dec 1971[29]
Madagascar	2 Aug 1967
Malawi	14 Sep 1970
Malaysia	10 Dec 1970
Maldives	27 Dec 1966[30]
Malta	9 Oct 1970[31]
Mauritius	23 Dec 1970[32]
Mexico	28 May 1932
Monaco	6 Jan 1967
Mongolia	6 Dec 1968[33]
Morocco	13 Oct 1970
Nepal	9 May 1969
New Zealand	24 May 1930[34]
Niger	5 Apr 1967[35]
Nigeria	15 Oct 1968[36]

Pakistan	15 Apr 1960[37]
Panama	4 Dec 1970
Paraguay	22 Oct 1933[38]
Philippines	8 Jun 1973
Rwanda	11 May 1964[39]
Saudi Arabia	27 Jan 1971
Sierra Leone	20 Mar 1967
South Africa	24 May 1930[40]
Sri Lanka	20 Jan 1954
Syria	17 Dec 1968[41]
Togo	5 Apr 1971
Tonga	28 Jul 1971
Trinidad and Tobago	24 Nov 1970[42]
Tunisia	12 Jul 1967
Uganda	24 May 1965
United Republic of Tanzania	22 Apr 1963
Upper Volta	3 Mar 1971
USSR	15 Apr 1928[43]
Yemen	17 Mar 1971

III. List of non-parties (UN members and such non-UN members which are bound by at least one of the post-World War II arms-control agreements)

Afghanistan
Albania
Algeria
Bahamas
Bahrain
Bangladesh
Barbados
Benin (Dahomey)
Bhutan
Bolivia
Botswana
Burma
Burundi
Byelorussia
Cambodia
Cape Verde
Chad
Colombia
Comoros
Congo
Costa Rica
Democratic Yemen
El Salvador (signed but not ratified)
Equatorial Guinea
Gabon
Grenada
Guatemala
Guinea
Guinea-Bissau
Guyana
Haiti
Honduras
Jordan
Korea, South
Laos
Mali
Mauritania
Mozambique

Nicaragua (signed but not ratified)
Oman
Papua New Guinea
Peru
Qatar
San Marino
São Tomé and Principe
Senegal
Singapore
Somalia
Sudan
Surinam
Swaziland
Ukraine
United Arab Emirates
United Republic of Cameroon
Uruguay (signed but not ratified)
Viet-Nam, South
Western Samoa
Zaire
Zambia

Notes:

[1] (1) The said Protocol is only binding on the Belgian government as regards States which have signed or ratified it or which may accede to it. (2) The said Protocol shall *ipso facto* cease to be binding on the Belgian government in regard to any enemy State whose armed forces or whose allies fail to respect the prohibitions laid down in the Protocol.

[2] The British Plenipotentiary declared when signing: "my signature does not bind India or any British Dominion which is a separate Member of the League of Nations and does not separately sign or adhere to the Protocol".

(1) The said Protocol is only binding on His Britannic Majesty as regards those Powers and States which have both signed and ratified the Protocol or have finally acceded thereto. (2) The said Protocol shall cease to be binding on His Britannic Majesty towards any Power at enmity with Him whose armed forces, or the armed forces of whose allies, fail to respect the prohibitions laid down in the Protocol.

[3] The said Protocol is only binding on the Bulgarian government as regards States which have signed or ratified it or which may accede to it. The said Protocol shall *ipso facto* cease to be binding on the Bulgarian government in regard to any enemy State whose armed forces or whose allies fail to respect the prohibitions laid down in the Protocol.

[4] (1) The said Protocol is only binding on His Britannic Majesty as regards those States which have both signed and ratified it, or have finally acceded thereto. (2) The said Protocol shall cease to be binding on His Britannic Majesty towards any State at enmity with Him whose armed forces, or whose allies *de jure* or in fact fail to respect the prohibitions laid down in the Protocol.

[5] (1) The said Protocol is only binding on the Chilean government as regards States which have signed and ratified it or which may definitely accede to it. (2) The said Protocol shall *ipso facto* cease to be binding on the Chilean government in regard to any enemy State whose armed forces, or whose allies, fail to respect the prohibitions which are the object of this Protocol.

[6] The Czechoslovak Republic shall *ipso facto* 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] (1) The said Protocol is only binding on the Estonian government as regards States which have signed or ratified it or which may accede to it. (2) The said Protocol shall *ipso facto* cease to be binding on the Estonian government in regard to any enemy State whose armed forces or whose allies fail to respect the prohibitions laid down in the Protocol.

[8] The document deposited by Ethiopia, a signer of the Protocol, is registered as an accession. The date given is therefore the date of notification by the French government.

