Verification of the CFE Treaty

A SIPRI Research Report

Sergey Koulik and Richard Kokoski

October 1991

Stockholm International Peace Research Institute

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Preface

Signed in November 1990, the Treaty on Conventional Armed Forces in Europe (CFE) represents a watershed in the history of arms control. This is due in no small measure to the carefully designed verification structure upon which the Treaty is founded. This thorough and detailed verification regime should provide for a relatively trouble-free ratification process and hopefully the smooth conduct of the various stages of Treaty implementation as well. The recent fast pace of European and international developments and events has understandably drawn much of the attention away from the CFE process. However, as unilateral reductions and restructuring of conventional forces in Europe proceed, it is critical that the legally binding obligations set forth in the Treaty and the means through which compliance with those obligations will be ensured are well understood. Furthermore, the negotiations and their outcome hold many lessons for future, potentially more ambitious arms reductions. The main purpose of this report is to analyse and provide insight into these arrangements, the associated problems which may arise and their potential solutions.

The political and military environment in Europe has changed dramatically since the CFE Treaty was signed. The qualitatively new element is recognition, both *de facto* and *de jure*, of the independence of Estonia, Latvia and Lithuania. Similarly, developments in the Soviet Union and Yugoslavia may lead to the emergence of new sovereign states in the area of CFE Treaty application. This cannot call the Treaty into question. One can expect the new states to assume the Treaty obligations, that is, to join it without amendments or reservations. The political and security framework established by the CFE Treaty offers an equitable participation of all states—both old and new—in the zone of application. In other words, the exercise of the inherent rights of nations to self-determination ought to be beneficial and not detrimental to co-operative security building in Europe.

With the changes in the European landscape, quantitative elements embodied in the Treaty have already taken on less relevance. However, functional elements, including the verification structure and its future implementation, will remain important, perhaps assuming an even greater role in the years to come than was expected when the Treaty was signed. It is hoped that the exploration of these issues as presented in this report will continue to be of use in providing information and understanding as an aid to ensuring both a rapid ratification process and the successful implementation of the CFE Treaty in the months and years to come.

Adam Daniel Rotfeld
October 1991

Acronyms

ACV	Armoured combat vehicle
AEW	Airborne Early Warning system
AIFV	Armoured infantry fighting vehicle
APC	Armoured personnel carrier
ATTU	Atlantic-to-the-Urals (zone)
AVLB	Armoured vehicle launched bridge
AWACS	Airborne Warning and Control System
BICES	Battlefield Information Collection and Exploitation System
CCD	Charge-coupled device
CFE	Negotiation on Conventional Armed Forces in Europe
CIA	Central Intelligence Agency
CSBM	Confidence- and security-building measure
CSCE	Conference on Security and Co-operation in Europe
DOD	Department of Defense
DPSS	Designated permanent storage site
ETM	Enhanced Thematic Mapper
GCHQ	Government Communications Headquarters (UK)
HACV	Heavy armoured combat vehicle
HRV	Haute Résolution Visible
IFOV	Instantaneous field of view
IMINT	Image intelligence
INF	Intermediate-range nuclear force
ISMA	International satellite monitoring agency
JACIG	Joint Arms Control Implementation Group
JCG	Joint Consultative Group
JSTARS	Joint Surveillance and Target Attack and Radar System
MD	Military District (Soviet)
MLRS	Multiple-launch rocket system
MOS	Marine Observation Satellite
MSS	Multispectral scanning system
MTM	Multinational technical means
NAEW	NATO Airborne Early Warning
NSA	National Security Agency
NTM	National technical means
OOV	Object(s) of verification
OSI	On-site inspection(s)
OSIA	On-Site Inspection Agency
POMCUS	Prepositioned Material Configured to Unit Sets
PSM	Plano Spaziale Militaire
SAR	Synthetic aperture radar
SCC	Standing Consultative Commission

SIGINT	Signals intelligence
SPOT	Système Probatoire d'Observation de la Terre
SRT	Strategic relocatable target
START	Strategic Arms Reduction Talks
TLE	Treaty-limited equipment
TM	Thematic Mapper
TRIGS	Tactical Reconnaissance Exploitation and Demonstration System
VCC	Verification Coordinating Committee
VHF	Very high frequency
WEU	Western European Union

1. Introduction

The Treaty on Conventional Armed Forces in Europe (CFE), signed in Paris on 19 November 1990, is the most sweeping arms control agreement in history and marks the beginning of a new era in arms control verification. It was able in short order to grapple successfully with a revamped and constantly changing European landscape to solidify arms limitations which at the very least greatly reduce the possibility of surprise attack. Along with other documents signed in November 1990, the Treaty provides a basis for strengthening security and for optimism with respect to the process of eliminating military threats in Europe.

It is important to note that the Treaty's provisions will provide invaluable guidance for future, more ambitious developments in multilateral arms control and the monitoring regimes which they will necessitate. It is also important for both confidence-building measures and future co-operation in further arms reductions that a firm foundation has been laid down and formalized. The cold war may be over, but it has left a legacy of a multitude of conventional (and other) armaments that must be dealt with.

In addition to the unprecedented arms reduction measures laid down by the Treaty, a unique and far-reaching verification regime has been devised. New opportunities for on-site inspection, including very thorough and intrusive elements, are incorporated in detail in the Treaty. Of particular importance is the introduction of challenge inspection (albeit with the right of refusal). The CFE Treaty gives an opportunity to develop and integrate national and multinational technical means (NTM and MTM) of verification into the framework of a multinational agreement supported by a large and complex flow of information from all the countries involved in the various monitoring activities. Here again, new ground will be broken, paving the way for future, even more complex compliance and security regimes.

Aerial reconnaissance is to be integrated into the monitoring structure of the Treaty at a later stage. The verification regime does not include continuous monitoring at any permanent facilities for production and storage. It does not deal with limits on manpower, although a separate declaration was made not to increase their levels while follow-on negotiations are under way. Nevertheless this agreement does show that it is important to build *flexibility* into the verification regime—a feature which provides opportunities for further negotiations to build upon the existing structure. While the WTO has been dissolved the Treaty nevertheless is based on an alliance-to-alliance structure and for clarity the WTO is often referred to in the manner in which it existed when the Treaty was signed.

Despite the drastic changes which occurred in the Soviet Union in August 1991, at the time of writing it appears that all international agreements and obligations will be upheld. Assuming this policy continues, the CFE Treaty will hopefully proceed swiftly through the process of ratification.

2. The November 1990 documents

The CFE Treaty (see appendix A) was signed in Paris on 19 November 1990 by the 22 countries of the former Warsaw Treaty Organization (WTO) and the North Atlantic Treaty Organization (NATO), after 20 months of negotiations in Vienna.

The following eight documents are integral parts of the Treaty:

Protocol on Existing Types of Conventional Armaments and Equipment (with an Annex thereto);

Protocol on Procedures Governing the Reclassification of Specific Models or Versions of Combat-Capable Trainer Aircraft into Unarmed Trainer Aircraft;

Protocol on Procedures Governing the Reduction of Conventional Armaments and Equipment Limited by the Treaty on Conventional Armed Forces in Europe;

Protocol on Procedures Governing the Categorisation of Combat Helicopters and the Recategorisation of Multi-Purpose Attack Helicopters;

Protocol on Notification and Exchange of Information (with an Annex on the format for the exchange of information);

Protocol on Inspection;

Protocol on the Joint Consultative Group;

Protocol on the Provisional Application of Certain Provisions of the Treaty on Conventional Armed Forces in Europe.

The CFE Treaty is accompanied by three declarations:

1. The Declaration of the States Parties to the Treaty on Conventional Armed Forces in Europe with Respect to Land-based Naval Aircraft, stating that the aggregate number of land-based combat naval aircraft held by either alliance should not exceed 430. No state is to have more than 400 permanently land-based combat naval aircraft in the area of application of the Treaty; and the limitations are to apply 40 months after the entry into force of the Treaty. The problem of land-based naval aircraft was controversial during the CFE Negotiation and was resolved by this separate declaration.

2. The Declaration of the States Parties to the Treaty on Conventional Armed Forces in Europe with Respect to Personnel Strength, in which states parties commit themselves not to increase total peacetime authorized personnel during the period of the follow-on negotiations.

The follow-on negotiations, which started on 26 November 1990, are aimed at the conclusion of an agreement on additional measures to further strengthen security and stability in Europe, including measures to limit the personnel strength of conventional armed forces within the area of application of the Treaty. The states parties seek to conclude these negotiations no later than the follow-up meeting of the Conference on Security and Co-operation in Europe (CSCE) to be held in Helsinki in 1992.

3. The Declaration by the Government of the Federal Republic of Germany on the Personnel Strength of German Armed Forces, limiting the armed forces

of the united Germany to 370 000 soldiers within three to four years. The corresponding reduction will commence on the entry into force of the CFE Treaty. Within this ceiling no more than 345 000 troops will belong to ground or air forces.

Analysis of the Treaty and its verification regime should bear closely in mind the other documents signed in Paris and adopted by European countries, the USA and Canada.[1] In the Charter of Paris for a New Europe, signed by the Heads of State or Government of the 34 CSCE countries on 21 November 1990, it is stated:

> With the ending of the division of Europe, we will strive for a new quality in our security relations . . . Security is indivisible and the security of every participating State is inseparably linked to that of all the others. We therefore pledge to co-operate in strengthening confidence and security among us and in promoting arms control and disarmament . . . The changing political and military environment in Europe opens new possibilities for common efforts in the field of military security.[2]

In the Joint Declaration of Twenty-Two States (NATO and WTO), 19 November 1990, the signatories solemnly declare that they 'are no longer adversaries' and 'will build new partnerships and extend to each other the hand of friendship'.[3]

The important 1990 Vienna Document of the Negotiations on Confidence- and Security-Building Measures Convened in Accordance with the Relevant Provisions of the Concluding Document of the Vienna Meeting of the Conference on Security and Co-operation in Europe, adopted in Paris on 21 November 1990, integrates a set of confidence- and security-building measures (CSBMs) to serve to strengthen confidence and security in Europe.[4] This document provides for: annual exchange of military information (on military forces, plans for the deployment of major weapon and equipment systems, and military budgets); risk reduction measures (mechanisms for consultations and co-operation as regards unusual military activities, co-operation as regards hazardous incidents of a military nature); contacts (visits to air bases, military contacts); prior notification and observation of certain military activities; annual calendars of military activities; verification of compliance with CSBMs, in addition to other measures.

Finally, the Supplementary Document to Give Effect to Certain Provisions Contained in the Charter of Paris for a New Europe establishes corresponding procedures and organizational modalities, including the creation of a Conflict Prevention Centre.[5]

[1] Key documents signed between Nov. 1989 and Nov. 1990 are published in Rotfeld, A. D. and Stützle, W. (eds), SIPRI, *Germany and Europe in Transition* (Oxford University Press: Oxford, 1991).

[2] Rotfeld and Stützle (note 1), pp. 220 and 222.

[3] Rotfeld and Stützle (note 1), p. 217.

[4] The 1990 Vienna Document is reproduced in SIPRI, *SIPRI Yearbook 1991: World Armaments and Disarmament* (Oxford University Press: Oxford, 1991), appendix 13B.

[5] Rotfeld and Stützle (note 1), pp. 227–28.

3. The key provisions of the CFE Treaty

I. The states parties

The states parties are the 22 members of NATO and the former WTO: Belgium, Bulgaria, Canada, Czechoslovakia, Denmark, France, Germany, Greece, Hungary, Iceland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Turkey, the UK, the USA and the USSR.

II. The area of application of the Treaty

The area of application is the entire land territory of the states parties in Europe from the Atlantic Ocean to the Ural Mountains, which includes all the European island territories: the Faroe Islands (Denmark), Svalbard, including Bear Island (Norway), the islands of the Azores and Madeira (Portugal), the Canary Islands (Spain), and Franz Josef Land and Novaya Zemlya (USSR). In the case of the Soviet Union, the area of application includes all territory lying west of the Ural River and the Caspian Sea—the Baltic, Byelorussian, Carpathian, Kiev, Odessa, North Caucasus, Transcaucasus, Leningrad, Moscow and Volga-Ural Military Districts (MDs). In the case of Turkey, it includes the territory north and west of a line extending from the point of intersection of the Turkish border with the 39th parallel to Muradiye, Patnos, Karayazi, Tekman, Kemaliye, Feke, Ceyhan, Dogankent, Gözne and thence to the sea. This area is usually referred to as the Atlantic-to-the-Urals (ATTU) zone and covers more than 2.5 million square miles (over 6 million km^2).

In Article IV of the Treaty three sub-zones within the ATTU (zone IV.1) area are defined—sub-zones IV.2, IV.3 and IV.4. Article V defines a flank zone. Sub-zones IV.4, IV.3, IV.2 involve successively larger areas, defined so that each sub-zone includes the previous sub-zone(s) (see figure 1). The flank zone is defined as an area separate from the other sub-zones with distinct limits on equipment.

Sub-zone IV.4	NATO:	Belgium, Germany, Luxembourg, the Netherlands
	WTO:	Czechoslovakia, Hungary, Poland
Sub-zone IV.3	Sub-zone IV.4, plus	
	NATO:	Denmark, France, Italy, the United Kingdom
	WTO:	USSR (Baltic, Byelorussian, Carpathian, Kiev MDs)
Sub-zone IV.2	Sub-zone IV.3, plus	
	NATO:	Portugal, Spain
	WTO:	USSR (Moscow and Volga-Ural MDs)
Flank zone	NATO:	Greece, Iceland, Norway, Turkey
	WTO:	Bulgaria, Romania, USSR (Leningrad, North Caucasus, Odessa, Transcaucasus MDs)

Figure 1. Sub-zones in the area of application of the CFE Treaty

The rationale for establishing sub-zones and corresponding limits on weapons within the ATTU area was to prevent each alliance from concentrating conventional armaments and equipment close to the borders between the two alliances, thereby reducing the possibility of an attack by either side on short warning.

III. Treaty limits

Each state party must limit and, as necessary, reduce its battle tanks, armoured combat vehicles (ACVs), artillery, combat aircraft and attack helicopters. ACVs include armoured personnel carriers (APCs), armoured infantry fighting vehicles (AIFVs) and heavy armament combat vehicles (HACVs). 'Artillery' includes large-calibre systems—guns, howitzers, artillery pieces combining the characteristics of guns and howitzers, mortars and multiple-launch rocket

Table 1. Zonal limits for each alliance

Zone	Battle tanks	ACVs	Artillery	Combat aircraft	Attack helicopters
ATTU zone IV.1	20 000	30 000[a]	20 000	6 800	2 000
(active units)	16 500	27 300	17 000		
Sub-zone IV.2	15 300	24 100	14 000		
(active units)	11 800	21 400	11 000		
Sub-zone IV.3[b]	10 300	19 260	9 100		
Sub-zone IV.4[c]	7 500	11 250	5 000		
Flank zone[d]	4 700	5 900	6 000		

[a] Of which no more than 18 000 AIFVs and HACVs, including no more than 1500 HACVs.

[b] Including a maximum of 2250 battle tanks, 2500 ACVs and 1500 artillery pieces in the Kiev MD. The inclusion of this military district in the zone lessened the Soviet reductions in the flank zone and increased cuts in zone IV.3.

[c] If the aggregate TLE of a group of states parties in active units is less than these ceilings, and provided that no state party is thereby prevented from reaching its maximum levels for notified holdings, then the difference in each category may be located by this group in sub-zone IV.3 within ceilings for this sub-zone.

[d] Notwithstanding these limitations, a state party or states parties may temporarily deploy additional TLE into the territory of members of the same group within the sub-zone, not to exceed 459 battle tanks, 723 ACVs and 420 artillery pieces in active units, of which no more than one-third (153 battle tanks, 241 ACVs and 140 artillery pieces) may be deployed to any one state party with territory in the sub-zone.

systems (MLRS) with a calibre of 100 millimetres and above. The term ‘attack helicopter’ covers specialized attack helicopters (designed primarily to employ guided weapons) and multi-purpose helicopters (designed to perform multiple military functions and equipped to employ guided weapons). Agreed definitions of these systems are based on several specific technical characteristics and military functions stated in the Treaty. These are elaborated on further in chapter 11.

The limits, to be effective 40 months after entry into force (and thereafter indefinitely or until superseded by another agreement), on this treaty-limited equipment (TLE) for each alliance within the ATTU zone and the sub-zones are shown in table 1.

TLE in the ATTU zone not in active units, that is, 3500 battle tanks, 2700 ACVs and 3000 artillery pieces, must be placed in designated permanent storage sites (see appendix B) only in sub-zone IV.2 with the permitted exception of the Odessa MD (up to 400 battle tanks and 500 artillery pieces) and the southern part of the Leningrad MD (up to 600 battle tanks, 800 ACVs, including no more than 300 ACVs of any type with the remaining number consisting of APCs, and 400 artillery pieces). Thus, the Soviet Union may store up to 1000 battle tanks, 800 ACVs and 900 artillery systems in two MDs of the flank zone within the overall limits on stored TLE. Like inclusion of the Kiev MD in zone IV.3, this exception slightly lessens the overall reductions the USSR will make in the flank zone.

The Treaty also limits armoured vehicle launched bridges (AVLBs)—capable of carrying, emplacing and retrieving a bridge structure—to 740 in active units for each group of states parties. Additional AVLBs must be placed in designated permanent storage sites. The initial information exchange showed that the WTO had 1580 (USSR 976) and NATO had 700 (USA 212, Germany 299) AVLBs—the ex-WTO states must therefore store 840 of them.[6]

It was required that TLE to be reduced be declared present within the area of application in the exchange of information at Treaty signature. Each state must notify all other states of its reduction liability no later than 30 days after the entry into force of the Treaty.

The Protocol on Existing Types of Conventional Armaments and Equipment lists types of TLE for each category—battle tanks: 24; APCs: 49; AIFVs: 16 ; HACVs: 15; artillery: about 100; combat aircraft: 55; specialized attack and multi-purpose attack helicopters: 17.

Exceptions to numerical limitations

All conventional armaments and equipment limited by the Treaty are subject to the above ceilings except (in a manner consistent with normal practices):

1. Items under manufacture or related testing;
2. Items used exclusively for research and development;
3. Items belonging to historical collections;
4. ACVs and multi-purpose attack helicopters held by organizations designed and structured to perform internal security functions in peacetime; AIFVs held by such organizations in excess of 1000 constitute a portion of the TLE while up to 600 AIFVs of a state party may be located within the flank zone;
5. Items in transit through the area of application to and from locations outside this area, if in the area for no longer than seven days;
6. Items awaiting disposal, having been decommissioned from service, provided that they are at no more than eight sites notified as declared sites and identified as holding areas for decommissioned TLE and provided that such TLE does not exceed 1 per cent of notified holdings of each state party, or a total of 250 items, whichever is greater (including no more than 200 battle tanks, ACVs and artillery pieces and no more than 50 combat aircraft and attack helicopters);
7. Items awaiting, or being refurbished for, export or re-export and temporarily retained within the area of application. Such TLE must be located elsewhere than at declared sites or at no more than 10 such declared sites notified in the previous year’s annual information exchange. In the latter case they must be separately distinguishable from TLE.

[6] Institute for Defense and Disarmament Studies, *Arms Control Reporter (ACR)* (IDDS: Brookline, Mass.), sheet 407.B.411, 1990.

Table 2. Official NATO and WTO allocation of post-CFE entitlements

Figures are residual holdings for 1995.

Country	Battle tanks	ACVs	Artillery	Combat aircraft	Attack helicopters
NATO countries					
Belgium	334	1099	320	232	46
Canada	77	277	38	90	13
Denmark	353	316	553	106	12
France	1 306	3 820	1 292	800	352
Germany	4 166	3 446	2 705	900	306
Greece	1 735	2 534	1 878	650	18
Iceland	0	0	0	0	0
Italy	1 348	3 339	1 955	650	142
Luxembourg	0	0	0	0	0
Netherlands	743	1 080	607	230	69
Norway	170	225	527	100	0
Portugal	300	430	450	160	26
Spain	794	1 588	1 310	310	71
Turkey	2 795	3 120	3 523	750	43
UK	1 015	3 176	636	900	384
USA	4 006	5 372	2 492	784	518
NATO total	**19 142**	**29 822**	**18 286**	**6 662**	**2 000**
Ex-WTO countries					
Bulgaria	1 475	2 000	1 750	235	67
CSFR	1 435	2 050	1 150	345	75
Hungary	835	1 700	840	180	108
Poland	1 730	2 150	1 610	460	130
Romania	1 375	2 100	1 475	430	120
USSR	13 150	20 000	13 175	5 150	1 500
WTO total	**20 000**	**30 000**	**20 000**	**6 800**	**2 000**

Note: In the case of a complete withdrawal of Soviet troops from Eastern Europe, the largest residual levels of TLE in active units will be in the Baltic, Byelorussian, Carpathian and Kiev MDs: 6260 battle tanks, 13 360 ACVs and 5500 artillery pieces, while unit-assigned 1540 battle tanks, 2140 ACVs and 1900 artillery pieces would be maintained in the Moscow and Volga-Ural MDs.

Source: Vienna Fax, vol. 2, no. 5 (28 May 1991).

The sufficiency rule

No one country can retain more than a specified amount of the total TLE in the ATTU zone. This rule is based on the political principle that 'no single state should have a dominant position in the new Europe'.[7] In other words, it was designed to allow each country to have enough weapons for its own defence, but to prevent one country from having a military potential which may pose a threat to another alliance. To ensure that no single state party possesses 'more than approximately one-third' of the limits for both alliances within the area of

[7] *Atlantic News*, 17 Nov. 1990, p. 1.

application, each state party is limited to 13 300 battle tanks, 20 000 ACVs, 13 700 artillery pieces, 5150 combat aircraft and 1500 attack helicopters.

Post-CFE entitlements

The above rule notwithstanding, on 3 November 1990 foreign ministers of the WTO states agreed on TLE cuts among the six members of the alliance that would have the USSR retain fewer battle tanks (13 150) and artillery systems (13 175) than specified in the Treaty two weeks later. While NATO's internal allocation of cuts is an agreement in principle, the WTO agreement is a legally binding treaty. Taking account of this agreement, the official allocation of post-CFE entitlements is as shown in table 2.

A state party may change the maximum levels for its holdings of TLE, notifying at least 90 days in advance. However, any increase in these levels which would otherwise cause the numerical limitations in any of the four zones to be exceeded must be accompanied by a corresponding reduction in TLE holdings in one or more states parties of the same group. Such notification with regard to ACVs must also include levels for AIFVs and HACVs. Any decrease in TLE held by a state party by itself confers no right for any other state party to increase its maximum levels. Each state party is solely responsible for ensuring that its notified holdings do not exceed their maximum—states parties of the same group shall consult to ensure that the maximum holdings taken together do not exceed the Treaty's limits.

IV. The timetable for the Treaty

The Treaty is of unlimited duration. Its implementation is divided into four phases:

1. *The baseline validation phase* covers the first 120 days after entry into force of the Treaty for the purpose of calculating inspection quotas and for intense inspection of baseline data.
2. *The reduction phase* during which TLE must be destroyed or certified encompasses a 40-month period, which includes the baseline validation phase.
3. *The residual level validation phase* covers 120 days after the reduction phase for inspections to check new baseline data after reductions.
4. *The residual phase* covers the unlimited duration of the Treaty when inspections to check data at declared and undeclared sites are to be carried out.

The reduction phase consists of three stages to be completed no later than 40 months after entry into force of the Treaty. During the first 16 months after entry into force, each state party shall have ensured that at least 25 per cent of its total reduction liability in each of the TLE categories has been reduced. No later than 28 months after entry into force of the Treaty, the percentage shall be raised to at least 60 per cent. The extra TLE is to be reduced during the remainder of the 40-month period.

The conversion of all battle tanks to non-military purposes is to be completed by the end of the third phase, while ACVs deemed reduced by reason of having been partially destroyed shall be fully converted to non-military purposes, or destroyed no later than 64 months after entry into force of the Treaty.

V. Reductions

The reductions of conventional armaments and equipment in Europe will be large-scale and unprecedented, although less than expected by many politicians and experts during the negotiations. Table 3 shows official TLE holdings of states parties in both groups and the reductions according to officially stated ceilings in each category by each state party and based on the sufficiency rule. The residual ceilings for NATO as planned for 1995 are below the Treaty limits while those for the ex-WTO countries meet the limits.

It can be calculated from table 3 that the states parties will have to reduce TLE categories by the following percentages, taking into account the inclusion of former GDR holdings in NATO potential and planned post-CFE ceilings:

1. NATO countries must reduce: battle tanks by 21.4%; ACVs by 12.9%; artillery by 11.8%; and need not make reductions in combat aircraft and attack helicopters.
2. The former WTO countries must reduce: battle tanks by 36.9%; ACVs by 28.3%; artillery by 19.2%; combat aircraft by 18.7%; and need not reduce numbers of attack helicopters.

To assess the scope of efforts needed to monitor reductions and destruction of TLE by each state party it is worthwhile presenting the actual and relative amounts of equipment to be cut by the states parties. Table 4 shows that the largest cuts, in terms of the share of a country's TLE holdings, will be implemented by Germany, Romania, the USSR, Poland and the Netherlands. The largest absolute cuts will be made by the USSR, followed by Germany, Czechoslovakia, Romania, the USA and Poland.

Table 3. Official November 1990 TLE holdings and reductions to 1995 residual limits

Figures are revised estimates as exchanged in February 1991.

	Battle tanks		ACVs		Artillery		Combat aircraft		Attack helicopters	
Country	H	R	H	R	H	R	H	R	H	R
NATO countries										
Belgium	359	25	1 381	282	376	56	191	+41	0	+46
Canada	77	0	277	0	38	0	45	+45	12	+1
Denmark	419	66	316	0	553	0	106	0	3	+9
France	1 343	37	4 177	357	1 360	68	699	+101	418	66
Germany	7 000	2 834	8 920	5 474	4 602	1 897	1 018	118	258	+48
Greece	1 879	144	1 641	+893	1 908	30	469	+181	0	+18
Iceland	0	0	0	0	0	0	0	0	0	0
Italy	1 246	+102	3 958	619	2 144	189	577	+73	168	26
Luxembourg	0	0	0	0	0	0	0	0	0	0
Netherlands	913	170	1 467	387	837	230	196	+34	91	22
Norway	205	35	146	+79	531	4	90	+10	0	0
Portugal	146	+154	247	+183	343	+107	96	+64	0	+26
Spain	854	60	1 256	+332	1 373	63	242	+68	28	+43
Turkey	2 823	28	1 502	+1 618	3 442	+81	511	+239	5	+38
UK	1 198	183	3 193	17	636	0	842	+58	368	+16
USA	5 904	1 898	5 747	375	2 601	109	626	+158	243	+275
NATO total	**24 366**	**5 224**	**34 228**	**4 406**	**20 744**	**2 458**	**5 708**	**+954**	**1 594**	**+406**
Ex-WTO countries										
Bulgaria	2 145	670	2 204	204	2 116	366	243	8	44	+23
CSFR	1 797	362	2 538	488	1 566	416	348	3	56	+19
Hungary	1 345	510	1 720	20	1 047	207	110	+70	39	+69
Poland	2 850	1 120	2 377	227	2 300	690	551	91	29	+101
Romania	2 851	1 476	3 103	1 003	3 787	2 312	505	75	13	+107
USSR	20 725	7 575	29 890	9 890	13 938	763	6 611	1 461	1 481	+19
WTO total	**31 713**	**11 713**	**41 832**	**11 832**	**24 754**	**4 754**	**8 368**	**1 568**	**1 662**	**+338**
NATO and WTO total	**56 079**	**16 937**	**76 060**	**16 238**	**45 498**	**7 212**	**14 076**	**614**	**3 256**	**+744**

Note: '+' before a number indicates that this number of TLE items may be *added* by the country in question. These figures do not take into account the obligations assumed by the USSR (outside the framework of the Treaty) which were agreed to in June 1990 to resolve some final data disputes (for details see chapter 11, section II on baseline data and first disagreements).

H: holdings; R: reductions

Source: Vienna Fax, vol. 2, no. 5 (28 May 1991).

Table 4. Quantities of TLE to be cut and their share in (pre-reduction) TLE holdings

Country	TLE items to be cut	Percentage of TLE to be cut
NATO countries		
Belgium	363	*15.7*
Canada	0	*0*
Denmark	66	*4.7*
France	528	*6.6*
Germany	11 234	*51.5*
Greece	174	*3.0*
Iceland	0	*0*
Italy	834	*10.3*
Luxembourg	0	*0*
Netherlands	809	*23.1*
Norway	39	*4.0*
Portugal	0	*0*
Spain	123	*3.3*
Turkey	28	*0.3*
United Kingdom	200	*3.2*
USA	2 382	*15.8*
NATO total	**16 780**	***19.4***
Ex-WTO countries		
Bulgaria	1 248	*18.5*
Czechoslovakia	6 305	*20.1*
Hungary	737	*17.3*
Poland	2 128	*26.2*
Romania	4 866	*47.4*
USSR	19 689	*27.1*
WTO total	**34 973**	***32.2***
NATO and WTO total	**51 753**	***26.5***

Methods of reduction

Eight methods of TLE reduction are set by the Treaty: destruction; conversion to non-military purposes; placement on static display; use for ground instructional purposes; recategorization; use as ground targets; reclassification; and modification. These methods apply to different categories of TLE as shown in table 5. In each case, the item presented at the reduction site shall consist of a complete assembly.

Destruction. The Treaty provides five methods of destruction: severing; explosive demolition; deformation; smashing; use as target drones. Table 6 shows which methods may be applied to different categories of TLE.[8]

[8] The layout of tables 5 and 6 was suggested by tables in Verification Technology Information Centre, *The VERTIC Guide to the CFE Treaty* (VERTIC: London, 1990).

Table 5. Methods of reduction of TLE

Reduction method	Battle tanks	ACVs	Artillery	Combat aircraft	Specialized attack helicopters	Multi-purpose attack helicopters
Destruction	X	X	X	X	X	X
Conversion	X	X	0	0	0	0
Static display	X	X	X[a]	X	X	X
Ground instructional purposes	0	0	0	X	X	X
Recategorization	0	0	0	0	0	X
Ground targets	X	X	X	0	0	0
Reclassification	0	0	0	X[b]	0	0
Modification	0	X[c]	0	0	0	0

X - permitted

0 - not permitted

[a] Permitted only in the case of self-propelled artillery.

[b] Permitted only in the case of specific models or versions of combat-capable trainer aircraft.

[c] Permitted only in the case of one specific APC.

Table 6. Methods of destruction of TLE[a]

Destruction method	Tanks	ACVs	Artillery	Combat aircraft	Attack helicopters
Severing	X	X	X	X	X
Explosive demolition	X	X	X	0	X
Deformation	X	O	X[b]	X	X
Smashing	X	X	X[c]	0	0
Use as target drones	0	0	0	X[d]	0

X- permitted

0- not permitted

[a] Each state party has the right to reduce its reduction liability for each category of TLE in the event of destruction by accident by an amount of no more than 1.5% of the maximum levels for holdings notified at the signature of the Treaty for that category. Destruction by accident must be notified to all other states parties within seven days and the state party should provide documentary evidence within 90 days of the notification.

[b] Only for MLRS and mortars which are not self-propelled.

[c] Only for self-propelled guns, howitzers, artillery pieces combining the characteristics of guns and howitzers or mortars.

[d] Only up to 200 per state party.

Conversion for non-military purposes applies to the following types of battle tank: T-54, T-55, T-62, T-64, T-72 and Leopard 1; and ACV: BMP-1, BTR-60 and OT-64. These items can be converted to: general-purpose prime movers; bulldozers; fire-fighting vehicles; cranes; power unit vehicles; mineral fine crushing vehicles; quarry vehicles; rescue vehicles; casualty evacuation vehicles; transportation vehicles; oil rig vehicles; oil and chemical

spill cleaning vehicles; tracked ice-breaking prime movers; and environmental vehicles.

The states parties, within the framework of the Joint Consultative Group established to promote the objectives and the implementation of the Treaty, can make changes to the list of vehicles and the list of non-military purposes to which they may be converted. Such changes shall be considered as improvements to the viability and effectiveness of the Treaty only relating to minor matters of a technical nature.

The Treaty allows each state party to convert a maximum of 5.7 per cent of its battle tanks as notified at the signature of the Treaty (not to exceed 750 battle tanks)—or 150 items, whichever is greater—and 15 per cent of ACVs as notified at the signature of the Treaty (not to exceed 3000 ACVs)—or 150 items, whichever is greater.

Converted vehicles shall not be placed in service with the conventional armed forces of a state party.

Static display. The number of items to be reduced by static display may not exceed 1 per cent or eight items, whichever is greater, of the maximum levels for holdings of each party declared at the signature of the Treaty. Also each state party may retain in working order two items of each existing type of TLE for static display in museums or similar sites.

Use for ground instructional purposes. The numbers of combat aircraft and attack helicopters must be no greater than 5 per cent of the holdings of each party in each of those two categories as notified at the signature of the Treaty.

Recategorization. This method applies to multi-purpose attack helicopters—when recategorized as combat support helicopters they are no longer subject to the Treaty limits. While multi-purpose attack helicopters are attack helicopters[9] designed for multiple military functions and equipped to employ guided weapons, combat support helicopters are defined as those not fulfilling the requirements of an attack helicopter but which may be equipped with a variety of self-defence and area-suppression weapons, such as guns, cannons and unguided rockets, bombs or cluster bombs, and may be equipped for other military functions. This method of reduction and the method of reclassification of combat-capable trainer aircraft are described in further detail in appendix C, because they place special requirements on verification. Recategorization can be done by conversion and certification or, if helicopters do not have specified elements to be removed, by certification alone. Certification must be conducted within the area of application. Each helicopter to be recategorized must bear the original manufacturer's serial number permanently stamped in a main airframe structural member.

The USSR may hold an aggregate total of up to 100 Mi-24R and Mi-24K helicopters equipped for reconnaissance, spotting or chemical/biological/radiological sampling outside the limits on attack helicopters. Mi-24R and Mi-24K helicopters in excess of this limit are to be categorized as specialized

[9] Attack helicopters are equipped to employ anti-armour, air-to-ground or air-to-air guided weapons and an associated integrated fire control and aiming system.

attack helicopters. NATO was against this provision as these versions could potentially be 'converted to attack helicopters quickly', but acknowledged that 'the actual numbers of the variants are rather small'.[10]

The Soviet Mi-26 unarmed transport helicopter is not covered by the Treaty. Some NATO countries insisted that such a heavy transport helicopter should have been covered as it was 'practically an armoured personnel carrier in the air' and even unarmed 'the soldiers it transports may be very well armed'; but this issue was dropped partly because of verification problems—a particular weapon site with no other TLE could have become subject to OSI just because of a few Mi-26s.[11] As these transport helicopters are spread all over the USSR the inspection teams could go anywhere in the European part of the country where no other TLE is located. Also, if transport helicopters were included in the Treaty, TLE quotas and consequently inspections would have to have been increased.

Use as ground targets. The numbers to be reduced by this method cannot be greater than 2.5 per cent of the holdings of battle tanks and of ACVs and no more than 50 self-propelled pieces of artillery of each state party as notified at the signature of the Treaty.

Reclassification. This method allows reclassification of specific models or versions of combat-capable trainer aircraft into unarmed trainer aircraft. The following aircraft can be thus reclassified: Su-15U; Su-17U; MiG-15U; MiG-21U; MiG-23U; MiG-25U; and UIL-28. Procedures must be carried out within 40 months of the entry into force of the Treaty with resultant removal of no more than 550 such aircraft, of which no more than 130 shall be of the MiG-25U model or version. Until certified as unarmed, such aircraft shall be counted against the numerical limitations on combat aircraft. Each state party can use whatever technological means it deems necessary to totally disarm the aircraft (see appendix C for further details).

Modification. This method applies only to the multi-purpose lightly armoured vehicle MT-LB which may be exceptionally modified within 40 months of the entry into force of the Treaty into an APC look-alike, listed as MT-LB-AT. Modification is implemented by alteration of the interior of the vehicle through the removal of the left-hand combat infantry squad seating and the welding of the ammunition racking to the side and the floor at a minimum of six points so that the vehicle is not capable of transporting a combat infantry squad. Modifications may be accomplished at locations other than reduction sites. If not modified these carriers are to be reported as APCs. This Soviet combat vehicle is capable of being both an artillery tractor and an APC. The Soviet Union has pledged to convert all APC models in the ATTU zone to artillery tractors.

These different procedures will of necessity place different accents on verification procedures and requirements.

[10] *Vienna Fax*, 10 Sep. 1990, p. 1.
[11] *Vienna Fax*, 10 Sep. 1990, pp. 1–2.

Each state party may use any technological means it deems appropriate to implement the procedures for reductions of TLE and to remove, retain and use those components and parts of TLE which are not themselves subject to reduction, and to dispose of debris.

Additional procedures for reductions may be proposed by any state party and be deemed sufficient upon a decision to that effect by the Joint Consultative Group.

VI. Permitted buildups of treaty-limited equipment

NATO countries of the flank zone, plus Spain and Portugal, will be allowed to increase some of their equipment and still remain within Treaty limits. For example, Portugal may more than double its tank potential and increase its major weapon holdings overall by about two-thirds; and Turkey may more than double its ACV holdings. The aircraft holdings for these two countries combined can be increased by 50 per cent. However, the NATO flank states together are going to match ceilings only in battle tanks while increasing ACV and artillery to holdings slightly below the allowed limits. Having an opportunity to meet not only the zone IV.2 sub-limits, but also to take up any shortfalls in zones IV.3 and IV.4, Spain and Portugal plan a buildup short of the limits in battle tanks, ACVs and artillery.[12]

The Treaty does not reduce NATO air power, setting limits above the present aircraft holdings. Even Germany, the only state which has to reduce aircraft, will do that by cutting planes from the former GDR inventory. The largest increase will again take place in the flank zone.

NATO may substantially upgrade its ACV potential by reducing armoured personnel carriers and increasing newer and more capable AIFVs, from the current level of close to 8000 to the sub-limit of 18 000.

All states parties may modernize their forces—there are no restrictions on production and the Treaty does not prohibit replacement of single-fire guns and howitzers with multiple-launch rocket systems.

VII. Transfer of equipment

Meeting concerns of the countries in the flank zone, the Treaty limits the transfer of equipment of each group of states parties into the zone to 459 battle tanks, 723 ACVs and 420 artillery pieces and the transfer to any one country to 153 battle tanks, 241 ACVs and 140 artillery pieces.

In December 1990 NATO defence ministers endorsed the plan to distribute more modern excess TLE among the members of the alliance, rather than to destroy them. This ‘cascading’ process is anticipated by the Treaty as a way to prevent the destruction of modern weapons if they can be substituted for older

[12] *Vienna Fax*, 26 Dec. 1990, p. 3.

Table 7. Weapon transfers planned by NATO

Recipient	TLE	Quantity	Donor
Denmark	Leopard 1 battle tank	110	Germany
	155-mm artillery	36	USA
Greece	M60, Leopard 1 battle tank	700	USA, Germany Netherlands
	M113 APC	150	USA
	155-mm artillery	70	USA
Norway	M 113 APC	125	USA
	Leopard 1 battle tank	100	Germany[a]
Portugal	M 60 battle tank	800	USA
	M 113 APC	100	Netherlands
Spain	M 60 battle tank	530	USA
	M 113 APC	100	USA
Turkey	M 60, Leopard 1 battle tank	1 050	USA, Germany
	M 113 APC	600	USA, Germany
	155-mm artillery	70	USA

Note: Figures represent weapons that recipient nations have arranged to accept as of 11 December 1990. All transactions are subject to change.

[a] Not final.

Source: *Defense News*, 17 Dec. 1990, p. 3.

equipment which can be destroyed instead. Germany, the Netherlands, the USA and Italy are expected to release more than 2700 battle tanks, 1000 ACVs and 300 artillery pieces to Denmark, Greece, Norway, Portugal, Spain and Turkey. Greece and Turkey will receive the most equipment.[13] Since, as noted, only Germany from among the NATO states will reduce aircraft, and will do so by reducing the former GDR inventory, no aircraft are involved in the transfer process. Thus, the main transfer routes would be from central Europe, where the largest portion of TLE is deployed, to northern and southern Europe. No timetable has been set for arms transfers. Specific NATO weapon transfers planned shortly after Treaty signature are shown in table 7.

According to the plan, the recipients will be required to destroy excess equipment at their own cost.

VIII. Residual levels: a new balance

Although the Treaty leaves in place enormous numbers of TLE items, almost 79 000 on each side, the reductions will remove asymmetries between NATO and the former WTO in TLE. From table 3 the ratios before reductions are: battle tanks—1:1.3; ACVs—1:1.2; artillery—1:1.2; combat aircraft—1:1.5; attack helicopters—1:1. According to former Soviet Defence Minister Dmitriy Yazov,

[13] *Vienna Fax*, vol. 2, nos 6 and 7 (12 Aug. 1991), p. 5.

the political processes in Eastern Europe and in the countries of the Warsaw Treaty Organization and the changes in the character and functions of the WTO military organization have resulted in assessment, as a rule, of armaments not of the WTO and NATO, but of the USSR and NATO. In such assessment the ratio would be correspondingly the following: in tanks and ACVs—1:1.5; in artillery, combat aircraft and attack helicopters—1:1.3. In case of reaching the limits of 20 000 artillery pieces by NATO, the ratio would further be changed to 1:1.5.[14]

The US Institute for Defense and Disarmament Studies states:

The CFE Treaty will give European NATO countries, for the first time, numerical superiority over the USSR in all major weapons deployed west of the Urals, discounting not only US-based forces prepared to defend Europe, but also US forces in Europe. This change renders obsolete longstanding Western controversies about Soviet intentions, attack warning time, quantity versus quality, and nuclear first use.[15]

Jonathan Dean has emphasized two aspects of the CFE Treaty. The first lies in its elimination of the possibility of surprise attack. The second is in the verification regime itself:

CFE on-site inspections will enable both sides to make important assessments of force readiness, training, morale, and leadership. The sub-zones will be useful barriers to sudden force concentration . . . In fact, these CFE restrictions and verification measures, together with the important set of new confidence-building measures reached in separate talks in Vienna, will provide the rules and regulations of the emerging European security system.[16]

It is the various aspects of the CFE verification regime which comprise most of the remainder of this report.

[14] *Krasnaya Zvezda*, 29 Nov. 1990, p. 2.
[15] *Vienna Fax*, 8 Nov. 1990, p. 1.
[16] *Arms Control Today*, Dec. 1990, p. 3.

4. Verification

I. What is verification?

There is no widely accepted definition of verification,[17] but there is a common understanding of its meaning. According to *The Oxford English Dictionary*, verification is 'the action of demonstrating or proving to be true or legitimate by means of evidence or testimony, formal assertion of truth'; 'demonstration of truth or correctness by facts or circumstances'; 'the action of establishing or testing the truth or correctness of a fact, theory, statement, etc., by means of special investigation or comparison of data'.

Verification in the arms control context involves several stages. The process begins with monitoring—the gathering of data by various human and technical means. Along with or following monitoring, information processing takes place in which data collected, usually from several different sources, are preliminarily interpreted and assembled into some more appropriate form. Once data are processed they must be evaluated and analysed. Detailed interpretation will then lead to a series of questions involving political issues. Is the information related to specific treaty provisions and, if so, is a potential violation indicated? What might the scale of the violation be? What might this indicate in terms of an appropriate response?

Treaties such as the CFE Treaty have provisions for consultations among states parties to the agreement to ensure smooth implementation, including resolving alleged violations or circumventions. If perceived violations exist and are deemed serious, with consultations failing to resolve the issue, possible responses up to and including notification of withdrawal from the treaty itself may be considered.

II. Purposes of verification

The above stages of verification serve diverse and interrelated purposes. The most obvious of course is to *detect* violations of an agreement, thereby to provide early warning and deny any advantage to a violator. The second purpose is to *deter* violations by the fact that verification increases the risk of detection. The third main purpose is to *build confidence*, not only among

[17] A good 'agreement specific' definition has been given in a recent UN Study: 'Verification is a process which establishes whether the States parties are complying with their obligations under an agreement. The process includes: collection of information relevant to obligations under arms limitation and disarmament agreements; analysis of the information; and reaching a judgement as to whether the specific terms of an agreement are being met. The context in which verification takes place is that of the sovereign right of states to conclude and their obligation to implement arms limitation and disarmament agreements. Verification is conducted by the parties to an agreement, or by an organization at their request.' UN Department for Disarmament Affairs, *Study on the Role of the United Nations in the Field of Verification* (United Nations: New York, 1991), p. 4.

treaty partners but also within domestic political communities. Finally, verification aims to *clarify uncertainty* (treaty assessment).

III. Standards of verification

The creation and functioning of a verification regime are dependent on verification policy decisions which, in turn, are based on technological, legal, military and political considerations, and it is these decisions which set the level of verification standards.

Among these standards two have been used most frequently in connection with major arms control agreements in the past. The first is 'adequate verification', which is usually defined in terms of the ability to discover militarily significant violations in time to make an appropriate response. The second is 'effective verification', which is now understood as the ability to detect any violation regardless of its military significance as a deterrent to cheating and can be associated with a juridicial approach to verification.

Such definitions are quite general and have thereby provoked criticism by a number of experts. Thus, for example, as Lynn Hansen writes,

> by focusing on the criterion of military significance, we can avoid descriptive phrases like 'adequate' or 'effective' verification. These adjectives easily lose their meaning because the verification process is not a pure science and because no widely accepted criteria exist for establishing adequacy or effectiveness. Instead, ascertaining compliance is an analytical task, involving incomplete and often piecemeal data, and sometimes tinged by political considerations.[18]

It is also true, however, that the term 'military significance' will remain vague until, at least, common criteria are agreed among states parties.

During the CFE Negotiation a number of experts pointed to the need to counter unrealistic public and political expectations of 'effective' verification standards and thus rather to formulate treaty provisions so as to optimize and enhance the capabilities and procedures for 'adequate' verification for the purposes of monitoring significant violations and of precluding destabilizing trends in the military–political sphere. This would then allow agreement on the basic requirements including sufficient information exchanges, reciprocal oversight rights and co-operative measures to increase confidence in verification. In the process of positive changes in Europe and with the end of the cold war the grounds for earlier demands for a very strict verification regime have faded still further. The dissolution of the WTO has added new complexities, but the task of concentrating resources on monitoring militarily significant force changes and not on discovering and/or preventing any cheating (no matter how minor) has prevailed.

Nonetheless, ambiguities associated with the absence of acknowledged common and specific criteria of 'military significance' together with its relation to political perceptions make it difficult precisely to quantify the level

[18] *Washington Quarterly*, winter 1991, p. 135.

of robustness required of the verification regime. Rather, one can only speculate that states parties would focus their attention on the most worrisome categories and types of TLE as they perceive them and to link detected violations, if they take place, with the general changes in military potential and structures. It is also true that the degree of faith in the verification regime will be closely connected with processes in military doctrines and the military–political situation in Europe. Other agreements signed in November 1990 must be taken into account. Finally, the robustness of the verification regime will depend on perceptions of the likelihood and scale of possible circumvention. This relates to the manner in which a state party or a group of states parties identify risks to their security and on capabilities to respond to certain violations. It relates as well to the degree to which they perceive the possible incentives of other states parties to violate the Treaty as well as on the ease and speed with which it is deemed possible to deny any 'gain' resulting from non-compliance. This is also coupled with the general impact of compliance concerns stemming from limitations in technical verification capabilities.

In summary, with respect to the CFE Treaty, official statements have tended to indicate that the states parties would orient their verification activities to detect and deter militarily significant violations, rather than to attempt to implement the 'effective verification' policies. This is mainly based on the new political situation in Europe which is characterized by increased trust, on financial considerations (i.e., the need for large expenditures to even attempt to detect any and all violations) and, indeed, on understanding the practical impossibility of keeping track of every piece of conventional TLE. As will be made apparent, the verification provisions for the CFE Treaty do in fact themselves reflect plans to concentrate verification activities on still loosely defined militarily significant violations, as a less comprehensive regime has been created than that proposed by some states parties during the Negotiation and expected by many experts and the public.

5. Verification provisions of the Treaty

I. Introduction

The CFE Treaty sets out a far-reaching and intrusive verification regime which includes national and multinational technical means, a large number of several different types of on-site inspection (including the important option of challenge inspections), exchanges of detailed data about the quantity and location of forces both before and after reductions and a Joint Consultative Group to mediate disputes. This regime is designed to operate in a dynamic environment of unprecedented reduction and removal of large numbers of weapons, each with their own specific characteristics, over a large area.

In creating a verification regime, the states parties have made efforts to meet a number of very important requirements: clearly spelled out and detailed data are to be exchanged;[19] verification means and measures must not be interfered with by other states parties and concealment measures are prohibited; every state party has an equal right to participate in verification; and maximum possible access to relevant military sites during inspections must be provided while allowing for minimum interference with routine military activities. Cost effectiveness has certainly played a role in conjunction with the related desire to make the regime as simple as possible given its inherently complex demands. These requirements must meet the basic task of providing clear and convincing evidence of compliance or lack thereof.

The verification provisions do not, however, include some measures proposed by members of both groups of states during the negotiation. The resultant regime has avoided such sophisticated (politically, technologically and organizationally) measures as monitoring production of TLE, using overlapping sensor systems by installing short- and medium-range sensors on the territory of a given state party, sophisticated tagging technology, permanent observation posts, portal monitoring, and so on. As mentioned above, the issue of aerial surveillance by overflights is to be discussed and agreed upon during the follow-on negotiations. The Protocol on Inspection does allow, while inspecting reductions, for placing ‘special marks’ on equipment to be reduced; these ‘special marks’ are, however, not more explicitly defined but can probably be considered a simple form of tagging.

II. Technical means of verification

A state party can use national or multinational technical means of verification at its disposal in a manner consistent with generally recognized principles of international law and must not interfere with such means of another state

[19] An annex to the Protocol on Notification and Exchange of Information details the specific format the exchanged data are to adhere to. Information includes that on command organizations, holdings, location and numbers of equipment, OOVs and declared sites.

party. Also it cannot use concealment measures that impede verification of compliance with the Treaty provisions by such means of another state party; this obligation does not apply to cover or concealment practices associated with normal personnel training, maintenance or operations involving TLE.

III. Inspections[20]

To ensure verification of compliance with the provisions of the Treaty, each state party has the right to conduct inspections within the area of application without refusal (except for challenge inspections): (*a*) to verify, on the basis of the information provided pursuant to provisions of the Protocol on Notification and Exchange of Information, compliance with the numerical limitations; (*b*) to monitor the process of reduction of TLE carried out at reduction sites; and (*c*) to monitor the certification of recategorized multi-purpose attack helicopters and reclassified combat-capable trainer aircraft.

The states parties can inspect declared sites, witness reductions and certification, and carry out challenge inspections to undeclared sites ('specified areas'). No information obtained during inspections can be publicly disclosed without the express consent of the inspecting state party.

On-site inspections (OSI) will follow four phases. During the first 120 days after treaty ratification, there will be intensive baseline inspections to confirm the accuracy of the data on existing forces provided by each country. During the following three years OSI will monitor weapon reductions. After that OSI will validate the reduction for a further 120 days. Finally there will be a permanent inspection process to monitor compliance. There exist quotas (described in detail below) for each of these phases for both declared site and challenge inspections. There are, however, no quotas for inspections of reduction or certification.

During an inspection conducted by more than one state party, one of them is responsible for the execution of the Treaty provisions. Upon completion of the residual level validation period, each state party can conduct, and each state party with territory within the area of application must accept, an agreed number of aerial inspections within the area of application. The agreed numbers and other provisions are to be determined during the CFE IA follow-on negotiations.

The stationing state party is fully responsible for compliance in respect of TLE in service with its conventional armed forces stationed on the territory of the host state party. They co-operatively ensure compliance with the relevant provisions of the Protocol on Inspection.[21]

[20] For more details see appendix D.

[21] In case of inspection sites with only a stationing state party's TLE, and under its command, the escort team is placed under the responsibility of a representative of a stationing state party for the duration of the inspection within that inspection site where the stationing state party's TLE is located. If the TLE of both the host and the stationing state party are present in inspection sites, the escort team is composed of representatives of both parties when TLE of the stationing state party is actually inspected. During the inspection within that inspection site, the host party exercises the rights and obligations of the

Table 8. Objects of verification (final exchange of information, 18 February 1991)

State party	OOV
NATO countries	
Belgium	50
Canada	13
Denmark	64
France	236
Germany	470
Greece	61
Iceland	0
Italy	190
Luxembourg	2
The Netherlands	88
Norway	59
Portugal	28
Spain	94
Turkey	150
UK	225
USA	169
Total	**1 899**
Ex-WTO countries	
Bulgaria	93
Czechoslovakia	185
Hungary	58
Poland	134
Romania	127
USSR	910
Total	**1 507**

Source: Trust and Verify, no. 19 (Apr./May 1991), p. 3.

Objects of verification

As described in detail below, passive declared site and challenge inspection quotas for each country are calculated based on the number of objects of verification (OOV) which the state possesses (passive quotas are the number of inspections of OOV a state party is obliged to accept). In general terms, OOV are elements of the military force structure with TLE. They are located at declared sites.

Because the concept of an OOV is significant, it is important to more strictly outline the definition as it appears in the Treaty itself.

The term ‘object of verification’ means:

1. Any formation or unit at the organizational level of brigade/regiment, wing/air regiment, independent battalion/artillery battalion, independent squadron or equivalent as well as any separately located battalion/squadron or

inspected party with the exception of those rights and obligations related to inspection of the TLE of the stationing party, which is exercised by that party.

equivalent unit at the next level of command below the brigade/regiment, wing/air regiment level holding TLE at a notified location;

2. Any designated permanent storage site, military storage site not organic to formations or units referred to above, independent repair or maintenance unit, military training establishment or military airfield notified at which TLE are permanently or routinely present;

3. A notified reduction site for TLE;

4. In the case of units below the level of battalion holding TLE that are directly subordinate to a unit or formation above the level of brigade/regiment or equivalent, that unit or formation to which the units below the level of battalion are subordinated is considered an OOV if it has no subordinate unit or formation at the level of brigade/regiment or equivalent.

It is also noted that a formation or unit holding conventional armaments and equipment *subject* to the Treaty,[22] but not in service with the conventional armed forces of a state party, is not considered an OOV.

In fulfilment of the Treaty requirements, the states parties declared their revised numbers of OOV in February 1991 as shown in table 8.

Quota of inspections

For a specified time period, the total number of inspections of OOV that each state party is obliged to receive is called the 'passive declared site inspection quota' and the maximum number of challenge inspections that each state party with its territory within the area of application is obliged to receive is called the 'passive challenge inspection quota'. The former is expressed as a percentage of the OOV which each state party possesses in the ATTU zone, while the latter is expressed as a percentage of the number of inspections of declared sites. These quotas are shown in table 9. This agreed rule on the number of inspections each state party is obliged to accept differs from the previously proposed rule of the passive quota as a percentage of the number of TLE items possessed by each state party.[23]

[22] Conventional armaments and equipment *subject* to the Treaty include primary trainer aircraft, unarmed trainer aircraft, combat support helicopters, unarmed transport helicopters, AVLBs, APC look-alikes and AIFV look-alikes *in addition to* conventional armaments and equipment *limited* by the Treaty (TLE).

[23] The formula for calculating the number of annual inspections each country would have to host was one of the main verification disputes during the negotiations. NATO insisted on a formula which was based on the country's area and the number of TLE items deployed there while the WTO preferred one based on the number of military units, storage sites and training camps in each country. WTO representatives complained that the NATO formula allowed 900 annual 'inspection days' for the West and left the East with only 400. Independent estimates put the likely number of inspections under the NATO proposal at 350 per year at NATO facilities and 800 at WTO facilities (*Defense and Disarmament Alternatives*, May 1990, p. 7; *Trust and Verify*, Apr. 1990, p. 3). According to Soviet military officials, the need for covering almost all military facilities in accordance with the Western plans was unjustified. For example, during the baseline validation phase, taking into account NATO's intentions to have an average of 5 inspection teams per day, each able to inspect 2–3 'objects' a day, it would be possible to inspect 1200–1800 'objects' in the USSR (*Voennaya mysl*, no. 11 [1990], p. 15). NATO officials maintained that the WTO formula would distort the quotas, since some states had many sites with small arsenals while others had few sites with large arsenals. Finally, both sides have agreed

Table 9. Passive quotas for inspections of declared and undeclared sites

	I. Baseline validation	II. Reduction phase	III. Residual validation phase	IV. Residual levels
Declared sites	20% of OOV	10% OOV p.a.	20% of OOV	15% OOV p.a.
Challenge inspection	15% of declared sites quota	15% of declared sites quota	15% of declared sites quota	23% of declared sites quota

The Treaty also provides for allotment of the inspections which each country will be allowed to make, as well as the number of inspections it will be required to grant to other countries.[24] These 'active' quotas are agreed among the members of each of the two groups of states parties. States parties can transfer parts of their active quota to other states parties. Nonetheless, no more than 50 per cent of a state's passive quota can be taken up by one single state party in a calendar year.

No state party may conduct more than five inspections annually on the territory of a state party in the same group. Thus, for example, former WTO countries can inspect each other and the passive quota for NATO inspections would be reduced accordingly. As there are six ex-WTO states, each of which would be allowed five such inspections of the other five states (i.e., 25 such inspections), the number of such intra-alliance inspections could *in principle* be a very large portion of the total passive quota—as many as 150 per year for the WTO as a whole. Rights such as these may not, however, be used in order to evade the objectives of the verification regime. Thus, for example, members of the same group of states parties may not inspect each other simply with the purpose of reducing their passive quota and thereby reducing the number of inspections allowed by members of the other group of states parties.

on the passive quotas as a percentage of the numbers of OOV each state party declares. In autumn 1990 the Soviet Union explained to the USA in Washington that 'anything contiguous to an object can be inspected, except for another object [which would count as a separate inspection under the quota] . . . You can look at the whole site (or division) within which a regiment lies, but you have to use another inspection to look at another regiment'. (*BASIC Reports from Vienna*, 8 Nov. 1990, p. 1).

[24] These quotas are closer to the Soviet proposals. The head of the Soviet delegation, Oleg Grinevskiy, noted that inspection quotas covering some 7–8 per cent of the objects to be verified could assure reliability and sufficiency 'in accordance with the estimates of our scholars and experts'. However, for meeting NATO concerns he proposed 'baseline data verification' covering up to 15 per cent, 10 per cent for the reduction period, 15 per cent for verifying residual levels and subsequent annual verification up to 10 per cent (*Arms Control Reporter*, 1990, sheet 407.B.388). It is also worth mentioning that the Western European Union regarded annual verification of 10 per cent of the declared inventory to be sufficient; Kunzendorff, V., *Verification in Conventional Arms Control*, Adelphi Papers 245 (winter 1989), p. 37.

Joint Consultative Group

The states parties have established a Joint Consultative Group (JCG) to promote the objectives and the implementation of the Treaty. It was stipulated that the first session be opened no later than 60 days after the signing of the Treaty.[25] Regular sessions are to be held twice a year and last up to 4 weeks each. Additional sessions may be convened at the request of one or more states parties and open no later than 15 days after the receipt of such a request by the Chairman of the JCG. The proceedings are confidential unless otherwise decided. (For more details see appendix E.)

[25] This session was convened on 29 November 1990.

6. Other important provisions of the Treaty

I. Notifications and exchange of information

The CFE Treaty states that to ensure verification of compliance with its provisions, each state party shall provide notifications and exchange of information pertaining to its conventional armaments and equipment and is responsible for its own information. This information comprises elements including:

- The structure of each state party's land, air and air defence forces within the ATTU zone;
- The overall holdings in each TLE category;
- The location, numbers and types of conventional armaments and equipment in service with the conventional armed forces of states parties;
- The location and numbers of TLE within the ATTU zone but not in service with conventional armed forces;
- The objects of verification and declared sites;
- The location of sites from which conventional armaments and equipment have been withdrawn;
- Timetable for the provision of information regarding the first five points above;
- Changes in organizational structures or force levels;
- Entry into and removal from service of TLE;
- Entry into and exit from the area of application of TLE in service with the conventional armed forces;
- Conventional armaments and equipment in transit through the ATTU zone;
- Any new type, model or version of conventional armaments and equipment;
- The number and types of armaments to be reduced by specified methods;
- The reassignment of TLE and AVLBs to organizations not part of the conventional armed forces;
- The location and description of the TLE within designated permanent storage sites;
- Technical data for each model or version of existing types of conventional armaments and equipment;
- Photographs for each existing type of TLE and of APC look-alike and AIFV look-alike;
- Reclassification and recategorization.

(For more details, see appendix F on notification and exchange of information.)

The Treaty gives the timetable for provision of information about the first five of these elements: upon signature of the Treaty (for the third, fourth and fifth only); 30 days after entry into force; on 15 December of every year after entry into force; after completion of the 40-month reduction period. The timetable for provision of information on other elements is given in appendix F.