[9] (1) The said Protocol is only binding on the government of the French Republic as regards States which have signed or ratified it or which may accede to it. (2) The said Protocol shall *ipso facto* cease to be binding on the government of the French Republic in regard to any enemy State whose armed forces or whose allies fail to respect the prohibitions laid down in the Protocol.

[10] On 2 March 1959, the embassy of Czechoslovakia transmitted to the French Ministry for Foreign Affairs a document stating the applicability of the Protocol to the German Democratic Republic. This was reaffirmed in a note of the German Democratic Republic, of 23 September 1974, received by the French government on 21 October 1974.

[11] (1) The said Protocol is only binding on His Britannic Majesty as regards those States which have both signed and ratified it, or have finally acceded thereto. (2) The said Protocol shall

cease to be binding on His Britannic Majesty towards any Power at enmity with Him whose armed forces, or the armed forces of whose allies, fail to respect the prohibitions laid down in the Protocol.

[12] Including the Netherlands Indies, Surinam and Curaçao. On 25 November 1975 Surinam became a sovereign state.

As regards the use in war of asphyxiating, poisonous or other gases, and of all analogous liquids, materials or devices, this Protocol shall *ipso facto* cease to be binding on the Royal Netherlands government with regard to any enemy State whose armed forces or whose allies fail to respect the prohibitions laid down in the Protocol.

[13] (1) The said Protocol is only binding on the government of the Portuguese Republic as regards States which have signed and ratified it or which may accede to it. (2) The said Protocol shall *ipso facto* cease to be binding on the government of the Portuguese Republic in regard to any enemy State whose armed forces or whose allies fail to respect the prohibitions which are the object of this Protocol.

[14] (1) The said Protocol only binds the Romanian government in relation to States which have signed and ratified or which have definitely acceded to the Protocol. (2) The said Protocol shall cease to be binding on the Romanian government in regard to all enemy States whose armed forces or whose allies *de jure* or in fact do not respect the restrictions which are the object of this Protocol.

[15] The said Protocol shall cease to be binding on the government of the Serbs, Croats and Slovenes in regard to any enemy State whose armed forces or whose allies fail to respect the prohibitions which are the object of this Protocol.

[16] Declares as binding *ipso facto*, without special agreement with respect to any other Member or State accepting and observing the same obligation, that is to say, on condition of reciprocity, the Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous and other Gases and of Bacteriological Methods of Warfare, signed at Geneva on 17 June 1925.

[17] Subject to the reservations that His Majesty is bound by the said Protocol only towards those Powers and States which have both signed and ratified the Protocol or have acceded thereto, and that His Majesty shall cease to be bound by the Protocol towards any Power at enmity with Him whose armed forces, or the armed forces of whose allies, do not respect the Protocol.

[18] On 13 July 1952, the People's Republic of China issued a statement recognizing as binding upon it the accession to the Protocol in the name of China. The People's Republic of China considers itself bound by the Protocol on condition of reciprocity on the part of all the other contracting and acceding powers.

[19] In a note of 21 November 1966, Cyprus declared that it was bound by the Protocol which had been made applicable to it by the British Empire.

[20] In a declaration of succession of 26 January 1973 addressed to the depositary government, the government of Fiji confirmed that the provisions of the Protocol were applicable to it by virtue of the ratification by the United Kingdom. The Protocol is only binding on Fiji as regards states which have both signed and ratified it and which will have finally acceded thereto. The Protocol shall cease to be binding on Fiji in regard to any enemy state whose armed forces or the armed forces of whose allies fail to respect the prohibitions which are the object of the Protocol.

[21] In a declaration of 11 October 1966, Gambia confirmed its participation in the Protocol which had been made applicable to it by the British Empire.

[22] In an official declaration of 13 January 1971 addressed to the French government, the government of Indonesia reaffirmed its acceptance of the Geneva Protocol which had been ratified on its behalf by the Netherlands on 31 October 1930, and stated that it remained signatory to that Protocol.

[23] On condition that the Iraq government shall be bound by the provisions of the Protocol only towards those States which have both signed and ratified it or have acceded thereto, and that it shall not be bound by the Protocol towards any State at enmity with Iraq whose armed forces, or the forces of whose allies, do not respect the provisions of the Protocol.

[24] The government of the Irish Free State 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 said Protocol, the government of the Irish Free State would cease to be bound by the said Protocol in regard to such State. In a note of 7 February 1972, received by the depositary government on 10 February 1972, the government of Ireland declared that it had decided to withdraw the above reservations made at the time of accession to the Protocol.

[25] The said Protocol is only binding on the State of Israel as regards States which have signed and ratified or acceded to it. The said Protocol shall cease *ipso facto* to be binding on the State of 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 this Protocol.

[26] Jamaica declared to the depositary government that it considered itself bound by the provisions of the Protocol on the basis of the ratification by the British Empire in 1930.
[27] The accession of the State of Kuwait to this 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 mentioned in this Protocol by any of the Parties, the State of Kuwait will not be bound, with regard to the Party committing the breach, to apply the provisions of this Protocol. In a note of 25 January 1972, addressed to the depositary government, Israel objected to the above reservations.
[28] By a note of 10 February 1972 addressed to the depositary government, Lesotho confirmed that the provisions of the Protocol were applicable to it by virtue of the ratification by the British Empire on 9 April 1930.
[29] The accession to the Protocol does not imply recognition or the establishment of any relations with Israel. The present Protocol is binding on the Libyan Arab Republic only as regards States which are effectively bound by it and will cease to be binding on the Libyan Arab Republic 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. In a note of 25 January 1972 addressed to the depositary government, Israel objected to the above reservations.
[30] In a declaration of 19 December 1966, Maldives confirmed its adherence to the Protocol.
[31] By a notification of 25 September 1970, the government of Malta informed the French government that it considered itself bound by the Geneva Protocol as from 21 September 1964, the provisions of the Protocol having been extended to Malta by the government of the United Kingdom, prior to the former's accession to independence.
[32] By a notification of 27 November 1970, the government of Mauritius informed the French government that it considered itself bound by the Geneva Protocol as from 12 March 1968, the date of its accession to independence.
[33] In the case of violation of this prohibition by any State in relation to the People's Republic of Mongolia or its allies, the government of the People's Republic of Mongolia shall not consider itself bound by the obligations of the Protocol towards that State.
[34] Same reservations as Australia. (See footnote 17.)
[35] In a letter of 18 March 1967, Niger declared that it was bound by the adherence of France to the Protocol.
[36] The Protocol is only binding on Nigeria as regards States which are effectively bound by it and shall cease to be binding on Nigeria as regards States whose forces or whose allies' armed forces fail to respect the prohibitions which are the object of the Protocol.
[37] By a note of 13 April 1960, Pakistan informed the depositary government that it was a party to the Protocol by virtue of Paragraph 4 of the Annex to the Indian Independence Act of 1947.
[38] This is the date of receipt of the instrument of accession. The date of the notification by the French government "for the purpose of regularization" is 13 January 1969.
[39] In a declaration of 21 March 1964, Rwanda recognized that it was bound by the Protocol which had been made applicable to it by Belgium.
[40] Same reservations as Australia. (See footnote 17.)
[41] The accession by the Syrian Arab Republic to this Protocol and the ratification of the Protocol by its government 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 this Protocol.
[42] By a note of 9 October 1970, the government of Trinidad and Tobago notified the French government that it considered itself bound by the Protocol, the provisions of which had been made applicable to Trinidad and Tobago by the British Empire prior to the former's accession to independence.
[43] (1) The said Protocol only binds the government of the Union of Soviet Socialist Republics in relation to the States which have signed and ratified or which have definitely acceded to the Protocol. (2) The said Protocol shall cease to be binding on the government of the Union of Soviet Socialist Republics 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.
On 2 March 1970, the Byelorussian Soviet Socialist Republic stated that "it recognizes itself to be a Party" to the Geneva Protocol of 1925 (United Nations doc. A/8052, Annex III).
[44] The Protocol shall cease to be binding on the government of the United States 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 fails to respect the prohibitions laid down in the Protocol.