The information to be provided thus covers not only conventional armaments and equipment *limited* by the Treaty (TLE), but in a number of cases also the broader group of conventional armaments and equipment *subject* to the Treaty. The term 'in service' applies to all conventional armaments and equipment subject to the Treaty that are within the ATTU zone, except those designed and structured to perform internal security functions in peacetime and the exceptions to numerical limitations outlined previously.

II. Site categories

Declared sites

A declared site is defined as a facility or precisely delineated geographic location with one or more OOV. It consists of territory within its man-made or natural outer boundary or boundaries as well as associated territory comprising firing ranges, training areas, maintenance and storage areas, helicopter airfields and railroad loading facilities at which TLE, combat support helicopters, reclassified combat-capable trainer aircraft, APC look-alikes, AIFV look-alikes or AVLBs are permanently or routinely present.

Inspection teams are to be provided with diagrams of declared sites including the perimeter, major buildings and roads on the sites.

Reduction sites

The term 'reduction site' means a clearly designated location where the reduction of TLE takes place. The locations of reduction sites, including those where the final conversion of battle tanks and ACVs to non-military purposes is to take place, must be notified by each state party upon entry into force of the Treaty. Each state party can designate as many reduction sites as it wishes, revise without restriction its designation of such sites and carry out reduction and final conversion simultaneously at a maximum of 20 sites. States parties can share or collocate reduction sites by mutual agreement. Notwithstanding such rights, during the first 120 days after entry into force of the Treaty (i.e., during the baseline validation period) reduction must be carried out simultaneously at no more than two reduction sites for each state party.

Designated permanent storage sites for TLE

TLE (and AVLBs as well) can be retained in designated permanent storage sites (DPSS) and are counted within the overall ceilings but are not subject to limitations on TLE in active units. Any TLE or AVLBs in storage other than in designated permanent storage sites are counted as being in active units.

Such storage sites are only to contain facilities for storage and maintenance, but not firing ranges or training areas associated with TLE. Each site is to be within a boundary defined by a continuous fence at least 1.5 m high, with no more than three gates for the entry and exit of armaments and equipment.

III. Serial numbers and special marks

A working register must be established at each reduction site to record the serial numbers of items undergoing reduction. This register will be made available to inspectors. In addition, inspection teams have the right to record factory serial numbers from conventional arms and equipment to be reduced or to place 'special marks' on the equipment before reduction and to record these numbers or marks again at the completion of the reduction process. It is specified that each combat helicopter subject to the recategorization procedure bear the manufacturer's serial number permanently stamped in a main airframe structural member. Both prior to and after certification, the serial numbers of helicopters and aircraft must be provided by the certifying party, and during inspections of certification, inspectors may not be refused the right to check these serial numbers.

IV. Format for the exchange of information

Data exchange should take into close consideration the specifics of the character and the stage of the reduction process. To avoid possible misinterpretations and ambiguities and, as a result, potential accusations, a set format for the exchange of information was agreed to by the states parties. The format is detailed according to the needs and purposes of the Treaty and includes several charts.

This precise manner in which information is to be exchanged is extensively outlined in Appendix G.

7. National and multinational technical means of verification

I. Introduction

The CFE verification regime involves detailed and thorough on-site inspection procedures which were deemed necessary in large part because of the multilateral nature of the Treaty. These are detailed in chapter 8. Sophisticated non-intrusive technological means of verification, national and multinational technical means (NTM and MTM), will also be employed. The basic problem here, however, is that these means are at present primarily the domain of the USA and the USSR. Nonetheless, the technological capabilities of several other states parties are also quite advanced and those of others are quickly gaining ground. In addition, some of the information acquired by the more technologically advanced nations is known to be transferred to other nations and could provide further reassurance of treaty compliance. The main types of NTM and MTM are discussed here, with special reference to the means that could be employed for verifying compliance with the CFE Treaty.

One important capability, infrequently discussed in connection with treaty verification in general and the CFE Treaty in particular, is the ability of even quite small nations inexpensively to deploy quite effective listening devices to intercept the communications traffic of other nations. The uses of information acquired by such equipment, whether deployed on home territory or in foreign embassies, for example, cannot be ignored.

In addition to the technological capabilities which can and will be employed to verify the CFE Treaty it is important to bear in mind the new opportunities for acquiring vast amounts and various types of information as a result of the opening up of much of Eastern Europe. In fact, a Central Intelligence Agency (CIA) task force has been set up to look into ways of exploiting the ‘deluge of open-source information’ now becoming available with the end of the cold war.[26]

When considering the methods available for treaty monitoring it is of the utmost importance to always bear in mind the adequacy of verification. What could or should be considered a militarily significant violation of the CFE Treaty? It has recently been stated that, among Western experts at least, the thinking ‘appears to be settling on a deviation from treaty limits in the 20–30 percent range as the threshold for military significance. However, a further complicating factor is that there could be a substantial difference between cheating that threatened a group of states (all of NATO, for example) and cheating that, because it was concentrated in one geographic location (Norway

[26] ‘CIA role in the ’90s: Is foreign business the enemy?’, *International Herald Tribune*, 14 Nov. 1990, p. 3.

or Turkey, for example), threatened only one member directly'.[27] In fact the definition of militarily significant cheating will probably change over time, encompassing a broader range of activities and concerns.

Targets of verification and resolution

In order to understand the capabilities of various sensors which will be used to verify the CFE Treaty and, even more importantly, how these capabilities apply directly to the TLE covered by the Treaty, it is important to introduce the notion of 'resolution'. The most modern optical sensors employ arrays of charge-coupled devices (CCDs)—now commonplace in home video recorders, for example. These convert the various intensities of light received from the ground target into electrical signals which can be easily transmitted and reassembled into images once received back on earth. The resolution of these sensors is defined in terms of the instantaneous field of view (IFOV). This is simply the area on the ground from which light is focused onto one of the (usually tens of thousand) elements in the detector array.

An image from the panchromatic (black-and-white) sensor on the well known French SPOT satellite has a resolution (IFOV) of 10 m, for example. This simply means that a complete picture is made up of a two-dimensional array of picture elements (pixels) each corresponding to an area 10 m square on the ground. This (very roughly speaking) is the level of detail that one can expect to extract from such an image. Large buildings are easily discernable, for example. Transportation lines, although fairly narrow, can also usually be discerned since they affect a long line of pixels to some degree. With the best resolution currently available to the most sophisticated satellites (10–15 cm), for example, it is possible to identify all of the weapons covered by the CFE Treaty if they are left in the open.

II. National technical means[28]

National technical means of collecting information are those methods which are independent of the co-operation of the country being monitored. They range from satellites in a wide variety of earth orbits to submarines used to tap into undersea communications cables. The two broadest categories of NTM are usually referred to as image intelligence (IMINT) and signals intelligence (SIGINT). As the names imply, IMINT refers to images acquired from satellites, aircraft, and so on, while SIGINT deals with the interception of all types of electromagnetic signal, including all forms of communications, radar emissions, and so on.

[27] Sloan, S., 'CFE verification: revolutionizing relations', *Arms Control Today*, May 1990, p. 21.

[28] For a more detailed examination of technological aspects of NTM see, for example, Kokoski, R., 'National technical means', ed. R. Kokoski and S. Koulik, SIPRI, *Verification of Conventional Arms Control in Europe: Technological Constraints and Opportunities* (Westview Press: Boulder, Colo., 1990), pp. 17–55.

In a certain sense, NTM could be considered the foundation of the CFE Treaty verification regime even though most states parties are not privy to most of the information they provide. This is certainly not to understate the necessary and wide-ranging co-operative monitoring possibilities allowed for by the Treaty. Inspections conducted either on the ground or from aircraft do, however, require co-operation. Although the climate in Europe in the early 1990s would not lead one to anticipate any serious problems in this regard, NTM are basically unaffected by the political atmosphere.

It is also important to stress the role that NTM capabilities play in providing early warning of military activities and thus increasing overall confidence. The rapid change in force deployments in Europe means the attendant increased warning time for a full-scale conventional attack is now measured in years. Thus, priorities of the mandate—to 'eliminate the capability for launching surprise attack and for initiating large-scale offensive action'—can now be monitored with a high degree of confidence through NTM alone. This is especially true now that many countries in the East are being opened up and information of all sorts is flowing out of them. Some of this will doubtless be of value in monitoring various aspects of the force structures and other military parameters which are of relevance to CFE Treaty verification. Such radical changes will, however, create problems for the gathering of reliable intelligence. As was recently pointed out, 'Perhaps the most fundamental challenge facing Western intelligence agencies will be working on a long-term process in the face of short-term demands in an environment characterized by the most profound uncertainty and change since the start of the Cold War'.[29]

The increasing estimates of warning time are bound to influence the threat perception as it sifts into the public awareness and back into government concern for compliance with conventional arms control agreements. This should have a major effect on the way in which the public will respond to accusations from some lobbies in the USA of Soviet cheating, for example. Even if they involve, say, hundreds of pieces of military equipment the public reaction would probably not exceed a collective yawn. In the former WTO countries, increasing concern with obtaining the necessities of life will probably lead to the same type of reaction should what might in the past have been termed major compliance issues be raised by voices within these countries.

When exploited to their full, satellites can have a profound effect on the verification of arms control treaties. For example it has been stated (without too much exaggeration, perhaps) that:

> With satellite photography [1981–87 CIA director Casey's] people could count Soviet tanks. Through imagery enhancement . . . they could determine whether a tank was in working order . . . detect any movement of Soviet forces, or a major new weapons program. Satellites might miss tightly held research and development projects in the Soviet Union . . . but that was about all they missed.[30]

[29] Riemann, R. H., 'The challenges of Glasnost for Western intelligence', *Parameters*, vol. 20, no. 4 (Dec. 1990), pp. 92–93.

[30] Woodward, B., *Veil: The Secret Wars of the CIA 1981–1987* (Simon & Schuster: London, 1987), p. 221.

It is important, however, not only that these resources be used but that the information be interpreted correctly, and without politicizing the intelligence gathered for verification purposes. A cautionary note must thus be sounded on over-reliance or over-dependence on intelligence collection methods and analysis. In addition, in the USA it has been estimated that arms control verification accounts for only 10–20 per cent of the NTM intelligence capability currently operated. This figure is, however, reportedly on the increase.[31]

Image intelligence—space assets

Commercial satellites aside, the only two states parties to the CFE Treaty which now possess independent means of acquiring imagery from space are the USA and the USSR. The operating modes of the satellites in the countries are quite different, the USSR still relying heavily on photographic film—requiring frequent launch and recovery of imagery—while the US capability is now completely reliant on longer-lived spacecraft transmitting pictures to the ground by electronic means. Both countries, however, can obtain large quantities of space imagery. Their satellites can be used for what are referred to as 'area-surveillance' missions in which large tracts of ground are covered with relatively low-resolution or 'close-look' missions, in which smaller areas may be covered but with very high resolution. Under good conditions, both the USSR and the USA are thought to be capable of obtaining resolutions in the visible-light part of the spectrum approaching 10 cm or so.[32] As exemplified in figure 2 (see page 65), this allows for precise identification of most of the equipment limited by the CFE Treaty.

Further capabilities include infra-red sensors. Having much lower resolution they are nonetheless extremely useful because of their ability (depending on the portion of the spectrum in which they operate) to function under much less than ideal lighting conditions. While in general not capable of producing as finely detailed images as visible light imagery and requiring much processing, radar, because it radiates its own electromagnetic waves that can pass through clouds, has a day–night, basically all-weather capability which is of particular importance over the often cloudy skies of the ATTU region. Thick vegetation presents less of a problem for these sensors, which are also particularly effective at finding metal objects in non-metallic environments. The USA has recently orbited the first two in a series of relatively high-resolution Lacrosse radar satellites. The resolution obtainable is believed to be good enough to detect individual TLE items subject to the CFE Treaty. Although the USSR is is not yet believed to have orbited radar with such high resolution it is known to have space-based radar capable of providing information on much of the infrastructure associated with conventional force deployments.

[31] 'Verification raises cost, technology concerns', *Aviation Week & Space Technology*, 6 Aug. 1990, p. 48.

[32] Kokoski and Koulik (note 28).

Both infra-red sensors and radar can be very useful in detecting camouflage concealment and deception practices. Article XV does prohibit states parties to the Treaty from interfering with NTM, and while concealment measures are also forbidden this is only the case for such practices *other* than those associated with normal training, maintenance and other operations. While it is hoped that all parties will live up to the letter and the spirit of these provisions it is also useful to have the tools to discover when and where violations may be taking place. In addition, under the Protocol on Inspection, Section VII, paragraphs 4 and 9, states parties are allowed the right to refuse *challenge* OSI of a particular area—given that 'reasonable' assurances are provided that no TLE is present. Satellites with their sophisticated capabilities can be used to help reassure that no suspect activity is taking place should such inspections be refused.

Computers, in addition to the somewhat mundane tasks of correcting distorted images and removing noise, are used to perform many tasks which can dramatically increase the value of images acquired. The resolution can be improved by about a factor of two by computer processing. Computer enhancement is used to further sharpen the images allowing for more details to be picked out. Change detection has been a computer-automated task in the US intelligence community since 1983.[33] In addition, the analysis, storage, collation and retrieval of information acquired from all types of intelligence, and its combination with information acquired from co-operative means of verification, will make increasingly large demands on computing capabilities.

US assets

As of mid-1991 the USA has three types of satellite in orbit that provide imagery of potential value in the verification of the CFE Treaty. These are the KH (Keyhole)-11, plus an advanced version of the KH-11 sometimes referred to as the KH-12 or KH-11+, and the radar-imaging Lacrosse satellite.[34] All of these satellites are capable of electronically transmitting images to the ground where they can be processed and made available to policy makers in a matter of hours or less.

KH-11s, the last few of which are now in orbit, have capabilities including resolution of the order of 15 cm when operating at their lowest orbital height. They are also believed to be equipped with infra-red detectors and photo-multipliers for enhanced night-time imaging capabilities. First launched in August 1989, the Advanced KH-11 is believed to have further enhanced capabilities, including resolution possibly slightly better than the earlier KH-11s. As of September 1991 there were believed to be three of these satellites in operation. The Keyhole satellites are designed to carry a large fuel supply to enable them fight atmospheric drag, which is especially pronounced when

[33] Richelson, J. T., *America's Secret Eyes in Space: The U.S. Keyhole Spy Satellite Program* (Harper & Row: New York, 1990), p. 137.

[34] For an up-to-date review of these satellites and their capabilities see Congressional Budget Office, *U.S. Costs of Verification and Compliance under Pending Arms Treaties* (CBO: Washington, DC, Sep. 1990).

they are in their lowest orbits to obtain high-resolution images. It also allows the orbit to be altered to access priority targets if deemed necessary.

Called 'the most important military payload ever launched'[35] by a White House expert, the Lacrosse imaging radar satellite will be especially useful for monitoring conventional forces. With a resolution in the range of 0.7–3 m and a 'refined ability to track armoured vehicles'[36] it should be able to *detect* most of the items limited by the CFE Treaty but probably not make all the relevant *identifications*. Its relatively high (approximately 700-km) orbit, coupled with its 24-hour imaging capability, makes Lacrosse ideal for selecting targets for closer inspection by its lower orbiting companions—the Keyhole satellites. The ability of radar to penetrate a certain degree of foliage which might be used as camouflage for the relatively small-size TLE covered by the CFE Treaty makes it potentially useful for detecting even small clandestine deployments and movements. The first Lacrosse was likely augmented by a second in a Titan 4 rocket launch in March 1991.[37]

It has been projected that there will be 2–6 Lacrosse satellites and 3–6 Advanced KH-11s by the year 2000—i.e., a total of 5–12 satellites. Straightforward calculations show that 8 satellites at an altitude of 500 km, spaced appropriately in the same orbit, would allow for at least 3–4 hours' coverage per day of any point on the earth. If the altitude is increased to 1000 km, then a string of 5–6 satellites would be sufficient and in addition would permit somewhat extended daily coverage.[38]

In addition, attempts have been made by US astronauts to locate military areas and detect vehicle and troop movements on the ground. One of the stated tasks of a shuttle mission planned for December 1991 (STS-44) is to evaluate this capability using a military expert for real-time reconnaissance from low earth orbit. The USSR is also believed to have conducted such experiments from its Mir space station.[39]

Soviet assets

In the early 1990s the Soviet Union operates what are usually referred to as the third-, fourth- and fifth-generation satellites for acquiring space imagery with a possible sixth-generation in the testing stage. Third-generation satellites are usually kept in orbit for only about two weeks, after which they return their photographic film to earth for processing. When used for area surveillance they are 'well suited to detect gross changes in military forces such as

[35] *Atlanta Journal & Constitution*, 27 Nov. 1988.

[36] 'U.S. mounts swift response to Iraq's invasion of Kuwait', *Aviation Week & Space Technology*, 13 Aug. 1990, p. 20.

[37] 'First Vandenberg Titan 4 launched', *Aviation Week & Space Technology*, 18 Mar. 1991, p. 26.

[38] Based on figures from CBO (note 34), pp. 46, 67–68, and similar calculations. The figures given have assumed imaging capability up to the maximum field of view, but capabilities in general degrade as this limit is approached. Note also that KH-11 orbits often extend down to about 200 km, a factor which substantially reduces the possible area covered.

[39] *Military Space*, 17 July 1989, p. 7; 'Navy tests targeting from shuttle', *Space News*, 30 Apr.–6 May, 1990, p. 1; 'DoD research develops device to locate objects from space', *Space News*, 6–12 Aug. 1990, p. 29; *Spaceflight*, Jan. 1991, p. 19.

new construction and major troop redeployments'.[40] High-resolution satellites of the third generation are characterized by lower orbits and are launched much more frequently.

Unlike the third generation, fourth-generation Soviet satellites remain in orbit for up to 60 days and periodically eject film capsules before the spacecraft itself is recovered at the end of a mission. Fifth-generation satellites are substantially different in many aspects. Similar to the US Keyhole satellites, they are capable of returning pictures directly to earth by electronic means,[41] making for much more timely availability of information and, in principle, much easier verification tasking. The lifetime of these satellites ranges to well over six months and they are known to be used in consort with satellites of the earlier generations.

Because of the relatively short lifetime of many of the Soviet satellites, many more reconnaissance and surveillance missions must be launched per year. This has resulted in the capability to launch satellites on relatively short notice, an important advantage in quick-reaction verification tasking. It should also be mentioned that the fact that the third- and fourth-generation satellites must return their film to earth for processing is not a serious drawback for many verification tasks. The information needed, especially with regard to substantial activity involving conventional forces, is not strongly time-sensitive.

Signals intelligence—the more readily accessible NTM

In discussing NTM for treaty verification, emphasis is usually placed on photographic reconnaissance satellites. For the CFE Treaty in particular, however, the role of signals intelligence, gathered using satellites and many other means, as outlined below, may be much more important than is often assumed for two major reasons.

First of all, the large numbers of conventional forces require of necessity a great deal of information flow—concerning training, deployments, exercises, and so on, all of which require substantial communications traffic for their successful co-ordination. Much of this is subject to interception by other countries and the information obtained can aid in piecing together various aspects of the conventional force structure. Much military communications traffic is encrypted, so that making the most of the information often requires access to time-consuming and expensive computer processing to decipher the content of messages. However, it is important to point out that even the so-called 'externals' of the SIGINT traffic can be extremely useful. Externals include such information as the point of origin, likely destinations, the relative amount of communications traffic and its priorities. The possibility that a vital clue to some clandestine military activity could be picked up through signals intercepts provides an additional deterrent to cheating.

[40] Johnson, N., *The Soviet Year in Space 1988* (Teledyne Brown Engineering: Colorado, 1989), p. 28.
[41] Kokoski and Koulik (note 28), p. 32.

Second, and perhaps more importantly, because the equipment needed to intercept substantial amounts of communications and other signals traffic can be relatively unsophisticated, it is also much more directly accessible to CFE Treaty parties other than the USA and the USSR. As is discussed in more detail below, it is probably the case that all states parties possess such capabilities that could be exploited for CFE verification purposes to some degree. Such resources will be particularly valued by countries worried about the military activities of nearby states (even those of the same alliance) as they pertain to the provisions of the Treaty.

Signals intercepts 'comprise the Soviet Union's principal means of surveillance and early-warning; they provide the great bulk of Soviet intelligence with respect to Western military capabilities and activities'.[42] There may be implications for Soviet SIGINT stations located in formerly allied East European states with the dissolution of the WTO; land-based signals intercept stations may well be phased out. Interestingly, similar problems may arise for the West for very different reasons. In the effort to redefine post-cold war aims, the CIA and National Security Agency (NSA) are being asked to explore gathering and disseminating economic intelligence—a practice which could put US SIGINT stations in Europe in an unwelcome position.[43]

US space-based SIGINT capabilities

The USA maintains a vast array of signals-intercept equipment based in space, on land and on sea-going vessels. The most technologically advanced is, of course, the space-based tier, which involves several types of satellite with a variety of signals-intercept capabilities. Small, low-orbiting 'ferret' satellites have been used since 1962 and are now usually carried aloft, 'piggyback', along with larger satellites. 'Jumpseat' satellites operate in highly elliptical orbits and are used to intercept Soviet satellite communications and radar signals.

By far the most powerful of the US SIGINT satellites are those in geostationary orbit (able to remain over one particular area at all times). The most advanced of these satellites, named 'Magnum', have unfurled intercept antennas said to be approximately 100 m across. Two or three of these satellites are now believed to be in operation and they are reportedly able to 'pick up broadcasts from radios the size of a wristwatch'[44] and to 'monitor troop movements and assist in treaty verification'.[45] In addition there are still perhaps two so-called 'Vortex' satellites which, while not as large or capable as the Magnum, are said to be able to 'listen to any part of the (Soviet) microwave network and thus eavesdrop on discussions—for example—between

[42] Ball, D., *Soviet Signals Intelligence (SIGINT)*, Canberra Papers on Strategy and Defence No. 47 (Strategic and Defence Studies Centre, Research School of Pacific Studies, The Australian National University: Canberra, Australia, 1989), p. 136.

[43] 'CIA role in the '90s: is foreign business the enemy?', *International Herald Tribune*, 14 Nov. 1990, p. 3.

[44] Gladwell, M., 'Space shuttle launched on secret military flight', *Washington Post*, 23 Nov. 1989.

[45] *New York Times*, 25 Jan. 1985.

members of the Politburo or Soviet military commanders. It could also intercept short-wave radio conversations between, say, Soviet tank commanders on the Polish border. It could even penetrate the (data links between) Soviet military computer systems.'[46] To aid in processing the enormous amount of data generated by these satellites, computers are programmed to search for certain key words or phrases within the intercepted communications traffic which are of particular interest to analysts.[47]

Soviet space-based SIGINT capabilities

The Soviet space-based SIGINT capability currently consists of three generations of spacecraft. The third generation is comprised of a constellation of six satellites in relatively low orbits and can reportedly locate pulsed signals to within 10 km.[48] The fourth generation of satellites, each of which is much larger than those of the third generation, has not yet reached the full complement of four satellites. These satellites will allow any area on earth to be covered at least once daily. Soviet fifth-generation SIGINT satellites, two of which are now believed to be on station, are located in geosynchronous orbit for continuous coverage similar to the US Magnum or Vortex series.[49]

Land-, sea- and air-based SIGINT of the USA and the USSR

Both the USA and the USSR also have sea- and air-based SIGINT capabilities and particularly large, land-based, signals-intercept networks. The aircraft-based portion is discussed below in section V. The USSR currently maintains approximately 63 intelligence collection ships of 11 different classes. Submarines have also been used to tap into undersea cables, for example. Land-based collection systems number about 300 on Soviet soil alone.[50] The most sophisticated of these stations are able to intercept high-frequency signals originating up to 10 000 km away and determine their location to within 0.5°. Some of these include additional very high frequency (VHF) capability. The potential importance of this type of station is illustrated by its purported ability to 'listen in on the tactical radio traffic between command and manœuvre units during NATO field exercises; between NATO aircraft and their ground controllers; and even between taxicabs and their dispatchers'.[51] Until the unification of Germany there were also about 150 stations in WTO countries. In what was the GDR a large SIGINT station was set up in Zossen-Wuensdorf as well as 19 SIGINT companies, one attached to each of the stationed Soviet

[46] 'How Geoffrey Prime betrayed to Moscow the key to unlock the West's big secret: Prime revealed Argus', *Sunday Times* (London), 14 Nov. 1982.

[47] Lindsey, R., *The Falcon and the Snowman* (Penguin: Harmondsworth, 1980), p. 64.

[48] Classified GAO study reported in Anderson, J., 'There's nothing new about military satellites in space', *Long Island Newsday*, 11 Feb. 1985.

[49] Pike, J., 'Military use of outer space', SIPRI, *SIPRI Yearbook 1990: World Armaments and Disarmament* (Oxford University Press: Oxford, 1990), p. 80.

[50] Kokoski and Koulik (note 28), p. 43.

[51] 'Soviet SIGINT platforms range from trawlers to consulates', *Defense Electronics*, Dec. 1988, p. 90.

divisions.[52] In the late 1980s, independent or co-operative SIGINT stations in the GDR totalled more than 50.[53] These capabilities must be assumed to be diminishing and in the next few years, as Soviet withdrawals are completed, will be eliminated entirely. As time goes on and with the dissolution of the WTO, the Soviet SIGINT collection network in Eastern Europe will become a less and less dependable source of information.

Although not as reliant on ships as the USSR, the USA also employs them as well as submarines for intercepting communications. US land-based stations of particular relevance to the CFE Treaty are located in the UK and in Germany. The political changes occurring in Europe may also be affecting US SIGINT stations, leading, for example, to the dismantling of some of the listening equipment stationed in Germany. However, some of this will reportedly be 'recycled to monitor arms control agreements and to collect data from new, mutually chosen targets'.[54]

SIGINT capabilities of other states parties to the CFE Treaty

Among the states parties to the CFE Treaty, only the USA and the USSR possess space-based SIGINT capabilities. Many of the other 20 states parties do have quite substantial other capabilities, however, especially land-based. While space and in some cases scarcity of available information do not allow a detailed examination of the SIGINT capabilities of all of the states parties to the CFE Treaty here, several illustrative examples are presented.

The British Government Communications Headquarters (GCHQ), in addition to listening posts on its home territory, has signals-intercept stations in Germany, for example, one of which 'concentrates on the HF intercept of Soviet Army and related activity in the western USSR and forward area'.[55] Listening posts are also thought to exist in British embassies in Warsaw, Budapest and Prague. In addition to similar activities by the armed services, the Federal Intelligence Service of the FRG—*Bundesnacrichtendienst* (BND)—has built up a host of sites to intercept telephone and radio communications of the WTO among other activities. France has acquired SIGINT from sources both within and outside the country, including a station in Berlin targeting the WTO, using ground-based facilities of the Groupement de Communications Radio-Electriques (GCR).[56]

Land vehicles including vans, trucks and even motor cars are known to be used for SIGINT purposes by Bulgaria, Czechoslovakia, Hungary, Poland and Romania as well as the USSR. Before unification they were also known to be operated by the GDR. Monitoring activities include government and military communications, military exercises and even weapon test ranges and R&D facilities.[57]

[52] Ball (note 42), pp. 19–20.
[53] Note 51, p. 89.
[54] Wines, M., 'U.S. prepares to reduce spying posts in Germany', *New York Times*, 15 Apr. 1990, p. 6.
[55] Richelson, J., *Foreign Intelligence Organizations* (Ballinger: Cambridge, Mass., 1988), p. 18.
[56] Richelson (note 55), pp. 20, 141, 169.
[57] Ball (note 42), pp. 71–73.

Information sharing

There are many reasons why satellite photographs and other data from the most sophisticated intelligence gathering equipment have not been widely disseminated to the general public. These include the need to keep exactly what is and is not known a secret, and the fear that other nations would be able to use the knowledge of the technological capabilities thus revealed to find and exploit potential weakness for denial and deception. A decisive objection in the USA has reportedly been that releasing a few select photos would lead to a barrage of requests for further images under the Freedom of Information Act, all of which would have to be sifted through in detail before individual decisions on declassification could be made.[58]

These reasons aside, the fact that most of the information acquired by NTM is not made available has a substantial effect on the role it can play—in the verification of multilateral treaties such as the CFE Treaty in particular. Some information acquired through NTM is, of course, distributed for various reasons—even on a regular basis in some particular cases (discussed below). The fact that the party obtaining the information retains strict control over which information is released at what time and at what level of detail, however, places definite restrictions on the level of confidence in treaty compliance which such information can provide to other concerned parties.

Of particular relevance for verification of the CFE Treaty it has been noted that 'a compliance system that depends heavily on NTM for information and minimal inter- and intra- alliance interaction might provide and guarantee against militarily significant cheating, but it might not provide the necessary instruments such as provisions for continuing NATO–WTO consultations on compliance and for crisis avoidance, to accomplish the political and stabilizing objectives'.[59]

Intra-alliance sharing

The fact that some intelligence is exchanged among allies is a given—the pertinent questions are how much, how important is it and is it what the receiving country wants or needs?

To the extent that the absence of intra-alliance data sharing from NTM is to avoid tightly held information falling into the hands of those for whom it is not intended, or is because the information itself is deemed too sensitive even for allies, the use of extensive OSI and the increased openness it provides could tend in some instances to entice the USA and the USSR to broaden their dissemination. If other parties can obtain the information anyway, through OSI for example, then why withhold it?

Also, in general, might it not be more productive and cost-effective to provide an ally the information from NTM and have that party use part of its OSI

[58] Richelson (note 33), pp. 143, 259.

[59] Sloan, S., 'Verifying compliance with a conventional arms control accord: considerations for the Congress', *CRS Report for Congress*, 90-79 F, 7 Feb. 1990, p. 30.

quota to obtain some other information, perhaps less accessible to NTM? This information would be of use to both the inspecting country (without NTM assets) and to the USA or the USSR. Such an *ad hoc* exchange mechanism might involve a request by the USA or the USSR to another party to use one of its OSI for a particular reason in exchange for providing some NTM data. Such arrangements could also be linked with aerial overflights as they become permitted.