Appendix 9G

Notifications of military manoeuvres in Europe, as of February 1976

State giving notification	Date of notification	Duration of manoeuvre	Designation of manoeuvre	Number of troops involved	Area of manoeuvre
Canada	21 Aug 1975	15–19 Sep 1975	Grosse Rochade[a]	. .	Federal Republic of Germany
Federal Republic of Germany	22 Aug 1975	15–19 Sep 1975	Grosse Rochade[a]	68 000	Federal Republic of Germany: Marktredwitz–Passau–Munich–Augsburg–Nuremberg
United States	22 Aug 1975	15–19 Sep 1975	Grosse Rochade[a]	. .	Federal Republic of Germany
France	25 Aug 1975	15–19 Sep 1975	Grosse Rochade[a]	500[c]	Federal Republic of Germany
United States	22 Aug 1975	15–19 Sep 1975	Cold Fire[a]	. .	Central European region
Turkey	22 Aug 1975	12–28 Sep 1975	Deep Express 75[b]	~18 000	Aegean Sea and Eastern Thrace
United Kingdom	25 Aug 1975	12–28 Sep 1975	Deep Express 75[b]	6 000–7 000[c]	Aegean Sea and Turkish Thrace
Federal Republic of Germany	9 Sep 1975	13–17 Oct 1975	Straffe Zügel[e]	17 100	Lower Saxony
United States	10 Sep 1975	13–17 Oct 1975	Straffe Zügel[e]	. .	Lower Saxony
Federal Republic of Germany	9 Sep 1975	14–23 Oct 1975	Certain Trek[d]	57 000	Northwestern Bavaria
United States	10 Sep 1975	14–23 Oct 1975	Certain Trek[d]	57 000	Northwestern Bavaria
Canada	10 Sep 1975	14–23 Oct 1975	Certain Trek[d]	. .	Federal Republic of Germany
United States	10 Sep 1975	Early Oct–late Nov 1975	Reforger 75[f]	10 000	Federal Republic of Germany
Norway	12 Sep 1975	3–7 Oct 1975	Batten Bolt 75[g]	8 000	Östfold area southeast of Oslo
Yugoslavia	29 Sep 1975	21–25 Oct 1975	Division in Action[h]	~18 000	Southwest Macedonia
Switzerland	10 Oct 1975	10–18 Nov 1975	. .[i]	40 000	Northeast Switzerland: Schaffhouse–Winterthur–St Gall–Rhine–Schaffhouse
The Netherlands	14 Oct 1975	28 Oct–6 Nov 1975	Pantser Sprong[j]	~10 000	Federal Republic of Germany: Küstenkanal–river Weser–Mittellandkanal–river Ems–Dortmund–Emskanal
USSR	4 Jan 1976	25 Jan–6 Feb 1976	Kavkaz[k]	~25 000	Region of Kutaisi, Yerevan and Tbilisi
Norway	3 Feb 1976	10–15 Mar 1976 Field manoeuvre period: 24 Feb–23 Mar	Atlas Express[l]	~17 000	North Norway

[a] "Grosse Rochade" was to take place in the context of the "Autumn Forge Exercise Series", a coordinated series of regular national and multinational field training and command post exercises conducted by certain members of NATO. Command level: Second Corps.

Reforger units were to conduct weapon test-firing exercises in major training areas prior to returning their equipment to storage and returning to the USA.

[g] "Batten Bolt 75"—a refresher training with allied cooperation. Command level: Land Command Östlandet.

Participating units: German Tenth Armoured Division, Fourth "Jäger" Division, parts of First Airborne Division, parts of corps support and logistic forces and parts of home defence units; one US brigade, one Canadian brigade, one French reconnaissance regiment, air support by parts of tactical air forces from some participating states. In addition, US tactical aircraft assigned to the European Theatre were to provide air support to the land forces involved as part of an air exercise designated "Cold Fire" to be held in the Central European region.

Absence of land forces from their garrisons: 11–13 to 19–20 September 1975.

[b] "Deep Express" was to take place in the context of the "Autumn Forge Exercise Series" (see footnote *a*). The purpose of the exercise was to improve the capability of NATO forces to react quickly and to improve standardization and interoperability. Command level: Allied Forces Southern Europe.

Participating units: ground forces element—approximately one infantry division, one amphibious brigade and some airborne units; naval element—51 warships; air element—6 fighter/bomber squadrons.

Absence from garrisons: 10 to 30 September 1975.

In addition, elements of forces of the USA, the UK, the Federal Republic of Germany, Belgium, the Netherlands and Italy were to take part.

British amphibious forces and British forces assigned to the Allied Command Europe (ACE) Mobile Force, together with maritime and air support were to be involved. The UK was to contribute five warships with associated support to this manoeuvre.

[c] This is the contribution of the forces of the notifying country only.

[d] "Certain Trek"—a field manoeuvre to be conducted within the framework of the "Reforger 75" exercise taking place in the context of the "Autumn Forge Exercise Series" (see footnote *a*). Type of forces: Predominantly regular ground forces with tactical air support. Command level: US corps.

Participating units: Third US Infantry Division, two brigades of First US Infantry Division, one German tank brigade, a brigade of Second US Armoured Division, one Canadian mechanized brigade group, Second US Armoured Cavalry Regiment, elements of a French dragoon regiment, one British airborne regiment. Air support by parts of the German tactical air force, as well as US and Canadian forces. Invitation of observers was to be extended by the Federal Republic of Germany.

[e] "Straffe Zügel"—a field training exercise.

Participating units: parts of a German armoured infantry division and one armoured reconnaissance regiment; Third US Armoured Cavalry Regiment and Thirty-Sixth US Marine Amphibious Unit.

[f] "Reforger 75"—an annual exercise deployment of US forces to the Federal Republic of Germany. After the October field manoeuvres, some of the

Participating units: ground force elements—Regimental Combat Team No. 1, one commando group (UK), one parachute company (UK), one commando company (the Netherlands); naval element—minor naval support; air element—participation by Norwegian and Danish squadrons; air defence forces—elements of air defence forces of Rygge and Fornebu.

Absence from garrisons: 2 to 7 October 1975.

[h] Participating units: infantry division.

Absence from garrisons: 20 to 26 October 1975.