Among the more formal (although not often publicized) arrangements for intelligence sharing among allies it is important to mention the UKUSA agreement for the exchange of intelligence information (mainly SIGINT) among the USA, the UK, Canada, Australia and New Zealand. Of particular note for the CFE Treaty is that the agreement also includes the NATO countries as third-party signatories.[60] In addition to this formal agreement there also exist numerous other multilateral and bilateral intelligence-sharing agreements. Also important, the USA provides a daily general release to NATO containing an analysis (not all-encompassing, of course) of its intelligence.[61]

Begun in 1981 and due to be at least partially operational by 1992, the Battlefield Information Collection and Exploitation System (BICES) was originally intended to allow NATO commanders to share information regarding Soviet units during wartime. Because of the diminishing threat, however, it will take on the new roles to 'ensure the continued exchange of intelligence between NATO countries in peacetime . . . [and as a] useful vehicle to improve co-ordination of cooperative responses'.[62] It has been suggested that such shared information could include that concerning the monitoring of arms control accords and unexpected military buildups as well as crisis situations and terrorist activities. In July 1991 an 18-month, $5 million pilot study was approved and it has been reported that NATO military leaders are hopeful regarding the use of BICES for military data needs for CFE Treaty verification.[63] Participating countries include the USA, the UK, Germany, Canada, France, Italy, Denmark, Norway and Portugal.

It is well known that there exists a 'special relationship' between the UK and the USA not only with regard to the sharing of SIGINT but also of satellite images, for example.[64] It is probable that KH-11, aerial reconnaissance and other data were provided by the USA during the Falklands War for instance. However, such exchanges are certainly not limited to the UK. President François Mitterrand of France was reportedly convinced that Libyan forces

[60] Ball, D. and Richelson, J. T., *The Ties that Bind*, 2nd edn (Allen & Unwin: Boston, Mass., 1990), p. 142; Richelson, J. T., *The U.S. Intelligence Community*, 2nd edn (Ballinger: Cambridge, Mass., 1989), p. 283.

[61] Lewis, P., 'Verification of conventional arms control in Europe', *IEEE Technology and Society*, Dec. 1990/Jan. 1991, p. 9.

[62] 'BICES gains importance as allies look to future, official says', *Defense News*, 7 Jan. 1991, p. 6.

[63] 'NATO C^2 program gets go ahead', *Defense News*, 22 July 1991, p. 3; 'NATO to begin work on long-delayed BICES project', *Defense News*, 1 July 1991, p. 11.

[64] See, for example, 'Allies, U.S. explore space cooperation', *Military Space*, vol. 7, no. 24 (19 Nov. 1990), p. 1; also, the UKUSA agreement, as the acronym might lead one to expect, has the NSA and the GCHQ designated as the First Parties to the Agreement—see Ball and Richelson (note 60), p. 142.

were still in Chad in November 1984 only when the USA provided him with satellite photographs to back up their claim.[65]

Arrangements for sharing sensitive information among the members of the WTO were also present although here again certain states received more and some much less.[66] There was reportedly a 'common electronic data storage center in Moscow for all the East European [intelligence] services'.[67] The dissolution of the WTO and the moves towards further autonomy of many of the former member states must, however, be having an effect on the associated information flow. The severity of this effect is, however, extremely difficult to surmise, especially in such a rapidly changing environment.

In a more general context, the USA has been providing the UN Special Commission with intelligence from its NTM in order to aid in its inspection of Iraq pursuant to Security Council resolution 687. In addition, it has lent a U-2 reconnaissance aircraft to the UN.[68]

Inter-alliance sharing

For the reasons mentioned above, information sharing between the alliances, though perhaps desirable from the verification point of view, has always been a very thorny issue. Information either of the quantity or quality to have an impact on the verification of the CFE Treaty is rather unlikely to be exchanged between countries belonging to the different groups of states parties to the Treaty in the immediate future. However, especially in the dynamic environment of the early 1990s, this situation could change somewhat. Co-operation between the USA and the USSR would not be completely new. In 1977, for example, when Soviet reconnaissance satellites noticed suspicious activity in the Kalahari, the USA was informed and KH-11 photographs subsequently confirmed the presence of a (South African) nuclear test site.[69] More recently, Moscow may have provided Washington with a great deal of intelligence information concerning Iraqi Soviet-made missiles, tanks and other weapons after the invasion of Kuwait.[70] While this information was not of the type acquired from sophisticated NTM, it is perhaps indicative of a new spirit of co-operation which could have an impact on future exchanges of various types of information of relevance for verification. It should also be remarked that classified images have already occasionally found their way into unclassified publications, a factor which further argues

[65] Richelson (note 55), pp. 56–57, 160.

[66] Some states such as Romania have been effectively 'frozen out' of the flow of military information. See Dean, J., 'Organizational and institutional issues', Kokoski and Koulik [note 28], p. 285.

[67] 'Inside the Stasi spy network: how East Germany became a haven for terrorists', *International Herald Tribune*, 22 Oct. 1990, p. 6.

[68] Milhollin, G. and White, G., 'Maybe Saddam did the world a favour', *International Herald Tribune*, 14 Aug. 1991, p. 4; *Jane's Defence Weekly*, 24 Aug. 1991, p. 309.

[69] Richelson (note 33), p. 138.

[70] 'Soviets giving Iraqi military secrets to U.S.', *Chicago Tribune*, 6 Sep. 1990, p. 1; 'Kremlin denies giving Iraq's secrets to U.S.', *International Herald Tribune*, 31 Jan. 1991, p. 1.

against being overly protective of such images for reasons of concealing system capabilities.[71]

The Strategic Environmental Research and Development Program which has been proposed in the USA to make use of intelligence assets for environmental studies could have important ramifications on the availability of heretofore classified data.[72] In fact recent reports indicate that some information obtained from US spy satellites will be released for this purpose (albeit appropriately sanitized).[73] Related to this, the USSR has recently stated that it is 'most interested in joint programs with the US for environmental observing systems and satellite surveillance systems that can be used for the verification of *international* arms control agreements'.[74] These types of proposal could bode well for future information exchange in connection with the CFE Treaty and possible follow-on treaties.

III. Multinational technical means

Multinational technical means involve co-operative monitoring by more than one party to an agreement to ascertain compliance of another party or parties. Thus some of the data collection and sharing discussed above may be seen as involving MTM, which will have direct relevance for monitoring the CFE Treaty. This section deals mainly with future plans for more openly discussed systems for providing MTM which could be of value in the CFE verification context.

European co-operation

The Parliamentary Assembly of the Western European Union (WEU)[75] has already issued two reports recommending the development of a European satellite system specifically for verification. France has proposed the formation of a joint processing and interpretation centre to train photo-interpreters using commercially available SPOT and Landsat images.[76] The necessity for the capabilities such a system would provide have not been universally accepted, however. With respect to information already flowing from the USA, opinion has been divided—a senior French Navy officer recently stated that although some processed intelligence information is provided, there is a need for unprocessed data from which independent conclusions can be drawn.

[71] Photos taken by a KH-11 satellite of the Nikolayev shipyard in 1984 which were provided (unauthorized) to, and published in, *Jane's Defence Weekly* had reportedly carried the notation REL UK AND CAN (Releasable to the United Kingdom and Canada); see Richelson (note 33), p. 201.

[72] 'Nunn leads Democratic effort to shift defense resources to environmental research', *Aviation Week & Space Technology*, 9 July 1990, p. 22; Latham, D., 'The right tools for the job: Senate proposes logical environmental strategy', *Space News*, 20–26 Aug. 1990, p. 16.

[73] 'Defense Department to share some data from spy satellites', *Space News*, 20–26 May 1991, p. 1.

[74] 'Soviets cut space again', *Space News*, 20–26 Aug. 1990, p. 1 (emphasis added).

[75] Member countries comprise Belgium, Britain, France, Germany, Italy, Luxembourg, the Netherlands, Portugal and Spain.

[76] *Military Space*, 14 Jan. 1991, p. 7.

On the other hand, Hans-Dieter Wichter, chief spokesman for the FRG Defence Minister, remarked in 1990 that the amount of intelligence flowing from the USA did not allow justification for the costs that would be involved in a European reconnaissance satellite.[77] Similar sentiments have also been voiced by Britain's minister for defence procurement stressing cost considerations and the 'good deal from the United States' Britain is getting in terms of intelligence acquired from space.[78] Along with France, however, Spain, Italy, Belgium and the Netherlands all agree on an independent European surveillance system.[79]

An important development occurred in June 1990 when the WEU agreed to establish a joint satellite interpretation centre beginning in 1992. Projected to be fully operational by 1994, the centre will acquire data from Landsat, SPOT, Helios and ERS-1 satellites. The main task of the centre will be 'to compile and process available data, and to make those data available to member states, particularly within the framework of the verification of arms control agreements, crisis monitoring and environmental monitoring'.[80]

Satellite surveillance technology was identified by defence ministers from 13 European countries in a mid-November 1990 meeting as among 11 priority areas in which Europeans could benefit from co-operation under the Euclid (European Cooperation for the Long Term in Defence) programme. Projects agreed upon included satellite surveillance technology, high-resolution optical sensors, advanced SAR data processing and ground-based systems.[81] The strong performance of US reconnaissance satellites in the Persian Gulf War has more recently further increased interest in developing a pan-European satellite verification capability.[82]

It should also not go without mention that in this broader context there have been repeated examinations of the possible roles of an International Satellite Monitoring Agency (ISMA) for verification purposes. [83]

Helios

In 1991 Helios is the only firmly planned *military* programme among NATO or former WTO countries other than the USA and the USSR for using satellites to acquire intelligence that could be useful in a verification context. The project, initiated by France and joined by Italy and Spain, is estimated to

[77] 'Mideast crisis deflates arguments favouring European spy satellite', *Space News*, 27 Aug.–2 Sep. 1990, p. 3.

[78] 'U.K. minister balks at call for European spy satellite', *Space News*, 16–22 July 1990, p. 1.

[79] 'Allies, U.S. explore space cooperation', *Military Space*, vol. 7, no. 24 (19 Nov. 1990), p. 1.

[80] 'WEU to establish center to study satellite data', *Defense News*, 1 July 1991, p. 19.

[81] 'Europe keen on spy satellite network', *Space News*, 26 Nov.–2 Dec. 1990, p. 2; *Military Space*, vol. 7, no. 24 (19 Nov. 1990), p. 5; 'Europeans launch cooperative R&D effort to bolster industries, gain technology', *Aviation Week & Space Technology*, 24 Dec. 1990, p. 67.

[82] *Defense News*, 8 Apr. 1991, p. 2.

[83] *The Implications of Establishing an International Satellite Monitoring Agency*, United Nations publication E.83.IX.3 (UN: New York, 1983); Jasani B. and Sakata, T. (eds), SIPRI, *Satellites for Arms Control and Crisis Monitoring* (Oxford University Press: Oxford, 1987).

cost in excess of $1.5 billion.[84] The satellites will carry sensors allowing for visible-light and infra-red imagery as well as having electronics-intelligence capabilities;[85] the first is scheduled to be operational by early 1994. Resolution will purportedly be in the 1-m range and capabilities will include 'the monitoring of major vehicle, warship and aircraft movements and the location of military targets, as well as assisting in general crisis management'.[86]

It is important to note that while each of the three countries involved will have its own receiving and processing facilities, satellite user time will be proportional to the financial investment of the three countries involved—79, 14 and 7 per cent shares for France, Italy and Spain respectively. Helios, however, will set a precedent that may lead to future co-operative space-based verification. In fact work is scheduled to begin in 1993–94, immediately after the first Helios launch, on a more advanced follow-on satellite involving France, Italy and Spain, with other West European nations being encouraged to join. In 1989 the FRG expressed interest in the post-Helios programme.[87]

Before the Persian Gulf War a former head of the French military space office said that Helios 'will be saturated with purely military missions, and will not be available for verification'[88] and thus recommended establishment of a separate European satellite for verification. Nonetheless, given the likely overlap between so-called military targets and locations of value for CFE verification it is hard to imagine that substantial peripheral benefits for verification would not accrue from the Helios observations and be exploited. As recently as early 1991, any hopes that data gathered by the Helios satellite would be shared were precluded by French officials.[89] France has also put forth the idea of using Helios as the core of a surveillance system run by the WEU.[90] However, by mid-1991, in an important policy reversal, France agreed to share data obtained with its allies, including regional arms control agencies.[91]

As a further consequence of the Persian Gulf War a proposal has been made to expand the Helios programme to include three generations, the first consisting of the two satellites already authorized. Two second-generation spacecraft equipped with visual and infra-red sensors would follow. The next decade would then see third-generation satellites equipped with advanced sensors as well as radar.[92]

[84] 'Budget reveals slower growth for military space programs', *Defense News*, 3 Dec. 1990, p. 14.

[85] Florini A., 'The opening skies: third party imaging satellites and US security', *International Security*, no. 13, no. 2 (Fall 1988), p. 104.

[86] *International Defense Review*, no. 1 (1989), p. 13.

[87] *International Defense Review*, no. 1 (1989), p. 13; *Defense & Armament Héràcles International*, no. 81 (Feb. 1989), p. 57.

[88] 'Soviets, NATO differ on number of Soviet military sites for CFE', *Defense News*, 17 Dec. 1990, p. 10.

[89] 'Europeans split on verification satellite need', *Space News*, 2–8 Apr. 1990, p. 3.

[90] *Jane's Defense Weekly*, 6 Apr. 1991, p. 517.

[91] 'France offers Helios data to allies', *Defense News*, 10 June 1991, p. 4.

[92] 'Matra Marconi space proposes expanded program for Helios reconnaissance satellite', *Aviation Week & Space Technology*, 20 May 1991, p. 63.

Plano Spaziale Militaire

In addition to its involvement in the Helios programme, Italy in June 1990 completed technical studies on plans to lead an effort to orbit a series of satellites over the next decade. It is hoped that the Plano Spaziale Militaire (PSM) or Military Space Plan will involve as many as nine European nations, and seven programmes, including two for observation satellites and one for electronic intelligence, are proposed. The programme, total funding for which is projected in the $8–13 billion range, will also incorporate communications, early-warning and navigation missions. The proliferation of long-range missiles and aircraft and the problems they pose for Italy and the rest of Europe have been cited among the rationales for the programme. An Italian official has stated that 'such a system cannot be set up by any single European nation and that only international cooperation can achieve this. Luckily times are ripe'.[93] As with the Helios project, such an undertaking would have obvious positive ramifications for CFE Treaty verification. The collection of high-quality space-based imagery and signals intelligence by many European nations would go a long way towards reducing their reliance on information from other countries and providing increased independent confidence of treaty compliance. However, the aftermath of the Persian Gulf War intensified a three-year debate on Italy's new defence posture causing further reassessments and resulting delays. Thus, unfortunately, at the time of writing the future of this programme remains in doubt.[94]

IV. Commercial space assets[95]

As seen, the methods for gathering images from space available today are controlled by and, with certain exceptions, available only to the USA and the USSR. Commercial space imagery, on the other hand, is available to any country or individual with the financial resources. There are several sources from which the prospective customer may choose, each with its own advantages and limitations. One basic factor that cannot be overcome, however, is that the commercial sources available today all still have insufficient resolution for many verification tasks which a party to the CFE Treaty may deem desirable. However, in the absence of information from the USA or the USSR they could be an important independent source of information to all of the states parties. This is true for images used directly and as a cue for OSI or aerial inspections, which all countries are or will be entitled to carry out.

[93] 'Italy plans military satellite network for early warning, reconnaissance', *Defense News*, 7 Jan. 1991, p. 3; 'Italy seeks to enlist European partners for military satellite fleet', *Space News*, 7–20 Jan. 1991, p. 8.

[94] 'Military space plan on hold; funds squeeze blamed', *Space News*, 29 Apr.–5 May 1991, p. 6.

[95] Also see for example, Skorve, J., 'Commercial and third party satellites', Kokoski and Koulik (note 28), chapter 3; Krepon, M., Zimmerman, P., Spector, L. and Umberger, M. (eds), *Commercial Observation Satellites and International Security* (St. Martin's Press: New York, 1990); Jasani and Sakata (note 83).

Landsat

The first US Landsat was orbited in 1972 and in mid-1991 Landsats 4 and 5 are on station and functioning. Each carries a Multispectral Scanner (MSS) which senses in the green, red and two infra-red bands with an IFOV of 80 m. The Thematic Mapper (TM) is a seven spectral band sensor with capabilities in the thermal infra-red region. Its resolution is 30 m (in all bands but the thermal infra-red, where it has a resolution of 120 m). Each image covers a ground area of 170 km x 185 km. Multispectral imagery, even of such limited resolution, can be useful in obtaining information on the infrastructure associated with weapon deployments. For example, it is known that combining the vegetation and terrain data obtained from such images with knowledge of missile-launching procedures has enabled the USA to narrow down the areas of possible missile deployments.[96] Procedures akin to this should also prove useful in the detection of possible clandestine deployments of conventional armaments should they occur, in addition to keeping track of the expansion or contraction of existing known military facilities. The launch of Landsat 6 has been delayed until mid-1992, however, it is believed that Landsat 5 will be operational until this spacecraft is in orbit.[97]

SPOT

Much better resolution can be obtained from the SPOT (Système Probatoire d'Observation de la Terre) satellites. The two Haute Résolution Visible (HRV) sensors can provide 10-m panchromatic and 20-m multispectral images covering an area of 60 km^2. Unlike the Landsat system, which is capable of taking pictures only straight down beneath its path, SPOT is equipped with a steerable mirror which allows for imaging areas on either side of its ground track. This capability allows for the acquisition of images of the same area from different angles and thus the creation of stereoscopic images which enhance interpretation. It also means that while Landsat can only image the same area once every 16 days, SPOT can image the same area every 2 or 3 days. This allows both frequent revisits to important areas and, in particular, a capability to detect changes which occur over a relatively brief period of time.

The 10-m resolution available can be very useful for obtaining information on infrastructure associated with deployment and storage of equipment limited by the Treaty. Johnny Skorve, with many years of experience in analysing and processing such images, has stated that they are capable of identifying roads, separate buildings, mechanized deployment/tactical training areas and (in the presence of high contrast) even aircraft.[98]

[96] 'SAC needs Landsat to hunt mobile missiles', *Military Space*, 18 Dec. 1989, p. 3.

[97] 'Landsat has key role in U.S. security', *Space News*, 3–9 Sep. 1990, p. 23; *Space News*, 26 Nov.–2 Dec. 1990, p. 22.

[98] Skorve, J., 'Commercial and third-party satellites', Kokoski and Koulik (note 28), pp. 59–61.

Soviet commercial imagery

The highest-resolution images from space available commercially are now obtainable from Sojuzkarta of the USSR. While the quality can be uneven, resolution has been known to be better than 5 m. One recent image of Saudi Arabia, for example, was good enough 'to permit the clear identification of US transport aircraft and to see the sites of infantry, armoured and transport facilities' as well as to identify individual vehicles and was estimated to have 3-m resolution.[99] Fighter jets have also been identified on Soviet commercial images taken with the KFA-1000 camera.[100] All of these images, however, are obtained with photographic film and thus must be digitized before they can be processed by computer. In addition, since the film capsules must be returned to earth for processing, the time required to obtain the images can be somewhat longer than for the other commercial satellites which relay their images directly to earth by electronic means.

In 1989 the USSR announced the development of a new satellite which could provide images of approximately 2-metre resolution, to be available commercially.[101] Although these products have not yet appeared, if they do they would represent an extremely important development as far as CFE Treaty verification is concerned. As can be seen in figure 2 and table 10, such resolution would provide the capability for many interpretation tasks concerning the TLE. Potential ramifications for conventional force verification would be substantial. Imaging at 2-m resolution approaches the threshold for very relevant interpretation tasks for conventional force monitoring—general recognition of aircraft and detection of individual vehicles, for example.

The Soviet Union has developed a commercial radar remote-sensing satellite. Called Almaz, the test version was launched in 1987. Almaz carries a radar which is capable of relaying in digital form images of 15-metre resolution to earth. The second satellite was launched on 31 March 1990 and some of the images already received have reportedly had resolutions as good as 11 metres.[102] It is hoped that export of the data will aid in financing the programme—the Space Commerce Corporation of Houston has a contract with Glavcosmos, the Soviet space agency, to sell the images in the USA. The cost of a 40 km x 40 km scene will be $1600, with a revisit time capability of one to three days.[103] Arms control potential is indicated in that 'applications

[99] Zimmerman, P., 'Intelligence for the asking: civil remote sensing's ripe commercial potential', *Space News*, 3–9 Dec. 1990, p. 24.

[100] 'Firm sells sharp Soviet space data of Mideast to all but Iraqi agents', *Space News*, 19–25 Nov. 1990, p. 4.

[101] *Aviation Week & Space Technology*, vol. 130, no. 15 (10 Apr. 1989), p. 11.

[102] *Space News*, 25 Feb.– 3 Mar. 1991, p. 2; *Space News*, 8–14 Apr. 1991, p. 18; *Aviation Week & Space Technology*, 8 Apr. 1991, p. 21; 'US firm seeks Almaz distribution', *Space News*, 17–23 June 1991, p. 10.

[103] 'Almaz launch delayed to January', *Space News*, 3–9 Dec. 1990, p. 2; 'Soviets press Americans to revise U.S. launch policy', *Space News*, 1–7 Oct. 1990, p. 12; 'Soviets set to launch Almaz', *Space*

Table 10. Resolution for vertical observation of military vehicles

Target	Resolution for vertical observation (m)		
	Detection	Recognition	Identification
Truck	2	1	<1
Camouflaged truck	3	2	<1
Tractor	5	3	<1
Tanks	2	1	<1
Viggen fighter aircraft	5	2	1
Camouflaged Viggen	5	2	1
Draken fighter aircraft	5	2	1
Hercules fighter aircraft	>5	5	2
Helicopter	3	2	1

Note: Detection: able to discern existence of the object of interest; Recognition: able to distinguish between different objects (i.e. a tank from an APC); Identification: able to distinguish between types of object (e.g. a T62 from a T80 tank).

Source: Zetterquist, P., *Technical Study of a Verification Satellite 'Project Tellus', Final Report*, Parts I and II (Part II only in Swedish), Report prepared by the Swedish Space Corporation in Co-operation with the Defence Staff and the Swedish Defence Research Establishment, Solna, Sep. 1988.

could include the detection and characterization of military facilities such as airbases, missile complexes and armoured formations'.[104]

Other platforms

The first Earth Remote Sensing Satellite (ERS-1), developed by the 13-member European Space Agency, was launched in July 1991.[105] It is capable of providing radar images, with all the attendant advantages described above, of 25–30 m resolution. Radar images already obtained with sensors of similar quality to those employed on ERS indicate that radar can provide additional information not apparent on Landsat images of similar resolution.[106] Although the satellite is designed to monitor earth resources it has the capability to acquire images of potential use in verification. In particular, valuable experience is sure to be gained in the acquisition and processing of radar images and their interpretation. Funding for a follow-on satellite to be launched in 1994 has already been acquired.[107] Much more valuable for verification purposes when it is orbited in June 1994 will be Canada's Radarsat with a resolution of about 10 m. Its resolution will be comparable to that of today's

News, 17–23 Sep. 1990; 'Soviet radar satellite shows potential to detect submarines', *Aviation Week & Space Technology*, 8 Oct. 1990, p. 22.

[104] 'Military implications of the Soviet Almaz radar satellite series', *Jane's Intelligence Review*, Aug. 1991, p. 376.

[105] 'Ariane launch of ERS-1 starts new science program', *Aviation Week & Space Technology*, 22 July 1991, p. 63.

[106] Skorve, J., 'Commercial and third-party satellites', Kokoski and Koulik (note 28), p. 64.

[107] 'ESA comes together on ERS-2', *Space News*, 2–8 July 1990, p. 2; 'ERS-2 would guarantee gapless remote sensing', *Space News*, 12–18 Nov. 1990, p. 2.

SPOT satellites but it will enjoy all of the advantages radar provides. With active agreements to distribute SPOT and Landsat data in Canada, Radarsat International, Inc. already has plans to market the Radarsat data once the satellite is launched.[108]

Japan is also set to launch its Earth Resources Satellite (JERS-1) in early 1992. Its imaging radar is to have an 18-m resolution, much improved over the 50-m resolution sensors aboard the two Marine Observation Satellites (MOS) already in orbit. It will also be equipped with multispectral optical instruments.[109]

Computer processing is now also coming into wide use in the commercial satellite sector, further enhancing its value for verification purposes. Radar images in particular require vast amounts of computer time just to generate the image, and the rapidly increasing capabilities of computers for such processing will go a long way to make such techniques further accessible in the near future. A recent important and thorough study has made use of such capabilities for combining SPOT and Landsat images of the same areas of the Kola Peninsula and was thus able to well document the growth of this important military installation. [110]

Freedom of access

Free and open access to commercial satellite images has always been regarded as one of the advantages of commercial satellites, although there have been few Soviet images of Eastern bloc territory. More recently, however, after the Iraqi invasion of Kuwait, a new precedent was set. In compliance with the UN trade embargo, Landsat images were reportedly being sold to all countries except Iraq (Iraqi companies, companies with ties to Iraq or Iraqi individuals). SPOT, citing national security concerns, also began restricting data of the region to the US and French military and a small number of carefully screened companies.[111] Iraq may nonetheless have been able to acquire such images through third parties. As a result of these restrictions, however, there have been renewed calls for media-owned satellites.[112]

V. Aerial reconnaissance

Non-cooperative aerial reconnaissance has taken place for decades involving the WTO and NATO and will doubtless continue—the data acquired being used, among many other purposes, for measuring compliance with the CFE regime. Flying close to borders but without violating the airspace of the

[108] 'SPOT sales in Canada', *Aviation Week & Space Technology*, 1 Oct. 1990, p. 11.

[109] 'Japanese earth satellites spawn multiple user groups', *Aviation Week & Space Technology*, 13 Aug. 1990, p. 70; 'Radar satellites to join earth observation fleet', *Space News*, 3–9 Dec. 1990, p. 6.

[110] Skorve, J., *The Kola Satellite Image Atlas: Perspectives on Arms Control and Environmental Protection* (The Norwegian Atlantic Committee: Norway, 1991).

[111] 'War enhances value of commercial remote sensing', *Space News*, 21 Jan.–3 Feb. 1991, p. 16.

[112] Brender, M. and Zimmerman, P., 'The day the open skies closed', *Space News*, 13–19 Aug. 1990, p. 15.

country being monitored, aircraft are used on both IMINT and SIGINT missions. Here again, however, as with space-based systems, until a CFE aerial regime is negotiated and/or an Open Skies agreement is reached the major capabilities rest with the USA and the USSR.

For the USA, while the highly capable SR-71 is no longer in use, capabilities include the U-2R and TR-1 aircraft. Optical Bar Cameras and electro-optical sensors can provide 15-cm resolution and its 3-m resolution synthetic-aperture radar is capable of near real-time image processing. Slant photography allows it to image areas inside countries while flying along the border. Both the U-2 and the TR-1 are also used in SIGINT missions.[113] A new support facility for the TR-1 to be completed in Germany in 1991—the Tactical Reconnaissance Exploitation and Demonstration System (TRIGS)—will 'support allied reconnaissance activities and assist in monitoring Soviet compliance with a Conventional Forces Europe Treaty'.[114] The most important aircraft collecting SIGINT is the RC-135, often flying along the periphery of the USSR and other Eastern bloc countries.[115]

Although the highly capable SR-71 reconnaissance platform has now been retired from its role there are rumours of even more capable manned or unmanned, possibly hypersonic, reconnaissance aircraft (often, correctly or incorrectly, referred to by the code name 'Aurora') under development as replacements.[116] A new and still classified triangular-shaped stealth reconnaissance aircraft, designated the TR-3A and capable of relaying near-real-time digital photographs, is believed to have operated in support of F-117As in the Persian Gulf War.[117]Advanced radars are also being developed in the USA for use on aircraft to locate Strategic Relocatable Targets (SRTs). One now being investigated has a range resolution of 0.5 m and an effective range of up to 10 m.[118] Such technology could certainly be of value in detecting conventional armaments.

Under continuing development the Soviet Ram-M 'Mystic' was first observed in 1982 and is believed to be a high-altitude reconnaissance aircraft of the TR-1 type to be used as a potential replacement for the Yak-25RM 'Mandrake'.[119] Currently employed Soviet platforms include the Ilyushin II-20 'Coot-A' equipped with cameras or other sensors possibly including side-

[113] Richelson (note 60), pp. 158–59, 179–80.

[114] *Aviation Week & Space Technology*, 2 July 1990, p. 31.

[115] Richelson (note 60), p. 158–59.

[116] 'Secret advanced vehicles demonstrate technologies for future military use', *Aviation Week & Space Technology*, 1 Oct. 1990, p. 20; 'Multiple sightings of secret aircraft hint at new propulsion, airframe designs', *Aviation Week & Space Technology*, 1 Oct. 1990, p. 22; 'Scientists' and engineers' dreams taking to skies as "Black" aircraft', *Aviation Week & Space Technology*, 24 Dec. 1990, p. 41.

[117] 'Triangular reconnaissance aircraft may be supporting F-117A', *Aviation Week & Space Technology*, 10 June 1991, p. 20.

[118] 'Boeing developing millimeter wave radar to spot Soviet Union's mobile missiles', *Aviation Week & Space Technology*, 8 Oct. 1990, p. 55.

[119] 'Soviet Ram-M reconnaissance aircraft photographed recently near Moscow', *Aviation Week & Space Technology*, 12 Feb. 1990, p. 43; 'New light on "Soviet U-2"', *Jane's Defence Weekly*, 20 Jan. 1990, p. 95; 'Soviet TR-1 under test,' *Jane's Defence Weekly*, 3 Sep. 1988, p. 431.

looking radar. For the USSR, Tu-95D Bear reconnaissance aircraft are the counterparts to the RC-135.[120]

Britain uses Nimrod R1/R2 aircraft for signals collection and Canberra aircraft for carrying out photographic reconnaissance missions, for example. Italy employs PD-808, MB-339 and G-222 RM aircraft for signals intelligence activities. Three variants of the Mirage aircraft are configured by France for overhead reconnaissance including optical, infra-red and possibly radar sensors as well.[121] The FRG uses Breguet Atlantique special-mission aircraft for SIGINT missions in the Baltic. Able to receive signals from hundreds of kilometres into the Eastern bloc they used 'radio communications from such missions . . . to develop a picture of the organizational structures of the military units in the Warsaw Pact countries'.[122] This is a strong further testament indeed to the usefulness of carefully analysed signals intercepts.

[120] Burrows, W. E., *Deep Black: Space Espionage and National Security* (Berkley Books: New York, 1988), p. 164.
[121] Richelson (note 55), pp. 21, 29, 116, 170.
[122] Richelson (note 55), p. 147.