[i] Purpose of the manoeuvre: cooperation between different types of armed forces and between the army and the organization of civil defence, occupation and preparation of a zone of defence; defence against a simulated attack. Command level: Fourth Corps.

Participating units: Seventh Frontier Division, reinforced, part of Eleventh Mechanized Division, one combat brigade, part of the air force, logistic units, civilian authorities and organizations; 5800 vehicles, 300 tracked vehicles, 200 horses.

The military attachés in Bern were to be invited to follow the manoeuvres.

[j] "Pantser Sprong"—national manoeuvres with troops and air-support. Purpose of the exercise: operations at brigade level. Command level: Fourth Division.

Participating units: Forty-third Pantserbrigade, units of Forty-first Pantserbrigade, supporting and maintenance units from First Army Corps, staff—Fourth Division.

Absence from garrisons: 26–27 October to 7–8 November 1975.

[k] Purpose of the exercise: cooperation of different types of forces under winter conditions. Command level: army corps.

Participating units: land forces, including airborne detachments, as well as air force units. Subsequent to notification, foreign observers were invited to attend the manoeuvres.

[l] "Atlas Express"—a multinational combined manoeuvre with the participation of Allied Command Europe Mobile Forces land and air components, AMF (L and A).

Purpose of the manoeuvre: to exercise the deployment of AMF to North Norway and alongside Norwegian forces under winter conditions. Command level: Allied Forces North Norway.

Participating units: Brigade North, Regimental Combat Team No. 15, AMF (L) and, in addition, one commando group UK Royal Marines and one company Royal NL Marine Commando; AMF (A) and, in addition, air force units from Norway, the USA, the UK, Canada, the Netherlands, the Federal Republic of Germany and Italy, and minor Norwegian naval forces.

Foreign forces were to start deployment into the manoeuvre area on 2 March and return to their duty stations on 23 March 1976.

10. Chronology of major events concerning disarmament and related issues

January–December 1975

3 February–18 April The second session of the Diplomatic Conference on the Reaffirmation and Development of International Humanitarian Law Applicable in Armed Conflicts takes place in Geneva.

13 February The Soviet Union and its allies, participating in the Vienna negotiations on the reduction of forces in Europe, propose that the USA, Belgium, Canada, the Federal Republic of Germany, Luxembourg, the Netherlands and the UK, as well as the USSR, Czechoslovakia, the German Democratic Republic and Poland, undertake, through a joint declaration, not to increase the number of their armed forces stationed in Central Europe, as long as the negotiations continue.

17 February In a joint Anglo-Soviet declaration on the non-proliferation of nuclear weapons, the two sides state that they aim at the discontinuance of all test explosions of nuclear weapons for all time and that, in the meantime, until the conclusion of an appropriate international agreement for this purpose, they will work for agreements limiting the number of underground nuclear-weapon tests to a minimum.

3 March An interview is published in which the Turkish Prime Minister says that if Turkey must go nuclear to defend itself, it will do so, and that it will not ratify the Non-Proliferation Treaty.

17 March–9 May The second working session of the Third United Nations Conference on the Law of the Sea takes place in Geneva.

26 March The Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction comes into force.

17 April The war in Cambodia ends with the occupation of Phnom Penh by the forces of the National United Front of Cambodia.

23 April The Foreign Ministry of the Provisional Revolutionary Government of South Viet-Nam issues a protest against the use by the adversary forces of bombs causing death by asphyxiation.

30 April The war in Viet-Nam ends when the forces of the Provisional Revolutionary Government of South Viet-Nam enter Saigon.

5–30 May The Review Conference of the parties to the Non-Proliferation Treaty is held in Geneva.

6 May The final communiqué of the conference of the Commonwealth Prime Ministers, held in Kingston, Jamaica, expresses concern at the continued testing and proliferation of nuclear weapons and reaffirms the need for urgent measures to facilitate a comprehensive ban on all nuclear-weapon tests as one essential step towards general and complete disarmament under effective international control. Concern is also expressed about the increase in naval activity in the Indian Ocean area on the part of the great powers and the establishment and expansion there of military installations. The heads of government call upon all nations, and particularly the great powers most directly concerned, to work towards the implementation of the resolutions of the United Nations declaring the Indian Ocean as a zone of peace.

15 May The foreign ministers of the Association of South-East Asian Nations (ASEAN) accept a draft treaty of amity and cooperation which outlines the procedure for the peaceful settlement of disputes among ASEAN countries, and approve a blueprint for the creation of a zone of peace, freedom and neutrality in South-East Asia.

22–23 May The NATO Defence Planning Committee establishes guidance on the levels and characteristics of forces, the scale of resources, the nature of the cooperative efforts, and the criteria for the determination of priorities to be used in all future defence planning in NATO, both national and international.

30 May A communiqué of the North Atlantic Council, meeting in Brussels with the participation of heads of state and government, affirms that the armed forces of the Warsaw Pact continue to grow in strength beyond any apparent defensive needs, and that the maintenance of the allied defence effort at a satisfactory level encounters new difficulties arising from the worldwide economic situation. The NATO states participating in the negotiations in Vienna emphasize that the development of understanding and cooperation requires mutual and balanced force reductions in Central Europe in a manner which would contribute to a more stable relationship and enhanced security for all.

9–20 June The Antarctic Treaty Eighth Consultative Meeting takes place in Oslo.

12 June An interview is published in which the President of South Korea says that if the United States withdraws its "nuclear umbrella", Korea will have to develop its own nuclear capacity to defend itself.

13 June In a speech at an electoral meeting in Moscow, the General

Secretary of the Communist Party of the Soviet Union suggests that an agreement should be concluded banning the creation of new types of weapons of mass destruction and new systems of such weapons.

27 June Brazil and the Federal Republic of Germany sign an agreement providing for the supply to Brazil of eight West German nuclear reactors, as well as the construction in Brazil of a plant for the reprocessing of irradiated fuels and a uranium enrichment plant.

3 July The heads of government of the independent and self-governing states members of the South Pacific Forum call for renewed efforts towards a comprehensive nuclear test-ban treaty and general and complete disarmament. They emphasize the importance of keeping their region free from the risk of nuclear conflict and commend the idea of establishing a nuclear-weapon-free zone in the South Pacific as a means of achieving that aim.

12–15 July The Sixth Islamic Conference of Foreign Ministers, held in Jeddah, Saudi Arabia, urges the nuclear-weapon states to undertake not to use or threaten to use nuclear weapons, under any circumstances, against non-nuclear-weapon states which are not protected by treaty guarantees from a nuclear power against nuclear threat or attack.

19 July An international symposium, held in Moscow, appeals to the scientific workers of all countries and their organizations to make the fullest use of their influence to ensure the cessation of the armaments race and the initiation of an era of true disarmament and lasting peace.

1 August The Conference on Security and Cooperation in Europe ends in Helsinki with the adoption of a Final Act which deals with questions relating to security in Europe; cooperation in the fields of economics, science and technology, and environment; security and cooperation in the Mediterranean; and cooperation in humanitarian and other fields. A document on confidence-building measures, included in the Final Act, provides for prior notification of major military manoeuvres.

4 August Egypt and Israel sign a second interim agreement on military disengagement in the Sinai Peninsula, providing for an Israeli withdrawal from some occupied territory.

7 August The Egyptian president states that if Israel obtains a nuclear strike capacity, Egypt will follow suit.

21 August The USA and the USSR submit to the Geneva Disarmament Conference identical draft conventions on the prohibition of military or any other hostile use of environmental modification techniques.

25–30 August The Conference of Ministers of Foreign Affairs of Non-Aligned Countries, held in Lima, Peru, condemns the retention and expansion of foreign military bases in the Indian Ocean, such as that at Diego Garcia, as well as the continued escalation of military rivalry among the great powers in that region; it decides that the non-aligned countries should coordinate their efforts in promoting the convening of a world disarmament conference, failing which a special session of the UN General Assembly should be held to study the problems of disarmament; it calls on the countries concerned to speed up the work of the CCD.

1–5 September Representatives of Bolivia, Chile, Colombia, Ecuador, Peru and Venezuela, meeting in Santiago, Chile, confirm the need for an agreement prohibiting in the Andean subregion certain categories of weapons which are contrary to humanitarian principles, or produce serious modifications of the ecology and threaten mankind, as well as the need for an agreement banning nuclear arms. They further recommend the prohibition of all types of highly sophisticated and offensive armaments now not existent in the subregion, the presence of which would upset peace in the area. They consider it advisable that ceilings should be established for certain types of armaments with a view to limiting military expenditures.

11 September The USSR submits, for consideration by the UN General Assembly, a draft treaty on the complete and general prohibition of nuclear weapon tests.

23 September The USSR submits to the UN General Assembly a draft agreement on the prohibition of the development and manufacture of new types of weapons of mass destruction and of new systems of such weapons (see 13 June).

24 September The Ministerial Council of the South-East Asia Treaty Organization (SEATO), meeting in New York, decides that the organization should be phased out over the next two years.

17 October In a declaration on the further development of friendship and cooperation between the Soviet Union and France, the two sides confirm their resolve to contribute to the realization of general and complete disarmament, including nuclear disarmament, under strict and effective international control. They state that they are in favour of convening a world conference on disarmament with the participation of all nuclear powers, and express their conviction of the need to prevent the proliferation of nuclear armaments and their determination to assume the responsibilities incumbent upon them in this respect as nuclear powers. They also display concern to ensure that their supplies of fissionable material or equipment to non-nuclear-weapon states are used exclusively for peaceful purposes.