8. On-site inspection

I. Introduction

Until the last phase of the Treaty implementation, the only co-operative method of monitoring and the only substantial means available to all states parties will be on-site inspections. Because of the limited number of OSI allowed, France, for example, will rely on other means of verification—establishing just the sort of three-tiered verification system described above. First, satellites and other NTM will be used to identify sites; second, co-operative aircraft overflights (when they become possible) will be carried out; and third, OSI will be conducted at disputed sites.[123]

On-site inspections are intrusive co-operative measures. One of the main values of OSI stems from the relevant proximity to the object under scrutiny, increasing the likelihood of detecting a violation. In the context of CFE Treaty verification they provide an equal opportunity for every state party to participate in the verification process, regardless of its technological capabilities. They also stimulate contacts among states parties, thereby introducing a new dimension—the human factor—which is considered an important element of successful verification activities. There is another advantage of OSI—fixed technical means of verification may be inflexible whereas human observation provides a more complete picture.

The Treaty provides for four types of inspection: inspections of declared sites; challenge inspections of undeclared sites—that is, within 'specified areas'; inspections to witness reductions; and inspections to witness certification. The Treaty excludes the permanent inspections officially proposed and much expected by many experts, that is, permanent manned observation posts[124] and fixed remote sensors.[125]

[123] 'Soviets, NATO differ on number of Soviet military sites for CFE', *Defense News*, 17 Dec. 1990, p. 10.

[124] This type of inspection includes permanent presence of inspectors and manned portal perimeter monitoring of a site. Although potentially useful for monitoring the TLE of most concern, as well as defence production, such inspections need large amounts of manpower and resources. The USA had proposed the following: inspectors should be placed at hundreds of defence plants in both alliances to monitor their production, and stationed at checkpoints to monitor the flow of armaments in and out of the ATTU zone to ensure neither side violates the Treaty limits. Several NATO countries objected to this position, and in January 1990 the USA, under the pressure of some of its allies, retreated from it. Permanent inspections and defence production were not included in the Treaty. 'With rejection of this position, the West cleared the view that it would not attempt to count individual weapons but detect "military significant" violations . . . ' (*Washington Times*, 25 Jan. 1990).

With regard to the last point, it is worth mentioning one dispute. Ambassador Jonathan Dean criticized NATO for opposing observers at major headquarters and airfields, manned supervision of weapons sites and a 'roving patrol system' of monitoring in general. Jennone Walker, until recently a US State Department representative to the NATO delegation of the CFE Negotiation, opposed this view: 'I can tell you they're not necessary. They would have been useful to have, but no one, almost no one in the U.S. government, and certainly not in the intelligence community or in the Joint Chiefs of Staff, thought they were necessary to detect military significant cheating'. (*Aviation Week & Space Technology*, 26 Nov. 1990, p. 27.)

[125] See Altmann, J., 'Short distance sensors', Kokoski and Koulik (note 28), pp. 123–38.

During the negotiations politicians and experts discussed different options for OSI. Most attention was paid to a purely bloc-to-bloc system, a multilateral structure within a wider CSCE framework and a multilateral structure within a bloc-to-bloc framework.[126] The states parties agreed to go along with the latter option, thus choosing a regime in which the main responsibilities and capabilities involve individual countries but which is built on a bloc-to-bloc basis.

National inspectors will, for the most part, be concerned with their own national interests. Data exchanged and verified by OSI will be analysed by individual countries and they will decide whether to share any information with another country even in the same alliance, whether a certain activity is a violation and whether to bring a violation to the JCG. At the same time, each country has the right to analyse and share results from OSI with other countries which may help in providing more reliable interpretation and judgement. But such a regime is fraught with more expenses, manpower and other problems for more effective OSI activities.

Inspection regimes can also be distinguished by the obligation associated with the OSI request. Fulfilment of the OSI request can be either mandatory, voluntary[127] or in response to challenge. The Treaty emphasizes the first of these. In the case of mandatory OSI, a state party being inspected must accept an OSI request according to stipulated procedures. The Treaty specifies that inspection of declared sites, inspection of reduction and inspection of certification may not be refused. However, the inspected state party does have the right to refuse challenge inspections within specified areas and these inspections, while important and precedent-setting, also comprise a relatively low percentage of the overall number of inspections allowed.

It should be mentioned that a specific OSI regime is a product of compromise in terms of military, political, economic and organizational considerations and interests. Besides the requirements of treaty verification *per se*, an OSI regime may be influenced by other objectives. In proposing a particular OSI package, for example, a given state or alliance may be motivated by intelligence-support considerations, its influence on current negotiating positions and other more political factors not directly related to verification.

Concern that an OSI regime could support the intelligence activities of an inspecting party might have influenced the agreement among negotiators to exclude permanent manned and remote sensor posts and to provide inspection teams with simple technical devices subject to examination by the inspected party. One can only speculate about the role of this concern in the OSI regime

[126] The pros and cons of these options are thoroughly analysed in Lewis, P., 'Technological aids for on-site inspection and monitoring', eds J. Grin and H. van der Graaf, *Unconventional Approaches to Conventional Arms Control Verification. An Exploratory Assessment* (Vu University Press: Amsterdam, 1990), pp. 234–41. As the latter option is discussed below, the main characteristics of the first two options should be noted. In the first, the inspection team was planned to consist of NATO and WTO personnel. Although teams could be national or multinational, they were to be under the control of NATO and WTO verification bodies. The second option included the co-ordination of verification by a multilateral agency under the aegis of a CSCE office.

[127] A voluntary OSI regime allows each state party the option to request or to grant OSI but places no legal requirements to oblige such a request.

in comparison with other considerations, namely, the experience of the 'technologically overdesigned' OSI regime with permanent inspections for the INF Treaty, cost considerations, manpower requirements, and so on.

II. Sensitive points

The Treaty uses the term 'sensitive points' to refer to any equipment, structure or location which has been designated as sensitive by the inspected state party (or the state party exercising the rights and obligations of the inspected state party through the escort teams) and to which access or overflight may be delayed, limited or refused.[128] It is worthwhile highlighting three aspects of the inclusion of such sensitive points. First is the provision, apparent from the definition, for a certain amount of room for manœuvre on the part of the inspected state party—it has more than the two choices of flat refusal or acceptance. For example, helicopter overflights above sensitive points can be delayed, limited or refused, and if permitted, photography of or above sensitive points during the overflight are permitted only with the approval of the escort team.

Second, on the other hand there are unambiguous obligations and rights. During an inspection of an OOV or within a specified area, 'inspectors shall not have the right to enter other structures or areas within structures (in which conventional armaments and equipment subject to the Treaty are permanently or routinely present), the entry points to which are physically accessible only by personnel doors not exceeding two meters in width and to which access is denied by the escort teams'. Such provisions are directly aimed at preventing access to areas not obviously connected with armaments and equipment subject to the Treaty.

Third, there is provision not to give unnecessary rights to the inspected party with regard to sensitive structures and areas, in order not to provoke suspicion. If, for example, the escort team declares that a sensitive point, shrouded object or container does contain certain conventional armaments and equipment covered by the Treaty, then it must display or declare them to the inspection team and take steps to satisfy the inspection team that no more than the declared amount of such conventional armaments and equipment is present.

The combination of these rights and obligations agreed to by the states parties addresses, among other things, the purpose of satisfying concerns about obtaining sufficient *access* while limiting possible acquisition of *excess* information not necessary for verification. At any rate, the trade-offs have

[128] A few days before the Treaty was signed the USA had accepted the concept of barring inspection at sensitive points, according to a US official. 'As applied to challenge inspections, certain areas would be off-limits, and the USA wanted to protect its own sensitive points. However, it was not a serious issue. It would be serious for those states which had undeclared sites with TLE in them. The US intended to use the option for just what it was, and recognized that states had to have the option to protect areas. It would apply to, perhaps, communication facilities and national command centers'. *Arms Control Reporter*, 1990, sheet 407.B.406–407.

now been made and optimal functioning of this part of the regime will, of course, depend on adequate co-operation on the part of both inspecting and inspected parties. If the toughest action among different allowed options regarding sensitive areas is taken by an inspected party, this may lead to suspicions and thus hamper the co-operative OSI process.

III. Political motivations and objectives

It should be borne in mind that the OSI regime can support specific political objectives. Regardless of the contribution to verification, OSI may indicate a visible commitment of a state party's intention to abide fully with the Treaty's provisions. Politicians may see the main value of this OSI regime as increased domestic confidence in the verifiability of the Treaty.

In initiating inspections at a particular site a state party can proceed from specific and non-specific motivations. Specifically, an OSI request may be aimed at resolving ambiguous situations or to detect possible violations and may be supported by information from NTM and other sources. Less specific motivations may just reflect the need to confirm data from information exchange or to deter possible violations; they might also be aimed at making the OSI process routine, enabling further training of inspectors and enhancing OSI credibility.

Such routine inspections of declared sites are important for determining the accuracy of the baseline data, although they only allow detection of violations at the declared sites and not those located elsewhere. It is not incidental that the quota of routine inspections is the largest for the 120-day baseline period before and after reductions. The other motivation with respect to the baseline period after Treaty signature may stem from intentions to make the OSI process routine from the start in order to reduce the political sensitivity of OSI, to gain more experience, to avoid different bureaucratic and political resistance, and so on.

IV. Challenge inspections

OSI of declared sites comprise the major share of the overall inspection quota, but the most important requests would be for challenge inspections triggered, for example, by detection of ambiguous or suspicious activities. Many experts had proposed unlimited rights for challenge inspections. The negotiators found it more appropriate and adequate to limit challenge inspections by quota based on the number of declared sites as well as to conduct such inspections within the whole area of application other than at declared sites, reduction sites or sites inspected to confirm certification. The specified area of inspection may not exceed 65 km^2 with a straight line between any two points not exceeding 16 km.[129]

[129] A few days before the Treaty was signed, it had been thought that challenge inspections would have applied to areas of 100 km^2. Such areas could have included facilities belonging to several

As noted above, some experts insisted on the necessity for challenge inspections without quota (while accepting the impracticality of such proposals) though this was not included in the CFE Treaty. With a quota on inspections there is, of course, an increase in the probability that circumvention will go undetected, but if other provisions of the Treaty and of the verification regime are taken into account, the possibility of an appreciable level of such circumvention can be considered low. Also, allowing for helicopter overflight further adds to the value of inspections.

To enhance their effectiveness it is appropriate that the process of notifying an intention to carry out challenge inspections is defined in the Treaty on a bilateral basis without intervention of international bodies and with no requirement to justify such inspections. Such a procedure corresponds to the critical nature of challenge inspections with regard to the security of any state party.

An important result of the Treaty is the agreement that declared site OSI are supplemented by challenge inspections. The successful use of these methods gives a key to building confidence and confirming principle compliance with Treaty provisions.

V. Cued and random sampling

OSI is 'extremely useful within a very narrow set of conditions . . . but OSI is too microscopic to allow broad area searches for violations . . . [however, it is] virtually the only credible way to confirm many of the suggested qualitative arms control limits [such as] the caliber of artillery or tank guns'.[130] In addition, because they are limited in number and the only direct means of verification available to most of the CFE signatories, the manner in which inspection sites are selected is of prime importance.

The number of allotted inspections per year is much less than the number of OOV and so some way must be chosen to sample these sites. There are basically two ways in which this can be done. The first is simply a random selection, which then provides the basis for a statistical estimate of the relative probability of compliance. This is called random sampling. If, however, as is the case especially for the USA and the USSR, there are other reliable means of ascertaining that a suspect activity is occurring, then it is possible to use this information to prompt an on-site inspection or inspections of the area in question. This is called cued sampling.

As pointed out elsewhere, it is important that, to the extent possible, both types of sampling are used.[131] Challenge inspections of undeclared sites will obviously always be cued by some other collateral information. Cued sampling should also be used so that valuable but perhaps incomplete information

countries and located in Germany. Thus inspections of these facilities could have used up an undue proportion of Germany's passive quota. (*Arms Control Reporter*, 1990, sheet 407.B.407)

[130] Oelrich, I., 'Conventional arms control: the limits and their verification', Occasional paper no. 8 (Center for Science and International Affairs: Harvard University, 1990), p. 48.

[131] Lewis, P., 'Implementation of verification methods', Kokoski and Koulik (note 28), chapter 9.

collected in other ways (NTM, other OSI, etc.) is made use of in the inspection process. However, various intelligence sources can often be misleading and this makes an important case for the desirability of random sampling as well. This dual sampling procedure would result in a more accurate picture of the actual state of the force structure and compliance. This would then, in turn, provide feedback to further assess and improve the manner in which intelligence is collected and analysed. To make the sampling process, and OSI in general, more effective it is desirable that groups of states co-ordinate their respective inspection site locations.

NATO has formed a Verification Coordinating Committee and hopes to standardize the conduct of inspections. Many countries have been reluctant, however, to forward a detailed inspection plan, reportedly because of concerns about security.[132]

It is important to point out when considering sampling, however, that quotas for OSI do not all have to be used. Not using all of them (while certainly sampling enough to assure compliance and take advantage of the confidence-building role) will not only save money but might also convey trust. One party would in effect be saying to another that they trust in its compliance enough that such inspections are not deemed necessary. This could be effective both between the alliances on a collective basis as well as within alliances (especially the WTO where the prospects of one alliance member using its inspections on another is now recognized). States with new or greater independence would first probably assert this new power by exercising the maximum number of inspections allowed. Hopefully once the initial desire to assert their rights has been put into practice in this way they might then be bold enough to exercise their option *not* to exercise their full rights under the Treaty. The Treaty allows for this type of unilateral action and its possibility should not be ignored.

To give an idea of the certainty which the numbers of random OSI will provide for CFE Treaty verification**,** the implications of a simple model can be explored. Suppose, for example, that 10 per cent of the OOV of one of the alliances has an excess of TLE. Then the probability that just one inspection, the location chosen at random, would turn up a violation is obviously 10 per cent.

The laws of probability then imply that if X inspections are made, the probability that a violation is discovered is given by $1 – (1 – 10/100)^X$, that is, by $1 – (0.9)^X$.[133] Five inspections (the maximum number allowed a given country per year of countries belonging to the same alliance) allow for $1 – (0.9)^5$, that is, 41 per cent certainty. Table 11 contains a listing of the probability of detecting a violation for various numbers of random inspections. It also includes probabilities for the assumptions that only 1 per cent of the OOV contain excess TLE and that 20 per cent do.

[132] 'Western allies to standardize CFE inspection', *Defense News*, 17 Dec. 1990, p. 10.

[133] See, e.g., Lewis, P., 'Implementation of verification methods', Kokoski and Koulik (note 28), p. 178.

Table 11. Dependence of probability of detecting a violation on the number of inspections

Number of inspections performed	Probability of detecting a violation[a]		
	1% of OOV containing excess TLE	10% of OOV containing excess TLE	20% of OOV containing excess TLE
1	*1*	*10*	*20*
5	*5*	*41*	*67*
10	*10*	*65*	*89*
20	*18*	*88*	*99*
40	*33*	*99*	*100*
100	*63*	*100*	*100*
200	*87*	*100*	*100*
300	*95*	*100*	*100*
400	*98*	*100*	*100*
500	*99*	*100*	*100*

[a] The probability is, of course, never exactly 100%. Where 100% appears in the table it indicates that the actual probability is *at least* 99.99%.

Note that for the cases in which 10 per cent or 20 per cent of the OOV have excess TLE, the probability of detecting a violation increases rapidly with the number of inspections, reaching virtual certainty with the numbers of inter-alliance inspections allowed for each phase of the Treaty implementation. Thus random inspections can provide a strong deterrent to cheating. In the case that only 1 per cent of the sites have excess TLE the probability of finding such a site with OSI is not quite as high but still allows for a high probability of detection. Note also in such a situation that for a clandestine force of 10 per cent in excess of allowed TLE to be held at 1 per cent of the OOV, each of these sites would need to be holding, on average, 10 times what they are allowed. Such a situation would surely be detected by other means. It can also be seen that if excess TLE are held at 10–20 per cent of OOV, these will be detected with virtual certainty with the co-ordinated conduct of 20–40 random inspections. It is hard to imagine a militarily significant amount of TLE deployed at less than this number of sites.

To use some precise numbers as an illustration, the number of OOV declared as of February 1991 were 1899 and 1507 for NATO and the WTO, respectively. Now, for example, the number of inspections allowed by NATO of the WTO in the baseline phase is 20 per cent of the 1507 declared WTO OOV or 301 inspections. The analogous figure for inspections by the WTO states is 380. In this phase 15 per cent of these may be challenge inspections of undeclared sites. If all of these are used this leaves 256 and 323 inspections of declared facilities which can be carried out by NATO and the WTO, respectively. Table 11 thus indicates that, if allies co-ordinate inspections, the probability of detecting a violation would be virtually 100 per cent if 10 per cent or 20 per cent of the OOV in fact contained excess TLE. If only 1 per

cent were in violation the confidence is still quite high, although detection is further from a certainty.

Equipment will of course be in transit from one OOV to another—a factor not considered in these relatively simple calculations. In addition the five inspections annually permitted by each country of members of the same alliance have not been taken into account since the number which will actually be carried out is uncertain at the time of writing. These factors will lower somewhat the confidence levels predicted but probably not to an appreciable degree. Table 11 thus gives a feel for the types of confidence which can be expected if random inspections (bloc-to-bloc) are used, given the inspection regime which has been negotiated. Clandestine deployments also present a problem but, as stated, challenge inspections of suspect sites are allowed, the data from which can also be coupled with other means to ensure adequate compliance.

9. Further verification possibilities

I. Co-operative aerial overflights

Given the above-mentioned superpower reticence when it comes to satellite image sharing, aerial reconnaissance could prove especially beneficial for monitoring the multilateral CFE Treaty. As agreement on this form of monitoring could not be resolved during the CFE Negotiation, aerial overflights will not be associated with the agreement until the post-reduction phase, by which point the specifics are to be ironed out. As stated in November 1990 by the NATO Deputy Secretary General, 'one of the significant omissions from the CFE Treaty is an aerial inspection regime, which we always considered to be an important element in our verification package'.[134] The failure of the 1990 Open Skies discussions to bear fruit makes the absence all the more acutely felt. As the details of CFE aerial inspection remain to be well defined, much will probably depend on the outcome of further Open Skies talks.[135]

Aerial overflight was slated as an important topic on the agenda of the CFE follow-on (CFE IA) talks which opened in Vienna on 26 November 1990. For states parties in which fiscal and/or technological constraints preclude direct access to high-quality satellite data, greater accessibility of aerial reconnaissance options promises to aid greatly in CFE Treaty monitoring. However, there are still major stumbling-blocks to be overcome concerning sensors used and data sharing. The Soviet position would have involved relatively unsophisticated sensors and the sharing of data among all CFE states. This is in contrast to the NATO position allowing for more sophisticated sensors and less sharing of the data acquired. From the verification standpoint it would perhaps have been better to accept the Soviet position for the short term and allow for the possibility of further refinement to the sensors used and the manner in which the data are shared at a later date.

Aerial inspection has many advantages over satellite reconnaissance. The most important of these in the CFE Treaty context would be the wide availability and cost effectiveness of the technology used and also potentially of all of the information gathered. From a strictly remote-sensing perspective, aircraft are able to fly low enough that almost unlimited resolution can be achieved, and they can loiter over a specific area for a long period of time whereas most satellites pass only briefly over a specific verification target. In addition they are often designed so that they can be outfitted with mission-specific sensors at short notice, providing increased flexibility.[136] They would

[134] 'Use of AWACS for treaty verification splits West', *Defense News*, 3 Dec. 1990, p. 31.

[135] On hold for a year and a half, the Open Skies talks reconvened in September 1991 and while some problems remain there is now a chance an agreement will be concluded by the follow-up conference of the CSCE scheduled for May 1992 (*Atlantic News*, no. 2351 [18 Sep. 1991], pp. 1–2).

[136] See e.g., Burrows (note 120), p. 148.

also allow for access to and relatively detailed examination of regions which would be difficult to reach for on-site inspectors, for example.

For the USA and the USSR, while they certainly make aerial observations desirable, these factors will play a less critical role in the overall assessment of CFE Treaty compliance than they would for the other signatories. This is first and foremost because of the other NTM already at their disposal. Even several hundred overflights per year would only allow for a small fraction of the coverage now provided by satellite observation. Nonetheless, the factors particular to aerial reconnaissance—especially its quick-reaction capability—will contribute to making this rung of the verification ladder useful to both the USA and the USSR.

For the other 20 CFE Treaty signatories, aerial inspections will be of much greater relative value. Satellite photographs from commercial sources are certainly available, but their relatively low resolution limits their usefulness basically to infrastructure monitoring in all but exceptional circumstances. Thus the co-operative aerial reconnaissance regime to be negotiated is much more critical for these states.

It is, however, extremely doubtful that aerial inspections will be needed to ensure adequately that *militarily significant* violations of the Treaty are not taking place. Given the vast restructuring of the military face of Europe, the OSI portion of the verification regime should be enough to provide this type of assurance to all CFE states parties. It should also be borne in mind here that helicopter flights with still and video cameras are permitted during the inspections. Much of the *type* of data which would be acquired through aerial overflights (although of course much less in *quantity*) can be obtained in this way. Nonetheless, aerial inspection will provide further information to the countries which require it the most, thus meeting a significant need.

Many different types of aircraft are already used in a variety of remote-sensing roles ranging from agricultural studies to map making. Thus, although the potential market for verification technology developed 'from the ground up' may not be large, several US defence contractors do appear to be interested in promoting existing equipment in a verification role. NATO and the former WTO states both expect that the agreement on aerial reconnaissance will allow radar, photographic and infra-red imaging, the Soviet Union having accepted use of synthetic aperture radar (SAR) but wanting 'comparable access to this'.[137]

II. Tags

There was a certain amount of surprise in some quarters at the absence of a full-scale tagging component in the CFE verification provisions. It is, of course, much easier to verify a complete ban on a type of weapon than to verify specific limits on the numbers allowed. The beauty and simplicity of the tagging concept are that it effectively converts a numerical limit on a

[137] 'Trust but verify', *Jane's Defense Weekly*, 24 Nov. 1990, p. 1037.

particular TLE category into a prohibition on any TLE without tags. Placing specific limits as it does on a number of weapons, the CFE Treaty would have been an ideal proving ground for the employment of tags. In fact provisions for so-called special marks have been made in the Treaty for monitoring reductions and are widely regarded as at least a minimal form of tagging.

The reasons that tags were not more systematically included in the CFE Treaty verification scheme may have been related to the sheer numbers of weapons that would have had to be methodically tagged in some way: tagging might create more problems than it solved. The absence of production monitoring may also have played a role, as one natural place to tag weapons would have been at production sites. The 'special marks' referred to will probably be very low-technology types of tag such as simple bar codes although somewhat more sophisticated methods do not appear to be ruled out.

At the Sandia Laboratories in the USA one type being developed is the reflective particle tag made with particles of micaceous hematite embedded in acrylic.[138] The particle-bearing acrylic is in effect 'painted' on to TLE and its particular unique 'fingerprint', resulting from the random pattern of the particles, is then recorded. A subsequent reading would confirm that the same TLE was in fact being observed. Another tag under development uses a simple and easy-to-read bar code in conjunction with a 'plastic casting fingerprint'.[139] A simple fingerprint is taken of the unique, intrinsic surface roughness of a part of a TLE item when viewed on a microscopic level. The simplicity of this scheme lies in the fact that subsequent fingerprints can be authenticated (using an electron microscope) at sites far removed from the actual TLE.

Use of some of the more sophisticated tags which might still be classified as special marks should, however, be considered for the CFE verification regime. This would not substantially add to the monitoring process since their role is relatively minor; however, the CFE Treaty would provide a useful trouble-shooting arena for possible employment of tags on a more widespread level in future accords.

III. Operational functions—verification tasking

Having discussed all the relevant monitoring methods it is apparent that there are a number of resources which can be of considerable value in the verification of conventional forces and their associated infrastructure. To illustrate the roles that the particular remote-sensing platforms can play, figure 2 shows the main satellite systems in operation today along with the resolutions necessary for various interpretation tasks for some conventional weapons covered by the

[138] 'Verification raises cost, technology concerns', *Aviation Week & Space Technology*, 6 Aug. 1990, p. 52.

[139] DeVolpi, A. and Palm, R., 'Bar codes and intrinsic-surface-roughness tag: accurate and low-cost accountability for CFE', updated version of paper presented at the Vienna Verification Workshop, Sep. 1990.

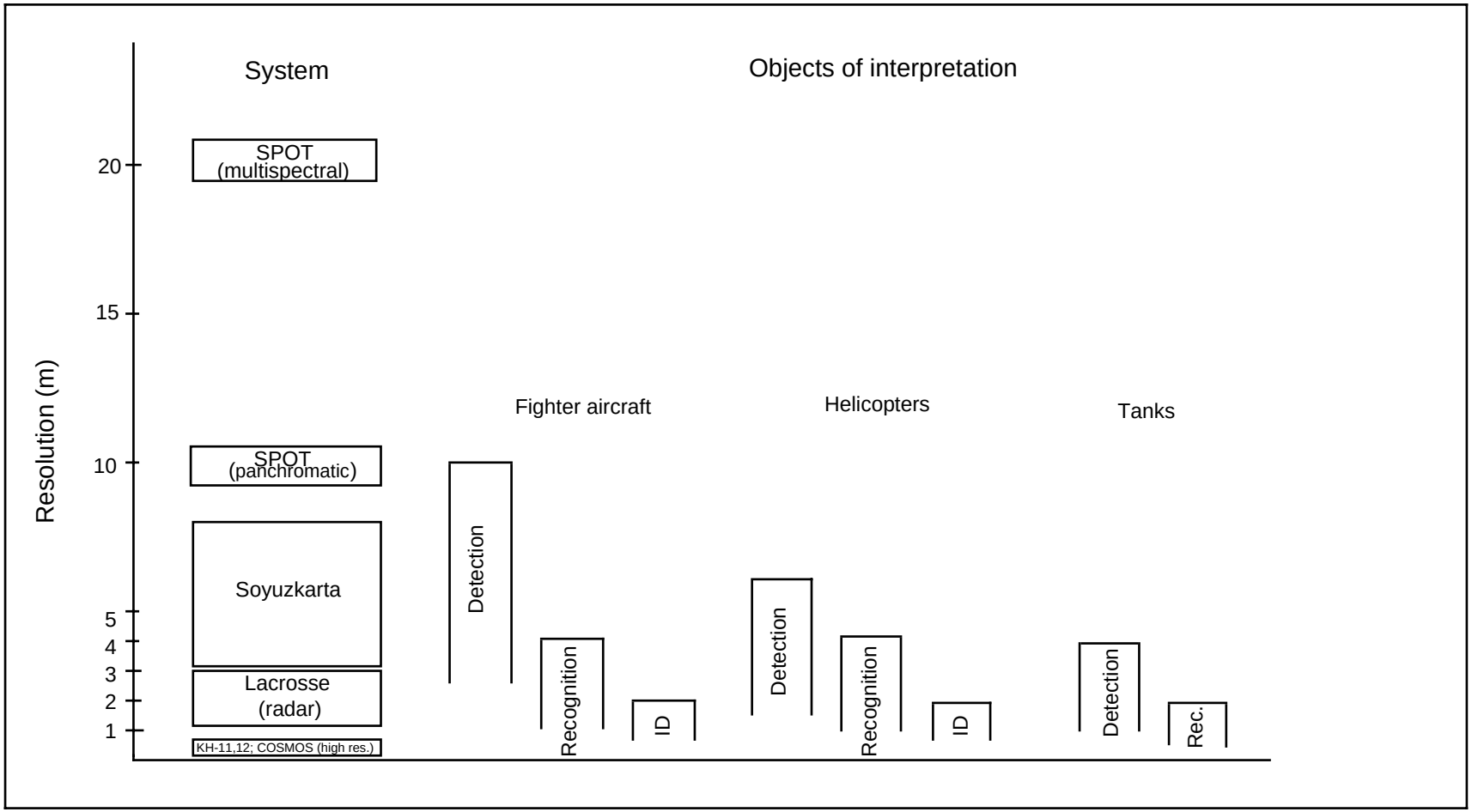

Figure 2. Interpretation tasks and current monitoring system capabilities

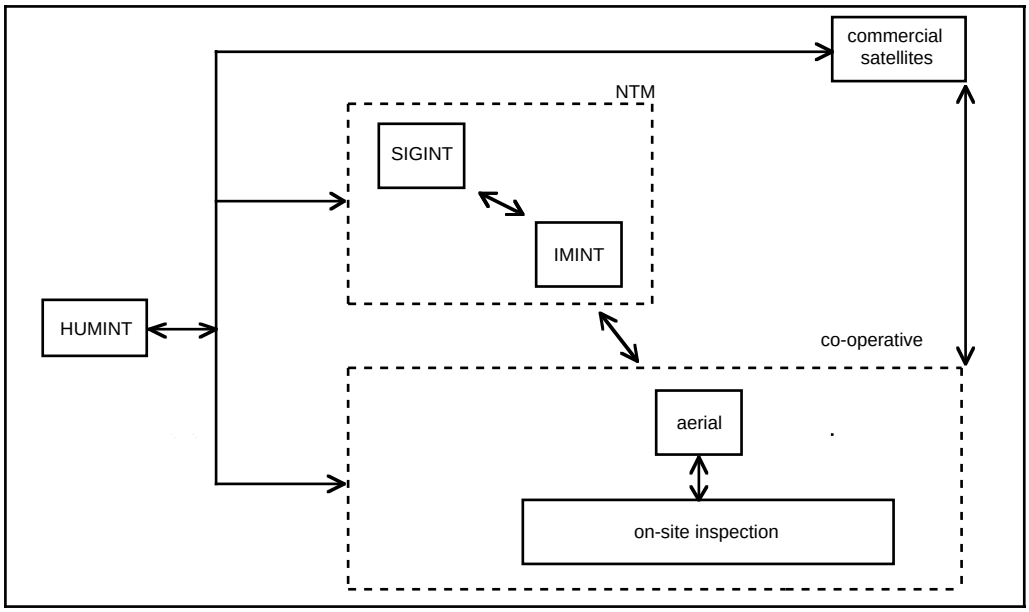

Figure 3. Operation of the verification system

CFE Treaty. As resolution depends on a number of factors, such as lighting conditions and contrast ratio, only an approximate range of the resolution necessary for detection, recognition and identification is indicated. (The approximate range has been obtained using values in table 10 multiplied and divided by a factor of 2.) This is especially true in the case of military satellites since there is the added unknown of the true capability of the sensors themselves.

Commercial satellites are of direct use primarily for gaining information on the infrastructure associated with conventional force deployments. However, given the OSI possibilities associated with the CFE Treaty they could also be of value in triggering such inspections to further clarify activities which may be somewhat ambiguous. It should also be noted that the best US and Soviet satellites are equipped to identify precisely all of the individual items limited by the Treaty. Although these resources will certainly not be expected to count and keep track of all of the weapons even after the reductions have taken place, their capabilities will allow for such counting procedures in specific instances where other evidence (perhaps also from satellites with lower resolution for example) has indicated that suspicious activity may be occurring.

Figure 3 demonstrates the way in which the verification system might be expected to operate. Various cueing schemes and possible feedback mechanisms are indicated. As discussed above, aerial reconnaissance will be available only in the latter stages of Treaty implementation. The figure largely speaks for itself; however, it should be noted that different areas of the figure will apply to a greater or lesser extent depending on specific verification targets. For example, a large clandestine production facility could well be first detected by commercial satellites; this would trigger further more intrusive

measures. On the other hand, the illegal movement or storage of a small number of TLE items is most unlikely to be detected in this manner and could only be discovered by high-resolution satellites or some more intrusive means.

It might also be useful to point out here that one way to assess the verification scheme as a whole is to scrutinize the effect of individual verification elements by examining the overall effect on the verification scheme if that particular element were to be used alone or were absent from the regime. NTM have been operating alone long before Treaty signature. OSI will be added as soon as the baseline validation begins. This will then permit the examination of the relative roles and the synergy that will exist between these two methods. Unfortunately most of the information needed for such analyses will not be publically available, but these types of study are sure to be performed, though perhaps behind the classified curtain. When the residual level stage is reached, aerial inspections will also be allowed and thus an assessment of the additional capability and confidence they provide should become apparent.

10. Steps for joint verification management

I. Introduction

Collection and analysis of data appropriate for verification as well as compliance determination lie within national responsibility. Nevertheless, efforts to share data on specifics of OSI, and challenge inspections in particular, among countries will provide many advantages. As shown, co-ordinating activities within a group of states parties will avoid redundancy and allow for the optimal application of statistical methods. So far, some steps for joint management have been made by NATO, although with obvious difficulties and less than expected or proposed results. Because of the well-known problems of the now disbanded WTO, comparable processes have not yet been developed by its member states.

Indicative of the rapidly changing political situation in Europe and its effect on the verification of the CFE Treaty and perhaps further agreements is the eagerness expressed by some former WTO member states to co-operate with NATO in verifying the Treaty. Hungary, Czechoslovakia and Poland were pressing early in 1991 for an arrangement whereby results of on-site inspections would be shared among *all* parties to the agreement. The West has reacted cautiously to such proposals of collaboration, stressing that any such arrangements would be of an *ad hoc* rather than a formal nature.[140]

In December 1989 US Secretary of State James Baker proposed that NATO should create a NATO Arms Control Verification Staff. According to Baker, such an agency would have respected the principle that verification was a national responsibility but would have assisted NATO countries to monitor compliance with arms control agreements. This new organization could have co-ordinated inspections and other verification activities, as well as provided assistance to individual alliance governments. The idea was rejected by several NATO members. A primary concern was that US views would dominate this organization since the USA was the NATO country with the most experience in verifying arms control treaties.[141] The USA, besides the USSR, is also the only country with the full range of required technological capabilities, especially for monitoring from space.

Nevertheless, co-ordination of verification among the NATO allies has been recognized as essential. The sheer scale of the verification task makes it impractical for each individual country to ‘go it alone’. In addition, joint efforts give the opportunity to pool expertise and partition chores, providing better information for less cost. The appropriateness of these efforts was stated in the North Atlantic Council Ministerial Communiqué of December

[140] Hitchens, T., ‘Ex-Soviet allies offer help on CFE verification’, *Defense News*, 4 Mar. 1991, p. 1.
[141] *Trust and Verify*, Feb. 1990, p. 1; *Defense News*, 2 Feb. 1990, p . 20.

1990: members of the alliance 'will ensure due co-ordination of national verification efforts through new Alliance bodies'.[142]

II. The Verification and Information Systems Directorate

The new Verification and Information Systems Directorate has been established under Leo Verbruggen, a Netherlands official at NATO, who will be directly responsible to NATO General Secretary Manfred Wörner and the North Atlantic Council. Wörner appointed US General Robert Chelberg as his special adviser for arms control and verification. The directorate is to consist of a permanent staff of civil and military officials and a high-level committee of national representatives from the 16 nations. The two groups would help co-ordinate and review information gathered, but would not have the power to decide whether a violation had occurred.[143] This structure is far from the idea for a NATO verification agency that was proposed by several Western experts and which could have encompassed the functions of data collection, distribution and analysis, co-ordination of alliance verification activities, liaison with intelligence data collection/analysis organizations, treatment of complaints and dealing with the WTO on verification/compliance matters.

There already exist models within NATO for co-operation in data acquisition and analysis, especially in tasking and in command and control such as the NATO Airborne Warning and Control System (AWACS) system. The NATO Airborne Early Warning (NAEW) force is the only force owned wholly by NATO and has been in operation since 1982. It is a rare example of co-ordination efforts within the alliance with regard to joint funding and multi-national staffing. The Boeing E-3A AWACS has become the standard for airborne early-warning systems. The NATO AWACS aircraft are manned by integrated international crews from Belgium, Canada, Denmark, Germany, Greece, Italy, the Netherlands, Norway, Portugal, Turkey and the USA.[144] It has been stated by the commander of this NAEW force that the programme 'is an outstanding example of cooperation between Alliance members, of joint funding and of political and economic accommodations of nations, resulting in the first fully integrated multinational air force in history'.[145]

As noted, such systems could in fact be useful for some verification purposes as they stand or with some readily accomplished modifications. How-

[142] *Atlantic News*, 19 Dec. 1990, p. 1 (Annex).

[143] *Arms Control Reporter*, 1990, sheet 407.B.409; *Defense News*, 9 July 1990, p.10.

[144] The current NAEW force consists of 18 E-3A aircraft and in 1980 it was granted full NATO Command Headquarters status by the NATO Defence Planning Committee. Force Command Headquarters are located at Supreme Headquarters, Allied Powers Europe, near Mons, Belgium. The Force supports all three major NATO Commands but the Supreme Allied Commander Europe acts as the executive agent. The second component of the Force will consist of the British E-3D aircraft which will be operated by British personnel only, though under the day-to-day control of the NAEW Force Commander and assigned to the Major Commands. The main operational base of the force is located in Geilenkirche, Germany, and forward operating bases are dispersed in Italy, Greece and Turkey. There is also a forward operation location in Norway (*Jane's NATO Handbook, 1990–91* [Jane's Information Group: Coulsdon, 1991], p. 244).

[145] Weber, A., 'Ten years of success', *NATO's Sixteen Nations*, special edition, 1990, p. 10.

ever, after the Treaty was signed major differences have emerged within NATO regarding the incorporation of AWACS aircraft in verification activities, because some members of the alliance prefer more emphasis on national control. David Facey, NATO Air Defence Director, however, suggested that AWACS may be employed; this would involve fitting detachable pods containing radar and infra-red sensors for ground surveillance to existing E-3As. Another possibility is to modify three NATO Boeing 707 aircraft currently used for AWACS training. According to the General Manager of the NATO AWACS fleet as of December 1990, the fleet could be ready for 'quick-reaction' verification missions in six to nine months.[146] Nevertheless, a common NATO position on this issue has yet to emerge.

III. Standardized practices

NATO plans to standardize some verification methods and practices through the training programme for military personnel to be involved in OSI activities. This programme was scheduled for late February 1991 at NATO's joint military training facility in Oberammergau, Germany. It is also suggested that civilians be invited in the future.

A Verification Coordinating Committee (VCC) has been created by NATO to discuss national plans and prevent conflicts between verification procedures. It is part of the NATO Verification and Information Systems Directorate and is comprised of two members from each NATO government. Currently the VCC is engaged in developing expertise using experience from a series of trial inspections which have been run for training purposes. A CFE data base for all NATO countries was nearing completion in March 1991.[147] The alliance also plans to form common practices and standards for conducting CFE inspections. This task is complicated because the Treaty has set a comprehensive regime of rights and quotas for both inspecting and inspected parties. The signatories have seen the first serious difficulties in verification emerging soon after the Treaty was concluded; they involved disputes on numbers of TLE and reassignments[148]—important issues for reaching consensus on initial data. The data validation phase is crucial for the further effectiveness of the verification regime and extensive inspection activities are to start by the end of this phase, thus the need for accelerating corresponding joint efforts. This is gaining a certain amount of support within the Alliance. On the other hand, many NATO countries are unwilling to advance a detailed schedule of planned inspections because of security concerns.

Trial inspections have been carried out, for example, a Canadian inspection team has conducted a trial inspection under the CFE Protocol on Inspection of military facilities in the Netherlands. The Inspection Protocol was closely followed in confirming TLE holdings at two sites from 29 January to

[146] *Trust and Verify*, Dec./Jan. 1991, p. 2.
[147] *Jane's Defence Weekly*, 23 Mar. 1990, p. 448.
[148] These issues are elaborated upon in chapter 11, section II.

1 February 1991. A helicopter overflight was included. It was concluded that 'in general, the Inspection Protocol provides a suitable framework for on-site inspections'.[149] In June 1991 nine Belgian inspectors with three observers conducted a trial inspection in Hungary. They closely examined equipment of the Hungarian army and, going beyond activities foreseen by the Protocol on Inspection, were even allowed to drive some vehicles.[150]

IV. National organizations

The main efforts, at least of several states parties which belong to NATO, however, have gone into the creation of national organizations responsible for implementing verification activities, including those for monitoring compliance with the CFE Treaty. It should be noted that also in this context the main experience of detailed verification procedures so far has been gained primarily by two individual countries—the USA and the USSR.

France reopened an air base to accommodate the French verification centre. The Creil air base, near Paris, would also serve as a processing centre for data from the Helios satellite.[151] Since there is a limit on the number of inspections that each country is allowed, a French official said that his country would rely on other verification measures. The operational French verification unit at the air base reports to the chief of the armed forces general staff. It totals 140 people, and will collect, process and analyse data on CFE implementation. As mentioned, France is establishing a three-tiered verification system. One tier will use satellites and other national verification techniques to identify military sites. In the second tier, aircraft flights will be conducted over sites, while the third verification tier will be used to demand OSI of disputed sites.[152]

The UK would locate its Joint Arms Control Implementation Group (JACIG) at RAF Scampton in Lincolnshire. The 270 people in the unit would be commanded by an army brigadier. This tri-service unit is tasked with providing inspection, escort and interpretation duties as part of verification and confidence-building activities of arms control agreements signed by the UK. The first major task of JACIG is to carry out OSI for the CFE Treaty in WTO countries and to host inspection teams of those countries during visits in the UK.[153]

The German foreign and defence ministries are co-ordinating verification activities. The former exercises political control through a sub-division within the ministry and a 'Steering Committee' under Foreign Office chairmanship. The latter has created a Centre for Verification Tasks of the Bundeswehr, which began its operations on 1 October 1990. With an initial staff of 100, in

[149] *The Disarmament Bulletin* (External Affairs and International Trade, Canada), no. 16 (spring 1991), p. 12.
[150] *Atlantic News*, no. 2330 (12 June 1991), p. 4.
[151] *Jane's Defence Weekly*, 21 July 1990, p. 75.
[152] *Defense News*, 17 Dec. 1990, p. 36.
[153] *The Times*, 14 Feb. 1990; *Jane's Defence Weekly*, 5 Jan. 1991, p .16.

the long term it will have 280 military and 110 civilian staff. Members of this centre will be trained to verify conventional disarmament in other European countries and accompany foreign inspection missions in Germany. The Centre has three divisions—Evaluation, Missions Abroad, and Missions at Home—responsible for verification-related matters, first under the CFE and INF treaties and later for confidence- and security-building measures (CSBMs), a possible treaty on short-range nuclear forces and a possible chemical weapons convention. They will provide military and political evaluations of treaty-related information, guidelines and proposals for inspections and observations, co-ordinate with government agencies and embassies of states parties, and provide escort and support for inspections inside Germany and support for German missions to other states parties.[154]

The INF Treaty led to the creation of a new US Government organization, the On-Site Inspection Agency (OSIA), which employs about 200 full-time military and civilian personnel. This agency will also play a similar role in carrying out the OSI part of CFE verification and 'envisions nothing generally different from INF'.[155] The basic low-technology approach has, they believe, been validated by the INF Treaty experience. Current expenditures are about $40 million per year and this is expected to grow to about $200 million for the first year of monitoring the INF Treaty in addition to the CFE Treaty plus all subsequent treaties, including a ban on nuclear testing, a chemical weapons convention and the strategic arms agreement (START). With respect to the organizational aspects of the OSIA, it has been pointed out that 'the initial success of the INF operation is in large part due to the wise decision to organize OSIA within the military. This provided easy access to necessary technical personnel, logistical support, and experienced leadership with the discipline necessary to respond rapidly under less than ideal conditions'.[156]

With respect to the ex-WTO states little is known about the specific manner in which comparable activities will be carried out. Because of the present state of flux it is very difficult to forecast the type of organizational form that co-operation in verification activities and information sharing might take. The Foreign Ministry of the USSR contains an organization dealing with verification. Operating from the Defence Ministry, the Nuclear Risk Reduction Centre in Moscow has been performing the functions of both distribution of information and the conduct of inspections for the INF Treaty. Similar roles could possibly be envisioned in the expansion of this centre to take on similar roles in the CFE context.

Concerning non-Soviet ex-WTO states, their position of inferiority *vis-à-vis* the USSR with respect to advanced verification technology should be overcome in a satisfactory manner without causing undue security concerns for the USSR. The prospect of these countries launching their own verification satellites are remote for the near future and commercial satellite

[154] *Atlantic News*, 20 July 1990, p. 2; *Focus on Vienna*, Oct. 1990, p. 8.

[155] 'OSIA would remain low-tech for Start, CFE verification', *Aviation Week & Space Technology*, 6 Aug. 1990, p. 57.

[156] Keeny, S., 'The on-site inspection legacy', *Arms Control Today*, Nov. 1988, p. 3.

data will not be adequate in itself. It has therefore been argued, for example, that 'it would make a good deal of sense if the information that they may use for targeting inspections were to come from Western nations rather than their old source of the Soviet Union' and that 'they will probably do what most of the NATO states will do—rely on snippets of information gleaned through various networks, buy or borrow imagery from the USA, USSR and France and produce their own images from aerial inspections when an overflight regime is eventually negotiated'.[157]

In fact some former WTO members have already been looking forward to future NATO membership, although NATO has not yet been very responsive to this. Hungary and Czechoslovakia have already expressed interest in acquiring Western air defence and command and control systems, a 'logical first step' towards future co-operation.[158]

[157] *Trust and Verify*, Dec./Jan. 1991, pp. 1–2.
[158] 'Czechs, Hungary look West to buy C^2', *Defense News*, 6 May 1991, p. 3.

11. Challenges for CFE verification

I. Notification and exchange of information

Organization and TLE holdings

Arms control specialists have long insisted that to avoid disputes over data, the exchange of which is the main first step in the effective functioning of a verification regime, exchange of aggregate data on each category of TLE must be accompanied by exchange of information on the organization, structure and disposition of forces of states parties. To make TLE counting more effective it is extremely useful to include unit structure as a basis for monitoring,[159] preferably down to brigade (NATO) or regiment (ex-WTO) level. In other words, the more detailed the information, the better the basis for verification. The CFE Treaty basically meets these requirements and covers both such data and information about command structure.[160]

In addition, as changes in military doctrines—with respect to offensive or defensive orientation in particular—can be judged from changes in the organizational structures of armed forces, information on organizational structure strengthens the co-operative environment, thus enhancing both stability and the effectiveness of the verification regime.

In sum, the organization/unit element which has been agreed upon for the CFE verification regime is an important factor in its effectiveness, especially with respect to the implementation of OSI. Through monitoring individual holdings of units one is more likely to reach an adequate assessment of the overall holdings of a state party. The Treaty's quota of inspections gives an ample opportunity to check the holdings of many individual units and reach a realistic assessment of the overall holdings.

Emphasizing the specific value of an organization/unit element, Jonathan Dean has specified the task of NATO's states parties:

What NATO will be seeking through exchange of detailed data on the strength of individual Pact units is not so much a basis for calculating Pact armament reductions. . . . The requirement of NATO's verification agencies is to have a clear understanding of unit holdings before reductions occur in order to provide a data base criterion,

[159] As aptly pointed out with respect to this point, 'every unit has a table of organization and equipment or its equivalent. It is here that the treaty-limited equipment . . . is identified in relation to personnel and other combat and combat support equipment. As a rule, Soviet and Warsaw Pact combat units have standard levels of equipment. In such a unit, the table of organization and equipment can be used in the monitoring process as a template against which every unit can be evaluated' (*Washington Quarterly*, winter 1991, p. 137).

[160] During the CFE Negotiation NATO wanted to go down to the battalion level, but the WTO insisted on going down to the regiment level. WTO regiments are the basic level of bureaucratic management, so implementing information exchange and subsequent verification of data at the battalion level would not have been easy. Thereby, some Western officials suggested that the two sides compromise by exchanging data at the regiment or brigade level, and mandating those units to provide information on their battalion level sub-units (*Arms Control Reporter*, 1989, sheet 407.B.273).

established in advance, for verification of unit holdings after reductions take place through on-site inspection and other collection means.[161]

The value of the combination of detailed data on unit designation, location and the specific TLE contained therein[162] is indicated by the fact that it is sometimes referred to as battle intelligence. The agreement between two alliances to provide this combination of data represents a breakthrough from previous traditions and thereby provides a unique opportunity to explore new pathways towards co-operation and confidence in the military sphere. In agreeing to the obligation to share this information, a state party obliges itself to provide complete and correct data and, hence, sends a message of serious commitment to abide by the terms and the spirit of the Treaty.

One of the main challenges for multilateral accords such as the CFE Treaty will be to develop appropriate methods to store and process the large quantities of information which will flow between parties. Improvements in information management systems including a substantial automation will be increasingly necessary as further accords on conventional weapons, for example, are concluded.[163]

Definitions and counting rules

The lack of precise definitions of TLE has often created ambiguities in connection with treaty-related exchange of data and the functioning of compliance mechanisms in particular. Experience with many previous arms control agreements indicates that the effectiveness of verification activities depends to a great extent on specific definitions and associated counting rules for TLE agreed to among states parties. In general, the more ambiguous the definitions and counting rules, the more difficulties encountered in reaching a common position on quantitative holdings at various stages throughout the life of an agreement; and the more disagreements on data, the more problems for verification and compliance mechanisms. The detailed definitions of TLE in the CFE Treaty are oriented towards solving this problem .

However, it is always possible that some sources of ambiguity remain. For example, ‘battle tanks’ are tracked, heavy, armoured vehicles weighing at least 16.5 tonnes and equipped with a 360-degree traverse gun of at least 75-mm calibre, but a small number of light tanks which do not correspond to this specific definition of battle tanks are included in the ACV category. On the other hand, heavily armed vehicles with wheels rather than tracks, and which ‘meet all other criteria’ of a battle tank are counted as tanks.

[161] Dean, J., ‘Verifying NATO–Warsaw Pact force reductions and stabilizing measures’, ed. F. Barnaby, *A Handbook of Verification Procedures* (Macmillan: London, 1990), p. 324.

[162] It is worthwhile to stress here that not only TLE information is exchanged but also a detailed account of conventional armaments and equipment covered by the Treaty, thus including those without strict limitations but which may have important roles to play in the disposition and overall posture of a state’s conventional forces. See appendix F on information exchange and appendix G on its specific format for the detailed nature of these notifications.

[163] ‘Arms control verification will tax data processing capabilities’, *Defense News*, 10 June 1991, p. 22.

Certainly, one would expect ambiguities in definitions to arise and be discussed among the states parties. So far, however, the main issue of this type raised since the signature of the Treaty concerns the MT-LB armoured personnel carrier. Although the Treaty contains a paragraph describing how this vehicle can be transformed into a non-combat look-alike, which would not be counted under Treaty ceilings, the two sides differ over how many MT-LBs in the current Soviet arsenal are to be counted as look-alikes and how many are still combat-capable. A Soviet diplomat has stated that 12 800 are look-alikes used for towing artillery and as ambulances.[164] The Treaty specifies that APC look-alikes and AIFV look-alikes are armoured vehicles based on the same chassis as, and externally similar to, APCs or AIFVs, respectively, not having a cannon or gun of 20-mm calibre or more and which have been constructed or modified in such a way as to prevent the transportation of a combat infantry squad. Because of provisions of a 1949 Geneva Convention which confers a special status on ambulances, APC ambulances may not be deemed ACVs or APC look-alikes. Thus it seems that objective problems for reaching a consensus on certain conventional armaments and equipment exist although, fortunately, covering only relatively minor TLE at least for the present.

Nevertheless, it should be stressed that, more importantly, the definitions are accompanied by a list of all of the specific existing types of TLE. This combination helps to avoid some problems which might otherwise appear. The armaments and equipment are specifically named in formal lists of existing types of battle tank and ACV, and so on, and these lists are to be updated. In addition, provisions oblige states parties to provide photographs of these existing types (except those models and versions of a type that have no significant externally observable differences from the 'exemplar' of that type). The agreed definitions and counting rules are the product of compromises made during negotiations and, after ratification, the process of Treaty implementation will doubtless point to their pros and cons.

It is important that the agreement was based on carefully assessing official NATO and WTO definitions and their adequacy before Treaty signature. At the end of 1988 and in early 1989 NATO and the WTO presented official statements on their forces. These figures turned out to differ substantially in some categories and types of conventional armament, but the differences were mainly caused by differences in counting rules. For example, NATO included only artillery pieces from 100-mm calibre and above while the WTO listed artillery pieces from 75-mm and above as well as mortars from 50-mm and above in their count of artillery pieces. The same type of problem arose in counting tanks, armoured vehicles, combat aircraft and helicopters. In 1989, however, it was already unofficially acknowledged that, taking into account different counting rules, no significant divergence existed between the data tabled by the WTO in January 1989 and those tabled by NATO in November

[164] *BASIC Reports from Vienna*, 17 Dec. 1990, p. 2.

1988.[165] Rather, the challenge constituted the necessity to find a common understanding of the counting rules.

This conclusion was supported by some results obtained during the negotiations. In April 1990 the CFE negotiators took an important symbolic step, completing an informal exchange of data on artillery holdings—the one weapon category for which they had already agreed on a definition—and on the lists of specific systems covered. According to several officials, the exchange served as a successful 'dry run' for the massive official one with the signing of the Treaty.[166] No divergence of the data supplied by a state party with those available by others was reported.

Other TLE categories had not been 'tested' before the Treaty was signed, mainly because definitions of these categories had been agreed upon within a short period of time. As a result, some substantial disagreements over data have taken place. Nevertheless, it should be mentioned that the agreed definitions and counting rules have had a positive impact on clearing up disagreements. On the other hand, first confusions also stemmed from a few 'objective' circumstances, primarily from Soviet redeployments beyond the Ural Mountains and Western preparations for and waging of the war in the Persian Gulf.

II. Baseline data and first disagreements

An initial discrepancy concerned the equipment listed by the USSR after the signature of the Treaty and NATO intelligence estimates: the Soviet data were lower than the Western estimates.[167] Several officials guessed that the discrepancies did not stem from error but were deliberate misstatements, possibly to permit continuation of the transfer beyond the Urals after the Treaty had been signed, reflecting the need to avoid high costs of destruction.[168] In the same vein, some US officials suggested that the Soviet Union intended to reach the declared levels, but failed to do so in time because of management problems. General John Galvin, NATO's Supreme Allied Commander, Europe, seemed to share the latter view.[169] Another speculation was that military commanders responsible for the transfer falsified reports because they had failed to ship equipment before the 19 November deadline. In any case later intelligence information has led the USA to revise its estimates down-

[165] *Arms Control Reporter*, 1989, sheet 407.B.162.

[166] *Vienna Fax*, 18 May 1990, p. 2.

[167] More precisely, the US charges were based on surveillance of Soviet forces by US intelligence agencies carried out in late November. *BASIC Reports from Vienna*, 17 Dec. 1990, p. 1. It was later learned that the estimates were in fact made some time earlier.

[168] It should be noted here that by late autumn 1990, according to a letter by Soviet Foreign Minister Eduard Shevardnadze to US Secretary of State James Baker, 4000 withdrawn Soviet tanks had already been destroyed, converted or exported. Another 8000 tanks were slated for future destruction or conversion. The other 8000 of the 20 000 tanks planned for removal from the ATTU zone were being moved to the Far Eastern part of the USSR to replace ageing weapons that would in turn be destroyed. Thus, the costly process of destruction had been started in the USSR. (*BASIC Reports from Vienna*, 17 Dec. 1990, p. 2.)

[169] *Arms Control Today*, Jan./Feb. 1991, p. 22.

wards, considerably narrowing the difference between the Soviet declared data and the US estimate.[170]

On the other hand, it should be mentioned that the Protocol on Notification and Exchange of Information and the Annex on the Format for Exchange of Information (see appendices F and G) were written largely by the USA and agreed to by other states parties in the last few days before the signature of the Treaty. This might have caused some confusion in the USSR. Oleg Grinevskiy commented that the data had only been preliminarily analysed and corrections would also have to be made to the Western data. Germany and several other European countries corrected what one US official termed 'gross mistakes' in their own data soon after the conclusion of the Treaty.[171]

The US data have reflected another problem which stems simply from circumstances. The USA declared it had 5904 battle tanks, 5747 ACVs, 2601 artillery systems, 704 combat aircraft and 279 attack helicopters. Except for battle tanks, these data generally correspond to earlier publicly available data. The declared number of tanks indicates that before transfers of armaments to the Persian Gulf the USA had more than 6800 tanks in active units and in storage in Europe—approximately 1000 more than expected. The US data also include the equipment sent to the Gulf, but counted against the CFE limits. This would allow it to be returned to Europe; however, such an eventuality is unlikely.[172] The USA has also transferred about 14 per cent of its tank holdings to Egypt and several other countries[173] instead of maintaining them in Europe where they would have had to be destroyed.

Another problem which cropped up immediately upon signature addressed the numbers of OOV. NATO expected approximately 1600 OOV to be declared by the USSR rather than 895[174] as included in the initial Soviet list. Western experts explained the discrepancy by the fact that the USSR considered each major military base as a single site, while NATO divided military complexes into several distinct sites. According to NATO officials, the counting of neighbouring sites would hinder NATO OSI, limited to 48 hours by the Treaty.[175] The Soviet data have meant a substantial decrease in the numbers of inspections planned by other states parties.

This problem was discussed in the first session of the Joint Consultative Group in Vienna. The USSR put forward several explanations: the reassignment of some low-strength divisions as storage sites might represent an advantage as a large number of storage sites could be inspected as one OOV; the amalgamation of below-strength active units and consequent decrease in active units, that is, a few regiments into one divisional OOV; the reduction of

[170] Note 169.
[171] *Arms Control Reporter*, 1990, sheets 407.B.414, 407.B.415.
[172] *Arms Control Today*, Dec. 1990, p. 22.
[173] Note 169, CFE supplement, p. 3.
[174] This number was revised to 910 in February 1991; see *Vienna Fax*, 28 Feb. 1991, p. 2.
[175] *Defense News*, 17 Dec. 1990, p. 10.

numbers of training vehicles at training areas to below the threshold for declaration (30 or 12 TLE items of a single category).[176]

One other Soviet explanation is worth mentioning, at least to reflect the difficulties for counting caused by withdrawals from Eastern Europe, which have been going on parallel to the early stages of the CFE Treaty implementation, and the process of restructuring of Soviet armed forces to achieve the purposes of 'reasonable sufficiency'. Eastern and Western negotiators agreed during the final phase of negotiations not to count 120 Soviet regiments and battalions in Eastern Europe as OOV because all of their TLE had already been removed. The USSR also claimed that an additional 80 sites were removed from the list because of the withdrawals from Eastern Europe. Finally, the USSR seemed to have removed all TLE from its chemical and communications and control units, thereby eliminating 360 OOV.[177]

Another NATO concern has been the transfer of Soviet equipment beyond the Urals before the Treaty was signed. Although not a violation of any Treaty provisions, this does mean that only half the number of weapons originally expected (100 000) will be destroyed by the WTO because many (including about 17 000 tanks) were moved out of the region in time for the 19 November signing. The Soviet Union has given assurances that some of this equipment has already been destroyed and that much of the rest will be destroyed. Many items withdrawn to Siberia have reportedly been left out in the open to rust (and are easily counted as long as they remain there) and would take at least two years to restore to peak condition.[178] US officials have in fact stated that it is possible to monitor 'militarily significant potentials' deployed east of the ATTU area and that, 'even if they (the USSR) do keep the stuff active in Siberia, putting them on the other side of the Urals is an important step for stability'.[179] NATO became much more concerned with another issue, however.

The dispute was sparked by the USSR transferring three motorized rifle divisions into coastal defence units[180] which it considers not limited by the Treaty (the mandate covers only ground, air and air defence forces). NATO claims that the Treaty does not exclude ground equipment in naval units from the limits (with exceptions of course for internal security forces, for example). The Soviet Union has in fact acknowledged the shift.[181] In total 5457 tanks, APCs and artillery pieces were reassigned to three coastal defence divisions,

[176] *BASIC Reports from Vienna*, 17 Dec. 1990, p. 2.

[177] Note 176.

[178] 'Soviets maneuver Warsaw Pact arms out of treaty's way', *International Herald Tribune*, 12 Nov. 1990.

[179] *Arms Control Reporter*, 1990, sheet 407.B.415.

[180] 'CFE stalls; signatories insist on Soviet compliance', *Defense News*, 18 Feb. 1991, p. 1.

[181] First Deputy Chief of the Soviet General Staff B. Omelichev stated: 'The Soviet Union has taken measures for more reliable defence of coastal directions, taking into account the US and NATO substantial superiority in assault and mobile naval means. We started this process already in 1987. As a result, three divisions of Ground Forces have been resubordinated to the Navy as the coastal defence divisions (and not as Marine divisions). Like all naval forces, they did not become the subject of Vienna negotiations and not because of our unwillingness and thereby they can not be considered within the framework of the Paris treaty.' (*Krasnaya Zvezda*, 16 Feb. 1991, p. 3).

four naval infantry regiments, the strategic rocket forces and civil defence units.[182]

The dispute took some time but was finally resolved at a meeting in Lisbon on 1 June 1991 between US Secretary of State James Baker and Soviet Foreign Minister Alexander Bessmertnykh.[183]

In an legally binding statement[184] the USSR agreed to reduce its holdings of TLE within the area of application by the number which it has in coastal defence forces and naval infantry (933 battle tanks, 1725 ACVs and 1080 artillery pieces). Of the 1725 ACVs, 972 will be destroyed or converted into civilian equipment while the remaining 753 will be modified to APC look-alikes not covered by the Treaty. Only half of the 933 battle tanks, 972 ACVs and 1080 artillery pieces will be reduced within the area of application, however. The other half will be withdrawn and an equivalent number (i.e., not necessarily the same equipment) will be destroyed or converted outside the area of application. While this latter proviso will not permit the equipment destroyed or converted outside the area of application to be monitored by OSI, the conversion or destruction is to be accomplished 'in accordance with procedures which provide sufficient visible evidence that the conventional armaments and equipment have been destroyed or rendered militarily unusable. The States Parties to the Treaty shall be notified in advance, giving the location, number and types'[185] —that is, so that NTM can observe. TLE within the area of application of the coastal defence forces and naval infantry will be subject to challenge OSI.