1 December An agreement for cooperation between the International Atomic Energy Agency (IAEA) and the European Atomic Energy Community (Euratom) is signed by the Director-General of the IAEA and a member of the Commission of the European Communities in charge of research, science and education.

9–10 December In the NATO Defence Planning Committee, meeting in a ministerial session in Brussels, the participating ministers note the increasing firepower, mobility and armoured strength of the Warsaw Pact forces and their capability in such areas as tactical nuclear, chemical and electronic warfare; the growth and worldwide deployment of the Soviet Navy; and the change in emphasis from air defence to offensive operations represented by the acquisition of new high-performance bombers and tactical aircraft with deep penetration capabilities. They reaffirm the need for NATO to maintain strong forces for deterrence and defence possessing a complete range of capabilities necessary for implementing the strategy of flexible response and pledge themselves to maintain and improve the national efforts needed to ensure that this strategy remains effective for the future.

11 December The UN General Assembly adopts resolutions in which it condemns all nuclear-weapon tests, takes note of the Soviet draft treaty on the complete and general prohibition of nuclear-weapon tests, and urges the CCD to give the highest priority to the conclusion of a comprehensive test-ban agreement; adopts a definition of a nuclear-weapon-free zone; takes note of the Soviet draft agreement on the prohibition of the development and manufacture of new types of weapons of mass destruction and of new systems of such weapons and requests the CCD to proceed to work out the text of such an agreement; requests the CCD to continue negotiations with a view to reaching early agreement on a convention prohibiting military or any other hostile use of environmental modification techniques; and decides to carry out a basic review of the role of the United Nations in the disarmament field.

11–12 December The North Atlantic Council meets in ministerial session in Brussels. In the communiqué issued after the council meeting, the participating ministers reaffirm their determination to persevere in their efforts to place relations with the USSR and other Warsaw Pact countries on a more stable basis and also stress the need to preserve the defensive strength of the alliance as a deterrent not only against military aggression but also against political pressure. They welcome the adoption of the Final Act of the Conference on Security and Cooperation in Europe. Reviewing the state of the negotiations on mutual force reductions in Vienna, they reconfirm the proposal to establish in the area of reductions approximate parity in ground forces in the form of a common collective ceiling for ground force manpower on each side; they also reaffirm the principle that NATO forces should not be reduced except in the context of a mutual and balanced force reduction agreement with the East.

15–16 December A meeting of foreign ministers of the USSR, Bulgaria, Czechoslovakia, the German Democratic Republic, Hungary, Romania and Poland takes place in Moscow. The ministers state that their governments will do everything in their power to bring about success in the negotiations for the cessation of the arms race and for disarmament, including nuclear disarmament, on a bilateral and multilateral basis, as well as on a worldwide scale. They also express their conviction that the negotiations taking place in Vienna should lead to effective and substantial reductions of armed forces and armaments in Central Europe without prejudice to the security of any state.

16 December It is reported that at the negotiations on the reduction of forces in Europe, the NATO countries have submitted a new proposal: in the first phase, the USSR would withdraw 68 000 troops and 1 700 tanks, while the USA would withdraw 29 000 troops, 1 000 tactical nuclear warheads, and a certain number of aircraft and missile launchers; in the second phase, a ceiling of 700 000 for ground forces would be established.

Errata

World Armaments and Disarmament, SIPRI Yearbook 1975

Page 11, line 22. For "24 000" read "2 400".

Appendix 8B. Register of arms trade to third world countries, 1974:

Page 222. Abu Dhabi, UK, 2 BAC VC.10. Under Comment, read "$3.6 mn" for "$3.5 mn".
Abu Dhabi, UK, BAC Rapier. Under Ordered, read "Dec 1974".
Dubai, Italy. Under Number, read "2" Augusta-Bell 205A.
Dubai, Italy. Under Number, read "1" SIAI-Marchetti SF 260W Warrior.

Page 223. Iran, FR Germany, 3 Patrol boat. Under Comment, read "Abeking" for "Abekin".

Page 224. Iran, USA. Under Item, read "Bell 214 A-1 Isfahan" for "Bell 215 A-1 Isfahan".

Page 226. Israel, USA. Under Item, read "AGM-45A Shrike" for "AGM-45A Strike".

Page 227. Kuwait, Singapore. Under Delivered, read "1974".

Page 228. Oman, UK. Under Number, read "2 1/3 batt" for "21/3 batt".