As for the strategic rocket forces, they will be permitted to include only APCs, the number of which cannot exceed 1701—the current level. Very importantly, the Soviet declaration states that unless otherwise specified, all TLE 'based on land within the area of application of the Treaty, *irrespective of assignment,* shall be subject to all numerical limitations of the Treaty'.[186] This forecloses the possibility that similar disputes will be allowed to arise in the future.

To further assuage Western concerns, in a separate (non-legally binding) statement issued at a special session of the JCG on the same day as the statement referred to above, the USSR also promised to destroy or convert an additional 6000 tanks, 7000 artillery pieces and 1500 ACVs which have been moved east of the Urals. It also pledged that none of the equipment moved east of the Urals would be stored in unit sets or used to create new large formations.[187]

[182] 'U.S. proposal could end CFE equipment dispute', *Defense News*, 8 Apr. 1991, p. 4.; 'Gorbachev offers U.S. deal on arms dispute', *International Herald Tribune*, 3 Apr. 1991, p. 7.

[183] *The Economist*, 8 June 1991, p. 30; 'Breakthrough for treaty talks', *Jane's Defence Weekly*, 15 June 1991, p. 999; *Atlantic News*, 19 June, 1991, p. 1.

[184] 'Statement by the Government of the Union of Soviet Socialist Republics', reprinted in *BASIC Reports on European Arms Control*, no. 15 (17 June 1991), pp. 3, 4.

[185] Note 184, p. 4.

[186] Note 184, p. 4 [emphasis added].

[187] Note 184, p. 2.

With regard to monitoring capabilities, the recent record thus reflects the basic fact that, while very capable, NTM, the only verification means employed thus far to assess declared data, are far from infallible. Moreover, as was continually stressed by experts before the signature of the Treaty, the US intelligence assets continue to play a dominant role in Western monitoring activities short of OSI. Accusations about the transfer of three Soviet divisions point rather to the problem of compliance, that is, how to resolve disagreements about clearly detected actions of a state party.

Finally, the validation phase has shown that the Treaty is not without some remaining loopholes either because of conscious political decisions or the speeding-up of the final part of the Vienna negotiations. In particular, by limiting the Treaty to the ATTU zone, the USA and the USSR were able to move their armaments beyond this area before the signature of the Treaty, instead of destroying them. Prohibitions on such activities could have been the subject of negotiations outside the Treaty itself.

III. Verification of separate TLE categories

To discuss appropriately the issue of verification of the various separate categories of TLE, two important issues must be borne in mind. The first is quite straightforward in principle—the specific definition of the TLE in question. CFE I has been fairly thorough in this respect as subsequent analysis will demonstrate. Second, while examining the effectiveness of the verification regime for each TLE item in a stabilizing mode,[188] it is necessary to attempt to understand what it is about each particular TLE category that makes it offensive (as unambiguously as possible in the setting in which it will most likely be employed). This second point is of particular note for the CFE verification structure since enhanced stability is among its primary objectives. Thus, the greater the confidence in the capabilities of the verification structure to monitor stabilizing features, the greater the confidence in the regime overall.

Armoured vehicles

The Treaty defines a ‘battle tank’ as:

> A self-propelled armoured fighting vehicle, capable of heavy firepower, primarily of a high muzzle velocity direct fire main gun necessary to engage armoured and other targets, with high cross-country mobility, with a high level of self-protection, and which is not designed and equipped primarily to transport combat troops . . . Battle tanks are tracked armoured fighting vehicles which weigh at least 16.5 metric tonnes unladen weight and which are armed with a 360-degree traverse gun of at least 75 millimetres calibre. In addition, any wheeled armoured fighting vehicles entering into service which meet all other criteria stated above shall also be deemed battle tanks. (Article II.1[C])

[188] Oerlich (note 130), pp. 16–17.

The definition addresses the parameters for offensive capabilities which are a combination of mobility, firepower and armour. When an attacker is moving through a defender's lines, armour is an important factor against the defender's counter-means. After a breakthrough other parameters may increase their relative role but armour remains important. Thus, it is not incidental that the definition emphasizes armour protection, meaning weight in practical terms. As included in the definition, weight then becomes one of the criteria for verification.

More precise definitions of armour protection could be related to weight-to-volume ratios and more elaborate definitions would have resulted. To increase armour protection and thereby tank capabilities one may also simply add armour. In terms of decreasing offensive potential, limitations on such procedures could also have been imposed. These limitations would have been essentially useless, however, since an inspected party could simply add armour after every successful inspection.[189]

Firepower is another crucial factor and it has been specified in the Treaty. At the same time several characteristics are not present. For example, the offensive capabilities are increased with stabilized guns which allow tanks to fire on the move. Even if all states parties agreed on limitations on stabilized guns, verification would require interior access to determine whether a tank had such stabilization or not and, consequently, a decision to allow for highly intrusive inspection.[190]

With regard to mobility, it is indirectly influenced by verification activities. For example, reduction of tank potentials enhances the defensive capabilities of the other side and adequate verification of reductions lends confidence to this process. Also, restrictions on AVLBs limit offensive capabilities and in particular the factor of mobility. Thorough checking of the numbers of AVLBs stored thus also contributes to this process.

Another problem which potentially would have allowed for large-scale increases in active TLE could have arisen if the storage provisions had included the central region. The time necessary to remove equipment from storage is very short—an estimated three hours, or if the turrets in tanks were 200 km distant, six hours—with an appropriate number of soldiers to reassemble the tanks. If one Western proposal was adopted allowing for equipment in storage in the central region, then this would have created linkage with troops there also.[191] As the final Treaty permits storage only in the periphery of the ATTU zone there is little concern about this.

The Treaty defines an 'armoured vehicle launched bridge' as 'a self-propelled armoured transporter-launcher vehicle capable of carrying and,

[189] For example, reactive armour could add between 1.5 and 2 tonnes to some French equipment (*Arms Control Reporter*, 1990, sheet 407.B.361).

[190] These aspects are put forward by I. Oelrich. He also mentions another possible constraint on gun effectiveness—limits on laser range-finders and similar devices. But verification in this case is not effective, even by interior access. Such devices could be added fairly quickly; see Oelrich, note 130, p. 18.

[191] *Arms Control Reporter*, 1989, sheet 407.B.161.

through built-in mechanisms, of emplacing and retrieving a bridge structure. Such a vehicle with a bridge structure operates as an integrated system'. (Article II.1[I])

With regard to AVLBs and their verification, the Treaty addresses the problem adequately. AVLBs are subject to inspection if they are located at declared sites, that is, those above the limits for active units of 740 for each group of states parties. If AVLBs in active units had been included as a TLE category, the additional verification problems would have been substantial.

Much of the bridging equipment is comprised of pontoon bridges which are carried on general-purpose trucks. An attacker could thus carry the equipment inside civilian trucks and keep them in civilian storage facilities. This type of equipment would certainly be very hard, if not impossible, to monitor. The Treaty specifies only 'armoured' vehicle launched bridges, which are not only easier to keep track of but also more effective in preparations for offensive operations. For example, scissor bridges, which are folded bridges carried on tank chassis, are large and distinctive. However, allowing for the fact that in terms of military significance a relatively small number of AVLBs may be quite important militarily, monitoring AVLBs outside storage sites may place a proportionately large burden on the verification regime.[192] Although the Treaty does exclude AVLBs from TLE and restricts verification to keeping track of them only in storage, there does exist the *de facto* limit of 740 AVLB per group of states parties, which does imply an additional verification burden. Nevertheless, information exchange helps to impose some restrictions on certain preparations for offensive operations with AVLBs.

With regard to armoured vehicles as well as other categories of TLE, one must expect unintentional violations which would not generally be substantial. Because of specific circumstances (moving to and from deployment areas, transferring to depot and repair facilities) the actual number may be less or more than declared at a particular time at a particular site (and indeed than those charged to keep track may be aware of). Without a stand-down provision, for example, it would be difficult even for an inspected state party to be confident in the exact number of armoured vehicles within the inspected area and the given period of time. If detected, the reaction of an inspecting party to such violations can be of two types: a violator is openly accused or the issue is dealt with in a confidential atmosphere. The reaction may well depend on the perceived nature of the violation, but a low-profile reaction would seem the more appropriate. On the other hand, if an open accusation does take place, it would be more likely to be politically rather than militarily motivated.

If an inspecting party detects an excess of a few tanks and treats such a violation using a 'military insignificance' criteria, a precedent may be perceived to have been set leading to an unofficial 'limit-plus-threshold' and the consequent acceptance of a 'limit-plus' as a new *de facto* limit. While the statistical nature of the process would probably lead to too few tanks being counted just as often as too many, the political nature of the process would

[192] Note 191.

argue that these problems be minimized by sticking to confidential discussions of non-compliance. Revealing a number of insignificant and unrelated violations may undermine an effective treaty regime.

Keeping good account of ACVs may present some formidable difficulties. One of the challenges is that the category has a large look-alike, count-alike problem. For example, in the case of the US M-113, different versions were used as command vehicles, recovery vehicles or medical vehicles. One Department of Defense official wondered whether the versions had enough observable distinctions to warrant separating them out in categories.[193]

Undeclared combat vehicles could be hard to detect. Besides tagging, which has not been included in the the CFE Treaty except in dealing with equipment to be reduced, one of the solutions is to decrease their military utility. Here an obvious link with CSBMs appears as they place certain limitations on out-of-garrison activities.

Artillery

Artillery is that TLE category whose definition was directly influenced by verification concerns. According to Canadian military advisor Colonel William Megill, 'we had this problem with the artillery. We had to go through the lists of systems with verification in the backs of our minds. So we decided that it was easier to verify systems 100mm and up. We couldn't go all over the place looking for every 81mm piece'.[194]

The term 'artillery' has been defined as 'large calibre systems' capable of engaging ground targets primarily by indirect fire:

> Large calibre artillery systems are guns, howitzers, artillery pieces combining the characteristics of guns and howitzers, mortars and multiple launch rocket systems with a calibre of 100 mm and above. In addition, any future large calibre direct fire system which has a secondary effective indirect fire capability shall be counted against the artillery ceilings. (Article II.1[F])

Limits on calibre helped negotiators to agree on the specific lists of systems limited by the Treaty. Their verification requires close-up inspections, using tape measures, for example (as well as limits on tank gun calibre, weight of vehicles, etc.).

Because of the large numbers of artillery systems now deployed, to be reduced and those to remain, different states or groups of states may choose different priorities in verifying the various types of equipment contained in this category. If the criterion of 'military significance' is adopted, limits on armoured artillery would be a prime focus of monitoring efforts. *Towed artillery*, for example, are more suitable for defensive tasks and thus may not be the subject of the same concern as armoured systems.

[193] *Arms Control Reporter*, 1989, sheet 407.B.271.
[194] *Arms Control Reporte*r, 1989, sheet 407.B.253.

Aircraft

The inclusion of aircraft presents the problem of 'reintroduction'. Reintroduction concerns aircraft in particular as they can be swiftly deployed over long distances from areas where their presence might be permissible to areas from which they have been banned above given allowed levels.

Counting aircraft is a complicated task, primarily because of the high mobility of this TLE category. Here again, the task could have been eased if the states parties agreed on a stand-down provision (i.e., a halt to all aircraft flying into, out of or within a particular area for a certain period of time), whereby NTM together with on-site inspections could permit the number of combat aircraft to be assessed by counting all aircraft inside an area within the stand-down interval.

Even if such a provision had been included (and the logistical problems would have been immense), it would not have solved all the problems of precise counting. Another method to enhance verification of aircraft could have been permanent observation posts at main bases as a support measure to this provision. Inspectors could then have fixed a number of aircraft at different bases and exchanged data among themselves to obtain maximum coverage of aircraft potential. Again, this method was excluded from the Treaty as it required permanent presence at sensitive bases.

Even the combination of permanent monitoring posts and a stand-down provision would not be adequate to ascertain the exact aircraft potential and avoid all possibilities of circumvention. In its absence, however, the Treaty places more burdens on national technical means along with the support of less intrusive OSI schemes allowed by the Treaty. To assist the effectiveness of NTM and OSI the Treaty specifies that inspectors can freely record serial numbers or place 'special marks' on equipment before reduction and check the numbers and marks after reduction. It must be remembered here that aircraft is not a category which is to be substantially reduced and reductions are required for the WTO countries alone.

If the states parties agree on using specific tags, it seems less troublesome to have relatively simple inexpensive counterfeit and transfer resistance tags such as bar codes, now in widespread use to price and catalogue many consumer goods, rather than very sophisticated ones. First, the use of this type of tag is quite adequate and compatible with the OSI provisions of the Treaty. Second, more sophisticated tags are fraught with serious problems.[195]

[195] For a description of tags, see Fetter, S. and Garwin, T., 'Tags', Kokoski and Koulik (note 28), pp. 139–54. Some specific problems of using more sophisticated options are analysed by L. Hansen, addressing a scenario in which each aircraft is fitted with a special transponder to transmit a unique, pre-assigned signature signal. Such a transponder is permanently set at its pre-assigned frequency. It has to be tamper-proof, permanently affixed as a hedge against the possibility of removal or alteration and must begin to transmit whenever the aircraft is in operation. A quota of OSI to check that transponders had not been tampered with would be required. Each aircraft has its own transponder code which is catalogued for information exchange. Besides the complexity and intrusive character of this scheme, it leads to other problems: transponders break; additional maintenance is required, etc. As a result, breakdowns in the monitoring process are a real possibility. Hansen, L., *Verifying Conventional Force Reductions,* Occasional Paper Series 1, The Henry Stimson Center, Washington, DC, Feb. 1990, pp. 28–29.

Thus, the Treaty provisions are based on the middle ground which may be assessed as the best approach of combining NTM, data exchange and on-site inspections short of permanent inspection teams and entry/exit points.[196] This combination is expected to provide adequate knowledge of aircraft presence, although not exact potentials.

It seems that the main task for the former WTO countries, given the present large numbers of 'surplus' NATO aircraft, is to make sure that the Treaty limits are not exceeded. This is especially true for the Soviet Union which is concerned with the NATO air force capabilities and with their remaining quantitative inferiority. For NATO the priority addresses the problems of monitoring reductions and reclassification.[197]

The exclusion of primary trainers from TLE categories will not have a substantial impact on possibilities of circumvention or any substantial effect on the military balance. They cannot easily be given combat capability and are distinguishable from true combat aircraft. In contrast, verifying look-alike trainers does pose difficulties and needs intrusive OSI. Such OSI is allowed by the Treaty and an inspection of certification is not counted against the quotas for OSI. NATO faces the major burden in verifying look-alike trainers: most of the training facilities and hence the lion's share of training aircraft belonging to the former WTO are within the ATTU zone. On the other hand, NATO has facilities and large numbers of look-alike trainers in the USA and Canada, that is, out of the ATTU zone.[198]

Helicopters

Problems of verifying limits on helicopters have many similarities with those of verifying aircraft ceilings. Helicopters in fact presented one of the most difficult problems during negotiations as they represent the one system on which a single chassis or airframe may be used for different purposes—some for military combat, some for military support and some for civilian tasks.[199]

On the other hand, modern attack helicopters do not have the internal volume to serve for transport and thus the two are quite readily distinguished.[200] Any transport helicopter can carry weapons, but its combat capabilities would be quite different from those of an attack helicopter.

Also, helicopters are more closely associated with ground forces than aircraft. This difference should be considered when assessing the relative impor-

[196] There is an additional difficulty in implementing the Treaty's OSI provisions with regard to aircraft. The numbers on Warsaw Pact aircraft have been routinely duplicated in both colour and number. But, while counting aircraft may be argued to be more important than counting tanks, for example, since they have more capability independent of their particular unit, such counting would be difficult unless all aircraft within a zone were counted simultaneously. Hansen (note 195), p. 26.

[197] According to James Woolsey, combat-capable trainers are essentially two-seater versions of single-seater combat aircraft such as the two-seater MiG-23. They can be used for combat though the range might be very slightly limited by having the added weight of an extra cockpit (*Arms Control Today*, Apr. 1990, p. 4).

[198] *Arms Control Today*, Mar. 1990, p. 16.

[199] Note 198, p. 5.

[200] Oelrich (note 130), p. 25.

tance of counting individual helicopters as compared with aircraft which can operate more autonomously.

IV. TLE monitoring priorities

As discussed above, an adequate verification regime has been incorporated into the CFE Treaty. However, taking into account resource constraints and the absence of some elements which would have allowed for more stringent and intrusive monitoring, it is reasonable to expect that much of the verification effort may be focused on those forces which are most capable of launching a surprise attack or of initiating large-scale offensive operations—on units deployed at or near borders in particular. These priorities may also be expected to be valid for resources assigned to data validation.

Priorities could certainly be changed in accordance with specific aspects of different phases of the Treaty. The process of reductions and restructuring of military potentials in Europe, along with changes in the military and political situation, will continue to transform present concerns and perceptions regarding the capabilities and intentions of another alliance/country. Assessments of capabilities would also be influenced by qualitative improvements in the conventional forces. One can only speculate about such broad transformations and it is thus appropriate to limit this analysis to some present concerns and to quite obvious developments which will occur as a result of reductions.

The specifics of the military potentials possessed by individual countries also have certain consequences for monitoring stored assets. The Soviet Union assigns virtually all of its equipment to active units.[201] The ex-WTO countries have no intention of sticking to the full levels allowed: Bulgaria and Romania would have no stored equipment; Poland and Czechoslovakia refused to store any weapons, while the USSR is not going to store the entire amount permitted for what was the WTO.[202]

Taking into account the present structure and plans of former WTO countries with respect to stored equipment and the large amount of such equipment possessed by NATO, verification of stored TLE will likely cause more problems for the Soviet Union in particular.[203]

The increasing use of covered storage for equipment, which can frustrate satellite and aircraft monitoring, is one challenge foreseen by Jonathan Dean : ‘This could especially be the case following reductions, when some storage facilities will no longer be used to full capacity, and assessment of equipment amounts can no longer be assisted by measuring storage capacity’.[204]

[201] *Vienna Fax*, 18 Oct. 1990, p. 2.

[202] *Arms Control Reporter*, 1990, sheet 407.B.403.

[203] For example, in mid-1990 the USA maintained around 2000 battle tanks in Western Europe in what are known as ‘Prepositioned Material Configured to Unit Sets’ (POMCUS), while other NATO countries held tanks in war maintenance reserves. These POMCUS and war-reserve vehicles were not in active units but qualified for NATO-proposed CFE counting rules under a ‘monitored storage’ provision. (*Jane’s Defence Weekly*, 16 June 1990, p. 1212). The initial NATO-proposed limits for stored battle tanks (of 4000) were aimed at preserving POMCUS sets (*Jane’s Defence Weekly*, 9 Dec. 1989, p. 1263).

[204] Dean (note 161), p. 330.

According to statements by military officials, both alliances have different concerns about individual categories and types of TLE. In 1989 the Chief of Staff of the Soviet Army, General V. Lobov, paid particular attention to NATO capabilities in aircraft and helicopters, pointing to the facts that they allow commencement of large-scale offensive operations without prior mobilization or adequate forward deployments of ground forces and that adequate preparations could be made clandestinely. He also emphasized aircraft and helicopter capabilities against tanks.[205] It is widely acknowledged, at least among Western experts, that NATO aircraft overall are qualitatively superior and in the process of reductions for reaching quantitative equality the impact of such qualitative characteristics will become more of a militarily significant factor than it is today. Thus, it is logical to expect that Soviet monitoring activities will involve keeping a close watch on NATO's air components in order to detect excessive numbers. The problems of counting aircraft, as mentioned above, are substantial and the USSR has to deal with them very carefully.

It must also be borne in mind that many countries will be entitled to increase rather than reduce their present numbers of aircraft and other TLE as well. This means that monitoring activities will also be aimed at counting new, upper limits possibly being approached from below.

Both groups of states parties may well have equal concerns about certain categories and types of TLE. With fewer tanks on both sides, AIFVs would be more effective in Europe. New HACVs developed in the future could dramatically augment the offensive capability of armoured units. The vulnerability of these thinly armoured vehicles limits their usefulness for sustained offensive missions, but their speed enables them to play a key role in rapid reinforcement or offensives together with tanks, ACVs and artillery.

With the continuing withdrawal of Soviet troops from Eastern Europe and substantial cuts of the holdings in the European part of the Soviet territory, the East European countries have begun to watch more closely the developments in conventional forces of their former WTO allies as well as the balances between them and their nearest NATO neighbours.[206] Some specific proposals of these countries were put forward during the negotiations with such concerns in mind.[207] It follows that verification priorities will thus be driven by them as well.

These withdrawals may also change NATO priorities for monitoring Treaty obligations of the former WTO countries and to a certain degree eliminate some traditional concerns of Western experts. It seems that NATO attention

[205] He said for example that a squadron of A-10s can destroy more than 100 tanks. One Alpha Jet or Tornado can destroy up to 10 tanks in 3–4 sorties. 42 AH-1s or AH-64As and 45 UH-1 helicopters (i.e., in one US mechanized division) can destroy more than 550 tanks during a single operation (*Krasnaya Zvezda*, 29 Apr. 1989, p. 3). All of these types except the UH-1 are treaty-limited.

[206] *Vienna Fax*, 5 Nov. 1990, p. 1.

[207] For example, Bulgaria unsuccessfully insisted that the MT-LB was not an ACV. It was explained that the Bulgarian 'military says we should have half the total holdings of Greece and Turkey, because we can defend with half the attacking force [so] we don't want a relatively high number of ACVs (*Arms Control Reporter*, 1990, sheet 407.B.362).

would focus on more general developments in the European part of the Soviet Union as well as on the possibility of circumvention. Specifics of priorities in NATO verification activities would in fact depend on different scenarios: withdrawn Soviet troops maintain their armaments and equipment, the manpower is cut and the troops are converted to Category III reserve units; armaments of new reserve units are placed in storage and partially dismantled; withdrawn units are completely dissolved, reduced armaments are transferred to existing reserve units and their present holdings of reduced armaments destroyed.

Recent developments in the former WTO countries provide an opportunity for NATO to focus more immediately on what is going on inside the Soviet Union, rather than to monitor primarily the reduction and transfer of troops from Eastern Europe. With the bulk of the Soviet troops in this region being 'under Western control' in the former GDR, and the obvious interest of other East European states in the complete withdrawal of Soviet forces, NATO has additional freedom to focus on monitoring the developments in the western Soviet MDs and other areas. In fact, with the reduced likelihood of conflict in Central Europe, NATO has recently reportedly been focusing on the Southern Flank.[208]

V. Unilateral decisions

Results of a single-nation distribution of residual levels of TLE categories might also depend on unilateral decisions to reduce TLE to lower than permitted levels as well as on reforms of military structures resulting from the new military and political situation. Among other things, these decisions will affect the location of conventional forces with TLE and involve some further specific aspects of verification. It is well to keep in mind that as a further aid to verifying unilateral decisions on forces, national legislative bodies will also function as a unilateral check on the activities of the military.

The Soviet Union has announced plans for military reform. According to these plans, for example, Soviet Air Force regiments will have 30–32 aircraft instead of 40. Also, 20 per cent of the tanks have already been removed from tank divisions as well as 40 per cent of tanks from infantry divisions.[209]

The process of complete withdrawal of Soviet armed forces from Czechoslovakia and Hungary in 1991 and from Germany and Poland in 1994 will have a more important impact on verification activities. One obvious consequence of these developments will be the actual observation and control of the withdrawal from host states parties which are not interested in the stationing of any Soviet TLE on their territories (not to speak of Soviet presence on former GDR territory). Also, major efforts of Western experts on verification before 1990 had been focused on means and methods to monitor reduced

[208] *Defense News*, 12 Nov. 1990, p. 8.
[209] *Kommunist*, no.13 (Sep. 1990), p. 20; *Voennaya mysl*, no. 4 (1990), p. 31.

levels of WTO and particularly Soviet armed forces in Central Europe. With the new developments, these concerns have thus lost some of their priority.

Czechoslovakia, Hungary and Poland plan to 'proportionally redeploy' certain portions of their armed forces, that is, from western parts of the territories closer to the borders with the Soviet Union.[210] For example, the Polish Defence Ministry intends to create two new military districts with the resultant redeployment of forces from the western part of the country 'to provide equal defence' of all borders.[211]

Unilateral initiatives have caused some problems since the data exchange. According to Soviet statements, under the plan of unilateral withdrawals and reductions announced by Mikhail Gorbachev in 1988 the number of tank and motor divisions had been reduced by 70 and 105, respectively by the time the Treaty was signed. Some 4000 tanks had been scrapped, converted or exported. In addition, some 8000 tanks had been earmarked to increase holdings and reserves in Soviet Asia, while the remainder were to be eliminated. Over the past two years, other Soviet TLE items (15 900 ACVs and 18 000 artillery systems) have been moved east of the Urals and 500 systems have been 'eliminated'. As elaborated upon above, these continuous redeployments from the ATTU zone have led to some confusion in Western intelligence estimates and thus to some consternation in the West in general.

From various high-level NATO officials and organizations there were clear statements about new perceptions of the WTO military threat even before the Treaty was signed. For example, in May 1990 the NATO Defence Planning Committee declared that the WTO no longer posed a military threat, and called for a review of its defence strategy.[212] First steps have been made in announcing a number of plans to change the military potentials of the NATO member states.

Before signing the Treaty several NATO countries had already stated that they were going to reduce personnel. Belgium plans to withdraw 25 000 troops from Germany and the UK is going to halve the strength of its air and ground forces in Germany during 1990–94 by cutting the British Army on the Rhine to 25 000 and closing two of four air bases. As regards the British forces, in place of three armoured divisions now based in Germany there is expected to be only one reinforced armoured division; the four air-defence Phantom squadrons in Germany and the UK would be retired, the burden of air defence to be handled by seven squadrons of Tornado F-3s (one more than at present) and a number of armed Hawk trainers, all of which would be home-based.[213] Similar withdrawals have been announced by Canada and the Netherlands.

[210] *Pravda*, 30 Jan. 1990.

[211] *Jane's Defence Weekly*, 8 Dec. 1990, p. 1131. The Polish plan includes the establishment of links with Western armed forces and the training of officers in France, the UK and Germany from 1991 as well as the possible purchase of some equipment from the West.

[212] *Arms Control Reporter*, 1990, sheet 407.B.369.

[213] *International Defense Review*, no. 8 (1990), p. 830.

Unilateral decisions regarding withdrawals, especially of Soviet armed forces from Eastern Europe, partly solve one of the main problems which has been frozen into place by the Treaty: the linkage of approaches to reductions with simplicity of verification. There is a consensus among experts that verification would be simplified and its effectiveness enhanced by requiring the complete removal of military formations. It is widely accepted that monitoring regimental or brigade disbandonment, for example, would be substantially easier than monitoring salami-type reductions within a given formation, such as reductions of a portion of the tanks from several divisions or brigades. This latter type of reduction has not been ruled out by the Treaty and thus has the potential for creating an added burden for monitoring tasks with the absence of a highly intrusive verification regime.

The 'thinning-out' approach—stipulating various zones wherein different concentrations of TLE are allowed—was supported by many states parties for a long period of time and, as a result, is included in the Treaty regime. With a reduction of a few per cent of tank holdings, units will be maintained albeit with some fluctuations in numbers and types of TLE resulting from repairs and replacement.

Plans of many states parties to restructure their force potentials present a problem for verification even with the strong information-exchange regime. For example, the creation of new units with reduced holdings of armaments and equipment would complicate monitoring. Part of the solution lies in agreed ceilings on manpower if the follow-on negotiations succeed. Without this one may expect an increase in units as the unlimited number of personnel can be assigned for support.

VI. Residual levels

As the foregoing makes apparent, one of the most difficult problems for verification will emerge after reductions of TLE and subsequent changes in the size, location and disposition of armed forces. As was written well before the signature of the CFE Treaty 'monitoring the reduction and destruction of existing [conventional] weapons is a relatively simple task'.[214] This is especially true in that the Treaty has provided for an unlimited number of inspections to witness such reductions. There is a more basic requirement to know the post-reduction location, designation and subordination of the units within which TLE operate, the locations and manner in which they are stored, and the sites from which they are exported. Here it is of special importance to know the structure of the forces within which TLE forms an active component. Thus there is more of a necessity to know about, say, specific units with TLE rather than the amount of TLE in repair depots.

The main concern of a number of states parties which was reflected during negotiations is rather to verify residual levels to maintain the balance than to verify withdrawals. Overwhelmed by this concern, some countries even

[214] Oelrich (note 130), p. 7.

conditioned their willingness to proceed on the restriction of the verification regime exclusively to residual ceilings.[215] Several requirements for verification, like definitions and counting rules, had to be oriented specifically to count residual levels. Though such 'one-sided' views have not dominated in the Treaty, this attitude may reflect priorities in verification, at least of some states parties.

There are similarities in monitoring problems with regards to verifying ceilings in the ATTU area, in the sub-zones and in any single country. One important basic similarity is the impossibility of verifying the precise number of TLE items. Another is the difficulty in defining the exact location of any substantial number of a certain TLE category at a given moment. Thereby, the main requirement will be to get the information, including that obtained by OSI, and to fix as precisely as possible the numbers and location of TLE to avoid the possibility of a militarily significant violation.

[215] For example, according to a member of the Canadian delegation, Canada wanted to count and verify only the residual levels after reductions. As for current data, they would have been dealt with informally in creating the definitions and counting rules. (*Arms Control Reporter*, 1989, sheet 407.B.159.)