Page 230. Syria, USSR, SAM-6. Under Ordered, read "1973" for "..". Under Delivered, read "1974" for "..".
India, Czechoslovakia, Aero L-29 Delfin. Under Comment, read "Delivered pending" for "Delivery pending".
India, USSR, MiG-23 "Flogger". Under Ordered, read "1974" for "..". Under Delivered, read "1978" for "..".
India, USSR, SAM-6. Under Ordered, read "1973" for "1974". Under Delivered, read "1974" for "1975".

Page 233. Thailand, USA, Fairchild AU-23A Peacemaker. Under Comment, read "$12 mn" for "$21 mn".

Page 235. Morocco, France. Add the following items to the register:

				Date: number of items	
Number	Item	Description	Comment	Ordered	Delivered
6	Patrol boat, P-92 type		Under construction	Feb 1974	..
2	Landing ship		Under construction	1974	..
1	Coastal minesweeper		Transferred 1974 for 4 years	..	Nov 1974

Page 235. Morocco, Italy, Fairchild C-119 Packet. Under Comment, read "Ex-1AF refurbished; in addition to 5 delivered 1973; ex-Canada".
Morocco, Italy, SIAI-Marchetti SF.260W Warrior. Under Delivered, read "1974" for "–".

Page 236. Ethiopia, Cessna A-37. Under Supplier, read "USA" for "Iran". Under Description, read "Light strike" for "Light strike trainer".

Page 237. Under Recipient, read "Malagasy" for "Malaysia".

Nigeria, Scottish Aviation Bulldog 123. Under Comment, read "5 delivered in 1973" for "delivered in 1973".

Rhodesia. Under Comment, read "Ex-Jordan Tigercat SAM" for "Ex-Jordan;".

Somalia, USSR, T-54. Under Ordered, read ". ." for "1973". Under Delivered, read "1973–74" for "1974".

Page 238. Tanzania, China, Shenyang MiG-19. Under Comment, read "In addition to 12 MiG-17s" for "In addition to 21 MiG-17s".

Togo, France. By the three items, under Comment, read "programme to expand Air Force" for "programme to Air Force".

Page 239. South Africa, France. Under Item, read "'Daphne'-class" for "'Daphine'-class".

Page 241. Argentina, FR Germany, Submarine, type 209. Under Number, read "2" for "1".

Argentina, Italy. Under Item, read "Aermacchi MB 326GB" for "Aermacchi MB 436GB".

Bolivia, Brazil. Under Item, read "Fokker-VFW S-11 Instructor" for "Fokker-VFW S-11". Under Description, read "Trainer" for "Instructor trainer".

Page 243. Ecuador, France. Under Item, read "Aérospatiale MM-38 Exocet" for "Aérospatiale MM-38 mm".

Ecuador, UK, BAC/Dassault-Breguet Jaguar International. Under Comment, read "U.c.: $7 mn" for "U.c.: $87 mn".

Peru, USA, Northrop F-5E Tiger II. Under Comment, read "$70 mn" for "$870 mn".

Page 243. Peru. Add to beginning of register for Peru the following items:

					Date: number of items	
Supplier	Number	Item	Description	Comment	Ordered	Delivered
Australia	2	GAF Nomad	STOL transport	For Army	(1975)	. .
France	8	Dassault Mirage 5	Fighter		Jul 1973	. .
FR Germany	2	Patrol submarine, type 209	Displ: 1 000 t		May 1972	1975–
Italy	43	Matra/Oto Melara Otomat	SS missile	Arming 4 Super Alpino frigates	1974	. .
	4	Super Alpino	Frigate	New construction	1974	. .
Switzerland	6	Pilatus Turbo Porter	STOL transport	In addition to 1 previously purchased	1974	. .
UK	8	Canberra B(I)8	Bomber	Ex-RAF	1974	1974

Page 244, line 1. Under Recipient, read "Peru" for "Uruguay".

Page 244, line 9. Under Recipient, read "Uruguay" on two lines with "USA".

Page 244. Venezuela, France. Under Comment, read "Incl 2 Mirage IIID trainer versions". Under Delivered, read "1973–74" for ". .".

Venezuela, FR Germany, Patrol submarine, type 209. Under Ordered, read "1973" for ". .". Under Delivered, read "1975–76" for ". .".

Venezuela, UK. Under Comment, read "3 gunboats and 3 missile boats" for "3 gunboats for 2 missile boats".

Page 396, line 22. For "Clouds are an insurmountable problem" read "Clouds are not an insurmountable problem".

Page 397, Table 13.1. For USAF[d] (1974–85A) the lifetime should read "141" instead of "About 124".

INDEX

World Armaments and Disarmament
SIPRI Yearbook 1976

This is the seventh SIPRI Yearbook. The aim is to bring together information on world armaments and military expenditure and developments in efforts made to limit or reduce them. The first six Yearbooks attracted worldwide attention and were used extensively in the United Nations, the Geneva disarmament negotiations and in national political circles as an authoritative source of information.

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