12. Past verification experience and the Treaty

The character of the Treaty itself and corresponding verification problems and activities are obviously unique. This does not mean, of course, that past verification experiences with other arms control agreements should be forgotten. On the contrary, many common and specific previous practices and experience with them should be closely considered, especially by those who are responsible for successful Treaty ratification and implementation. Thereby it is appropriate to refer to some lessons learned from major arms control enterprises such as the SALT agreements, the INF Treaty, agreements between Egypt and Israel, the Western European Union experience, and so on.[216] This is of particular importance for understanding the synergistic effects of some modes of verification which are useful for several treaties at once (NTM in particular) and other political factors. A number of factors have proved to be stimulants for effective verification regimes. Some of those which can be considered of particular relevance for the verification activities associated with the CFE Treaty are discussed below.

Creation of a supranational body for examining and eventually solving problems of implementing an agreement and which provides 'checks and balances' for technical verification and monitoring has proved to have positive impact on a successful treaty regime. Ambiguities caused by inadequacy of the available data can in principle be solved, and measures to enhance data collection from NTM, for example, can be evaluated. The importance of such bodies and one of their main contributions to other, subsequent arms control agreements stems from the acknowledgement that the states parties should adjust agreements to developments not foreseen during negotiations.

Problem-solving approaches within a supranational body are needed mainly in three cases:

1. Ambiguous activity and clear treaty language: in this case states parties should not rush to judgement based on insufficient evidence and should solve a problem within a body which can thus serve its intended purposes.
2. Ambiguous activity and ambiguous treaty language: in this case the language should be clarified; this might involve a supranational body.
3. Clear non-compliance activity and ambiguous treaty language: in this case the problem is to be solved by political means; this requires a favourable political environment for the effective functioning of a supranational body.

The fourth possible case—clear treaty language *and* clear non-compliance—should present fewer problems but may nonetheless have to be dealt with. Thus, the compliance record of, say, the SALT agreements emphasized the need for maximum unambiguous language with further clarification by a

[216] Methodological lessons learned from the experience of other verification regimes are documented in Kokoski and Koulik (note 28), part III.

Standing Consultative Commission (SCC)–Joint Consultative Group (JCG)-type body when possible. It should be stressed that the negotiations in Vienna did a very thorough job in providing clarifications, and the results should thus be apparent in the implementation process.

To protect sensitive intelligence-gathering systems it is often deemed desirable to phrase provisions to protect the source and/or the precision of the supporting information. It may also be important to take account of the availability of more than one source of information in formulating the verification tasks. At the same time, the Treaty itself may rely more on acknowledged and less sensitive means. The sensitivity of data and discussions of their possible dissemination could also be discussed by a JCG-type body.

The Sinai Field Mission[217] showed how the technological limitations, given that the verification system was complementary to national intelligence, could be compensated for by using joint bodies (e.g., the Joint Commission) and related procedures to resolve compliance issues. Intensive military contacts (through the Joint Egyptian–Israeli Military Commission which took responsibility for implementing and co-ordinating the military realignment, disengagement and disarmament in the Sinai) also helped to resolve military disputes. It is important to note that the various systems and methods were adequately integrated into one operational system, which strengthened the verification of compliance. The involvement of several parties demanded a high degree of co-operation and co-ordination to enable a combination of forces to work together.

Analysis of the effectiveness of the problem-solving approaches of a supranational body leads to two conclusions. First, this kind of body must be given strong powers to deal adequately with clear violations not acknowledged by the offending state party. Second, the work of the body is influenced by the political climate. Its effectiveness is dependent on the readiness of the participants to clarify and solve ambiguities which remain in the treaty. Thus, even with an adequate supply of data, the problem-solving activities could be considerably hampered by non-technical factors.

With past verification experience relying to a large extent on information acquired through NTM, the role of assumptions and methodology and their effect on perceptions of compliance has certainly been substantial. This has often led to ambiguous estimates of treaty-related activities. The increasing role of OSI has and will doubtless continue to be the primary source of clarification of these ambiguities. Past experience has reflected the absence of a precise and accepted degree of uncertainty in different cases. As an arms control agreement is a compromise between competing interests, it should inevitably clarify this degree of uncertainty or it would face many difficulties in solving ambiguities.

The definitions of allowed concealment, camouflage and denial practices can create particularly difficult questions of uncertainty. These difficulties caused by definitions and assumptions based perhaps on previous experience,

[217] See, for example, Koulik, S., ‘The “Sinai experience”’, Kokoski and Koulik (note 28), chapter 12.

which may be incomplete or in error, or simply not applicable, should be avoided if possible.

The placing of limits on such a large number of TLE items would seem to necessitate a highly intricate monitoring mechanism if an INF-type regime were to be applied. The large numbers of conventional weapons necessary to constitute an effective military potential, however, indicate that the monitoring uncertainty which might be acceptable could be somewhat larger than for the INF Treaty. This is true not only for uncertainty in the absolute number of weapons, which is obvious, but, more importantly, with regard to the uncertainty of these numbers as a proportion of the total. The main issue is the necessity to have a treaty verification regime function well within acceptable margins of error. The INF experience supplies an example of such a verification regime, but has rightly not been regarded as a precise mould on which to model a CFE verification regime.

The INF experience has shown that perimeter/portal monitoring (PPM) arrangements may not be useful for a CFE Treaty unless they limit military production. While PPM could be used as an alternative or complementary measure to short-notice inspections at secured storage areas, it may not be worth the added expense. Tagging schemes for TLE can complement short-notice inspections and make cheating more difficult at declared locations.

In the USA the OSI associated with CFE will be carried out by the On-Site Inspection Agency (OSIA)—the same body that has handled these activities for the INF Treaty. Addressing the issue of lessons learned from the INF experience which could be applied to other treaties, including those limiting conventional weapons, the Director of the Agency stated:

> It appeared at first glance to be quite a complicated treaty with a lot of complicated procedures. But in the actual [implementation] it all turned out to be very achievable. We met our time lines, we delivered the right numbers of people at the right time, both sides satisfied their obligations, and all treaty rights were protected. So the treaty ended up being a workable document.
>
> We learned lessons about funding, timing, team composition and airlift. Most of the lessons learned had to do with building an organization and creating an infrastructure to facilitate the inspection process.
>
> The inspections themselves turned out to be fairly straightforward events . . .
>
> We have learned lessons on training that we are prepared to apply to future treaties. One specific lesson has to do with mock inspections. Doing [these] practice inspections to test procedures was the most meaningful training we did. Clearly you have to bring people together, educate them on the treaty, their rights, the procedures and equipment.[218]

It is hoped that the implementation of the CFE Treaty will proceed as smoothly as the new climate of international co-operation has already allowed for the INF Treaty.

[218] Interview with Brig. Gen. Roland Lajoie, Director, OSIA, in *Defense News*, 26 Nov. 1990, p. 30.

13. Conclusions

Given the dynamic political climate in which it must operate, the CFE Treaty presents a number of challenges and opportunities to the effective operation of the verification regime. As illustrated in the explication and analysis of the Treaty presented here, new and important breakthroughs in verification have occurred with its signature.

The CFE verification regime has seen the ground-breaking introduction of challenge on-site inspection of non-declared areas. Although these may be refused, appropriate assurances must then be forthcoming. Aerial overflights will be negotiated to further enhance the latter stages of the verification process where the important task of monitoring residual levels will occur. Possibilities of multinational technical means to further improve monitoring and solidify co-operation among many of the states parties appear quite feasible in the years ahead. The multilateral nature of the regime, including countries without the sophisticated NTM available to the USA and the USSR, makes these measures particularly necessary.

Detailed information exchange, including data not only on numbers and locations of TLE, but also on overall force structures, provides a breakthrough in transparency, substantially aiding the overall verification process as well as contributing to reinforcing a positive political climate to resolve any ambiguities or problems which may arise. Importantly, such information will continue to be exchanged in a periodic manner throughout the lifetime of the Treaty. Moves towards the defensive orientation of forces have been included through such measures as zonal constraints and quantitative limits on bridging equipment, for example. These elements will, of course, place an increased burden on the monitoring and verification structure, but their inclusion plays an important role in ensuring that the objectives of the mandate are fulfilled and, as has been discussed, the monitoring regime has been defined to deal effectively with these measures.

More stringent verification measures which had been advocated by some of the participants and other outside experts at various stages were, however, not adopted. Restrictions on manpower have been postponed but the CFE IA follow-on talks, which formally opened on 26 November 1990, will attempt to deal with this issue. The verification problems associated with manpower are different in several ways from those dealing mainly with hardware and thus the decision to deal with the issue in the CFE IA talks can be seen as appropriate. Production monitoring proved to be intractable at this first stage but may yet follow in later negotiations. Monitoring methods have been developed to deal specifically and effectively with production monitoring as demonstrated by the INF Treaty. Thus, should the political will be present at some future stage, the associated verification procedures should be amenable to rapid and appropriate inclusion in follow-on talks. It should also be

mentioned that, although resolution of the increasingly important qualitative elements associated with conventional weaponry was not the subject of this first agreement and were thus not dealt with, it must be recognized that these aspects should be given high priority in the near future.

Nonetheless, the Treaty and its monitoring regime have dealt in a surprisingly effective manner with a large and complex array of weaponry. Of course, the different types of TLE involved each have inherent individual problems associated with appropriately monitoring their location and movements and these are thoroughly discussed in this report.

In light of the overall analysis, it is concluded that the CFE Treaty verification regime is adequate to detect militarily significant violations, defined in terms of the original aims of the Treaty, in time to make possible an appropriate response. In terms of the achievement of priorities of the mandate, namely the elimination of the capability for launching a surprise attack and initiating large-scale offensive action, the vast ongoing restructuring of conventional forces implies that the monitoring regime will provide more than adequate warning of the redeployments which would be necessary, in the Central European theatre in particular.

One of the main challenges for the verification regime will of necessity involve implementation arrangements associated with the multilateral character of the Treaty. Parties are not yet fully prepared for the information management which will be necessary, but care should be taken to maximize these structures towards the goal of a smoothly functioning verification regime. In particular, methods should be directed towards minimizing potential difficulties involving communication between national and multinational verification bodies. In this respect the initial problems with respect to ambiguities associated with Soviet behaviour could perhaps be seen in a positive light as giving a breathing space and preventing rushing ahead with hastily prepared procedures. Confidence has also perhaps increased that further challenges which may involve minimal ambiguities in the Treaty and associated differences in interpretation such as those which have already surfaced may be readily solved.

However, with the break-up of the WTO, concerns that were not imagined at the outset of the CFE Negotiation have now come to the fore. The provision of adequate monitoring of relatively small military movements or buildups that may threaten individual states or groups within states has become a very prominent issue. Concerns such as these will involve monitoring of conventional forces on a much smaller scale than the verification structure put in place by the CFE Treaty has been designed to deal with adequately. To alleviate this type of security concern of many European nations, especially those previously allied with the USSR, even more bold and radical measures may be required. This will necessitate a re-examination of priorities in terms of rapid changes in overall force structures and the manner in which they can be satisfactorily monitored. Thus, while basic overall conventional parity will be achieved in Europe in the next few years, there remains much to be

accomplished to ensure that this leads to an increasingly stable force structure in the future.

Although the ratification of the CFE Treaty is still not assured at the time of writing, the signing of such an intricate agreement in an astonishingly short period of time has in any case provided rich lessons for future monitoring of conventional arms control in Europe. In addition, many aspects of the verification regime may well serve as a model for other regions where large and expanding conventional potential is becoming cause for increasing concern.

Appendix A. Treaty on Conventional Armed Forces in Europe

Paris, 19 November 1990

The Kingdom of Belgium, the People's Republic of Bulgaria, Canada, the Czech and Slovak Federal Republic, the Kingdom of Denmark, the French Republic, the Federal Republic of Germany, the Hellenic Republic, the Republic of Hungary, the Republic of Iceland, the Italian Republic, the Grand Duchy of Luxembourg, the Kingdom of the Netherlands, the Kingdom of Norway, the Republic of Poland, the Portuguese Republic, Romania, the Kingdom of Spain, the Republic of Turkey, the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland and the United States of America, hereinafter referred to as the States Parties,

Guided by the Mandate for Negotiation on Conventional Armed Forces in Europe of January 10, 1989, and having conducted this negotiation in Vienna beginning on March 9, 1989,

Guided by the objectives and the purposes of the Conference on Security and Cooperation in Europe, within the framework of which the negotiation of this Treaty was conducted,

Recalling their obligation 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 and principles of the Charter of the United Nations,

Conscious of the need to prevent any military conflict in Europe,

Conscious of the common responsibility which they all have for seeking to achieve greater stability and security in Europe,

Striving to replace military confrontation with a new pattern of security relations among all the States Parties based on peaceful cooperation and thereby to contribute to overcoming the division of Europe,

Committed to the objectives of establishing a secure and stable balance of conventional armed forces in Europe at lower levels than heretofore, of eliminating disparities prejudicial to stability and security and of eliminating, as a matter of high priority, the capability for launching surprise attack and for initiating large-scale offensive action in Europe,

Recalling that they signed or acceded to the Treaty of Brussels of 1948, the Treaty of Washington of 1949 or the Treaty of Warsaw of 1955 and that they have the right to be or not to be a party to treaties of alliance,

Committed to the objective of ensuring that the numbers of conventional armaments and equipment limited by the Treaty within the area of application of this Treaty do not exceed 40 000 battle tanks, 60 000 armoured combat vehicles, 40 000 pieces of artillery, 13 600 combat aircraft and 4 000 attack helicopters,

Affirming that this Treaty is not intended to affect adversely the security interests of any State,

Affirming their commitment to continue the conventional arms control process including negotiations, taking into account future requirements for European stability and security in the light of political developments in Europe,

Have agreed as follows:

Article I

1. Each State Party shall carry out the obligations set forth in this Treaty in accordance with its provisions, including those obligations relating to the following five categories of conventional armed forces: battle tanks, armoured combat vehicles, artillery, combat aircraft and combat helicopters.

2. Each State Party also shall carry out the other measures set forth in this Treaty designed to ensure security and stability both during the period of reduction of conventional armed forces and after the completion of reductions.

3. This Treaty incorporates the Protocol on Existing Types of Conventional Armaments and Equipment, hereinafter referred to as the Protocol on Existing Types, with an Annex thereto; the Protocol on Procedures Governing the Reclassification of Specific Models or Versions of Combat-Capable Trainer Aircraft into Unarmed Trainer Aircraft, hereinafter referred to as the Protocol on Aircraft Reclassification; the Protocol on Procedures Governing the Reduction of Con

ventional Armaments and Equipment Limited by the Treaty on Conventional Armed Forces in Europe, hereinafter referred to as the Protocol on Reduction; the Protocol on Procedures Governing the Categorisation of Combat Helicopters and the Recategorisation of Multi-Purpose Attack Helicopters, hereinafter referred to as the Protocol on Helicopter Recategorisation; the Protocol on Notification and Exchange of Information, hereinafter referred to as the Protocol on Information Exchange, with an Annex on the Format for the Exchange of Information, hereinafter referred to as the Annex on Format; the Protocol on Inspection; the Protocol on the Joint Consultative Group; and the Protocol on the Provisional Application of Certain Provisions of the Treaty on Conventional Armed Forces in Europe, hereinafter referred to as the Protocol on Provisional Application. Each of these documents constitutes an integral part of this Treaty.

Article II

1. For the purposes of this Treaty:

(A) The term 'group of States Parties' means the group of States Parties that signed the Treaty of Warsaw[1] of 1955 consisting of the People's Republic of Bulgaria, the Czech and Slovak Federal Republic, the Republic of Hungary, the Republic of Poland, Romania and the Union of Soviet Socialist Republics, or the group of States Parties that signed or acceded to the Treaty of Brussels[2] of 1948 or the Treaty of Washington[3] of 1949 consisting of the Kingdom of Belgium, Canada, the Kingdom of Denmark, the French Republic, the Federal Republic of Germany, the Hellenic Republic, the Republic of Iceland, the Italian Republic, the Grand Duchy of Luxembourg, the Kingdom of the Netherlands, the Kingdom of Norway, the Portuguese Republic, the Kingdom of Spain, the Republic of Turkey, the United Kingdom of Great Britain and Northern Ireland and the United States of America.

(B) The term 'area of application' means the entire land territory of the States Parties in Europe from the Atlantic Ocean to the Ural Mountains, which includes all the European island territories of the States Parties, including the Faroe Islands of the Kingdom of Denmark, Svalbard including Bear Island of the Kingdom of Norway, the islands of Azores and Madeira of the Portuguese Republic, the Canary Islands of the Kingdom of Spain and Franz Josef Land and Novaya Zemlya of the Union of Soviet Socialist Republics. In the case of the Union of Soviet Socialist Republics, the area of application includes all territory lying west of the Ural River and the Caspian Sea. In the case of the Republic of Turkey, the area of application includes the territory of the Republic of Turkey north and west of a line extending from the point of intersection of the Turkish border with the 39th parallel to Muradiye, Patnos, Karayazi, Tekman, Kemaliye, Feke, Ceyhan, Dogankent, Gözne and thence to the sea.

(C) The term 'battle tank' means a self-propelled armoured fighting vehicle, capable of heavy fire power, primarily of a high muzzle velocity direct fire main gun necessary to engage armoured and other targets, with high cross-country mobility, with a high level of self-protection, and which is not designed and equipped primarily to transport combat troops. Such armoured vehicles serve as the principal weapon system of ground-force tank and other armoured formations.

Battle tanks are tracked armoured fighting vehicles which weigh at least 16.5 metric tonnes unladen weight and which are armed with a 360-degree traverse gun of at least 75 millimetres calibre. In addition, any wheeled armoured fighting vehicles entering into service which meet all the other criteria stated above shall be deemed battle tanks.

(D) The term 'armoured combat vehicle' means a self-propelled vehicle with armoured protection and cross-country capability. Armoured combat vehicles include armoured personnel carriers, armoured infantry fighting vehicles and heavy armament combat vehicles.

The term 'armoured personnel carrier' means an armoured combat vehicle which is designed and equipped to transport a combat infantry squad and which, as a rule, is armed with an integral or organic weapon of less than 20 millimetres calibre.

The term 'armoured infantry fighting vehicle' means an armoured combat vehicle which is designed and equipped primarily to transport a combat infantry squad, which normally provides the capability for the troops to deliver fire from inside the vehicle under armoured protection, and which is armed with an integral or organic cannon of at least 20 millimetres calibre and sometimes an antitank missile launcher.

Armoured infantry fighting vehicles serve as the principal weapon system of armoured infantry or mechanised infantry or motorised

infantry formations and units of ground forces.

The term 'heavy armament combat vehicle' means an armoured combat vehicle with an integral or organic direct fire gun of at least 75 millimetres calibre, weighing at least 6.0 metric tonnes unladen weight, which does not fall within the definitions of an armoured personnel carrier, or an armoured infantry fighting vehicle or a battle tank.

(E) The term 'unladen weight' means the weight of a vehicle excluding the weight of ammunition; fuel, oil and lubricants; removable reactive armour; spare parts, tools and accessories; removable snorkelling equipment; and crew and their personal kit.

(F) The term 'artillery' means large calibre systems capable of engaging ground targets by delivering primarily indirect fire. Such artillery systems provide the essential indirect fire support to combined arms formations.

Large calibre artillery systems are guns, howitzers, artillery pieces combining the characteristics of guns and howitzers, mortars and multiple launch rocket systems with a calibre of 100 millimetres and above. In addition, any future large calibre direct fire system which has a secondary effective indirect fire capability shall be counted against the artillery ceilings.

(G) The term 'stationed conventional armed forces' means conventional armed forces of a State Party that are stationed within the area of application on the territory of another State Party.

(H) The term 'designated permanent storage site' means a place with a clearly defined physical boundary containing conventional armaments and equipment limited by the Treaty, which are counted within overall ceilings but which are not subject to limitations on conventional armaments and equipment limited by the Treaty in active units.

(I) The term 'armoured vehicle launched bridge' means a self-propelled armoured transporter-launcher vehicle capable of carrying and, through built-in mechanisms, of emplacing and retrieving a bridge structure. Such a vehicle with a bridge structure operates as an integrated system.

(J) The term 'conventional armaments and equipment limited by the Treaty' means battle tanks, armoured combat vehicles, artillery, combat aircraft and attack helicopters subject to the numerical limitations set forth in Article IV, V and VI.

(K) The term 'combat aircraft' means a fixed-wing or variable-geometry wing aircraft armed and equipped to engage targets by employing guided missiles, unguided rockets, bombs, guns, cannons, or other weapons of destruction, as well as any model or version of such an aircraft which performs other military functions such as reconnaissance or electronic warfare. The term 'combat aircraft' does not include primary trainer aircraft.

(L) The term 'combat helicopter' means a rotary wing aircraft armed and equipped to engage targets or equipped to perform other military functions. The term 'combat helicopter' comprises attack helicopters and combat support helicopters. The term 'combat helicopter' does not include unarmed transport helicopters.

(M) The term 'attack helicopter' means a combat helicopter equipped to employ anti-armour, air-to-ground, or air-to-air guided weapons and equipped with an integrated fire control and aiming system for these weapons. The term 'attack helicopter' comprises specialised attack helicopters and multi-purpose attack helicopters.

(N) The term 'specialised attack helicopter' means an attack helicopter that is designed primarily to employ guided weapons.

(O) The term 'multi-purpose attack helicopter' means an attack helicopter designed to perform multiple military functions and equipped to employ guided weapons.

(P) The term 'combat support helicopter' means a combat helicopter which does not fulfill the requirements to qualify as an attack helicopter and which may be equipped with a variety of self-defence and area suppression weapons, such as guns, cannons and unguided rockets, bombs or cluster bombs, or which may be equipped to perform other military functions.

(Q) The term 'conventional armaments and equipment subject to the Treaty' means battle tanks, armoured combat vehicles, artillery, combat aircraft, primary trainer aircraft, unarmed trainer aircraft, combat helicopters, unarmed transport helicopters, armoured vehicle launched bridges, armoured personnel carrier look-alikes and armoured infantry fighting vehicle look-alikes subject to information exchange in accordance with the Protocol on Information Exchange.

(R) The term 'in service', as it applies to conventional armed forces and conventional armaments and equipment, means battle

tanks, armoured combat vehicles, artillery, combat aircraft, primary trainer aircraft, unarmed trainer aircraft, combat helicopters, unarmed transport helicopters, armoured vehicle launched bridges, armoured personnel carrier look-alikes and armoured infantry fighting vehicle look-alikes that are within the area of application, except for those that are held by organisations designed and structured to perform in peacetime internal security functions or that meet any of the exceptions set forth in Article III.

(S) The terms 'armoured personnel carrier look-alike' and 'armoured infantry fighting vehicle look-alike' mean an armoured vehicle based on the same chassis as, and externally similar to, an armoured personnel carrier or armoured infantry fighting vehicle, respectively, which does not have a cannon or gun of 20 millimetres calibre or greater and which has been constructed or modified in such a way as not to permit the transportation of a combat infantry squad. Taking into account the provisions of the Geneva Convention 'For the Amelioration of the Conditions of the Wounded and Sick in Armed Forces in the Field' of 12 August 1949 that confer a special status on ambulances, armoured personnel carrier ambulances shall not be deemed armoured combat vehicles or armoured personnel carrier look-alikes.

(T) The term 'reduction site' means a clearly designated location where the reduction of conventional armaments and equipment limited by the Treaty in accordance with Article VIII takes place.

(U) The term 'reduction liability' means the number in each category of conventional armaments and equipment limited by the Treaty that a State Party commits itself to reduce during the period of 40 months following the entry into force of this Treaty in order to ensure compliance with Article VII.

2. Existing types of conventional armaments and equipment subject to the Treaty are listed in the Protocol on Existing Types. The lists of existing types shall be periodically updated in accordance with Article XVI, paragraph 2, subparagraph (D) and Section IV of the Protocol on Existing Types. Such updates to the existing types lists shall not be deemed amendments to this Treaty.

3. The existing types of combat helicopters listed in the Protocol on Existing Types shall be categorised in accordance with Section I of the Protocol on Helicopter Recategorisation.

Article III

1. For the purposes of this Treaty, the States Parties shall apply the following counting rules:

All battle tanks, armoured combat vehicles, artillery, combat aircraft and attack helicopters, as defined in Article II, within the area of application shall be subject to the numerical limitations and other provisions set forth in Article IV, V and VI, with the exception of those which in a manner consistent with a State Party's normal practices:

(A) are in the process of manufacture, including manufacturing-related testing;

(B) are used exclusively for the purposes of research and development;

(C) belong to historical collections;

(D) are awaiting disposal, having been decommissioned from service in accordance with the provisions of Article IX;

(E) are awaiting, or are being refurbished for, export or re-export and are temporarily retained within the area of application. Such battle tanks, armoured combat vehicles, artillery, combat aircraft and attack helicopters shall be located elsewhere than at sites declared under the terms of Section V of the Protocol on Information Exchange or at no more than 10 such declared sites which shall have been notified in the previous year's annual information exchange. In the latter case, they shall be separately distinguishable from conventional armaments and equipment limited by the Treaty;

(F) are, in the case of armoured personnel carriers, armoured infantry fighting vehicles, heavy armament combat vehicles or multipurpose attack helicopters, held by organisations designed and structured to perform in peacetime internal security functions; or

(G) are in transit through the area of application from a location outside the area of application to a final destination outside the area of application, and are in the area of application for no longer than a total of seven days.

2. If, in respect of any such battle tanks, armoured combat vehicles, artillery, combat aircraft or attack helicopters, the notification of which is required under Section IV of the Protocol on Information Exchange, a State Party notifies an unusually high number in more than two successive annual information exchanges, it shall explain the reasons in the Joint Consultative Group, if so required.

Article IV

1. Within the area of application, as defined in Article II, each State Party shall limit and, as necessary, reduce its battle tanks, armoured combat vehicles, artillery, combat aircraft and attack helicopters so that, 40 months after entry into force of this Treaty and thereafter, for the group of States Parties to which it belongs, as defined in Article II, the aggregate numbers do not exceed:

(A) 20 000 battle tanks, of which no more than 16 500 shall be in active units;

(B) 30 000 armoured combat vehicles, of which no more than 27 300 shall be in active units. Of the 30 000 armoured combat vehicles, no more than 18 000 shall be armoured infantry fighting vehicles and heavy armament combat vehicles; of armoured infantry fighting vehicles and heavy armament combat vehicles, no more than 1 500 shall be heavy armament combat vehicles;

(C) 20 000 pieces of artillery, of which no more than 17 000 shall be in active units;

(D) 6800 combat aircraft; and

(E) 2000 attack helicopters.

Battle tanks, armoured combat vehicles and artillery not in active units shall be placed in designated permanent storage sites, as defined in Article II, and shall be located only in the area described in paragraph 2 of this Article. Such designated permanent storage sites may also be located in that part of the territory of the Union of Soviet Socialist Republics comprising the Odessa Military District and the southern part of the Leningrad Military District. In the Odessa Military District, no more than 400 battle tanks and no more than 500 pieces of artillery may be thus stored. In the southern part of the Leningrad Military District, no more than 600 battle tanks, no more than 800 armoured combat vehicles, including no more than 300 armoured combat vehicles of any type with the remaining number consisting of armoured personnel carriers, and no more than 400 pieces of artillery may be thus stored. The southern part of the Leningrad Military District is understood to mean the territory within that Military District south of the line East–West 60 degrees 15 minutes northern latitude.

2. Within the area consisting of the entire land territory in Europe, which includes all the European island territories, of the Kingdom of Belgium, the Czech and Slovak Federal Republic, the Kingdom of Denmark including the Faroe Islands, the French Republic, the Federal Republic of Germany, the Republic of Hungary, the Italian Republic, the Grand Duchy of Luxembourg, the Kingdom of the Netherlands, the Republic of Poland, the Portuguese Republic including the islands of Azores and Madeira, the Kingdom of Spain including the Canary Islands, the United Kingdom of Great Britain and Northern Ireland and that part of the territory of the Union of Soviet Socialist Republics west of the Ural Mountains comprising the Baltic, Byelorussian, Carpathian, Kiev, Moscow and Volga–Ural Military Districts, each State Party shall limit and, as necessary, reduce its battle tanks, armoured combat vehicles and artillery so that, 40 months after entry into force of this Treaty and thereafter, for the group of States Parties to which it belongs the aggregate numbers do not exceed:

(A) 15 300 battle tanks, of which no more than 11 800 shall be in active units;

(B) 24 100 armoured combat vehicles, of which no more than 21 400 shall be in active units; and

(C) 14 000 pieces of artillery, of which no more than 11 000 shall be in active units.

3. Within the area consisting of the entire land territory in Europe, which includes all the European island territories, of the Kingdom of Belgium, the Czech and Slovak Federal Republic, the Kingdom of Denmark including the Faroe Islands, the French Republic, the Federal Republic of Germany, the Republic of Hungary, the Italian Republic, the Grand Duchy of Luxembourg, the Kingdom of the Netherlands, the Republic of Poland, the United Kingdom of Great Britain and Northern Ireland and that part of the territory of the Union of Soviet Socialist Republics comprising the Baltic, Byelorussian, Carpathian and Kiev Military Districts, each State Party shall limit and, as necessary, reduce its battle tanks, armoured combat vehicles and artillery so that, 40 months after the entry into force of this Treaty and thereafter, for the group of States Parties to which it belongs the aggregate numbers in active units do not exceed:

(A) 10 300 battle tanks;

(B) 19 260 armoured combat vehicles;

(C) 9100 pieces of artillery; and

(D) in the Kiev Military District, the aggregate numbers in active units and designated permanent storage sites together shall not exceed:

(1) 2250 battle tanks;

(2) 2500 armoured combat vehicles; and

(3) 1500 pieces of artillery.

4. Within the area consisting of the entire land territory in Europe, which includes all the European island territories, of the Kingdom of Belgium, the Czech and Slovak Federal Republic, the Federal Republic of Germany, the Republic of Hungary, the Grand Duchy of Luxembourg, the Kingdom of the Netherlands and the Republic of Poland, each State Party shall limit and, as necessary, reduce its battle tanks, armoured combat vehicles and artillery so that, 40 months after entry into force of this Treaty and thereafter, for the group of States Parties to which it belongs the aggregate numbers in active units do not exceed:

(A) 7500 battle tanks;

(B) 11 250 armoured combat vehicles; and

(C) 5000 pieces of artillery.

5. States Parties belonging to the same group of States Parties may locate battle tanks, armoured combat vehicles and artillery in active units in each of the areas described in this Article and Article V, paragraph 1, subparagraph (A), up to the numerical limitations applying in that area, consistent with the maximum levels for holdings notified pursuant to Article VII and provided that no State Party stations conventional armed forces on the territory of another State Party without the agreement of that State Party.

6. If a group of States Parties' aggregate numbers of battle tanks, armoured combat vehicles and artillery in active units within the area described in paragraph 4 of this Article are less than the numerical limitations set forth in paragraph 4 of this Article, and provided that no State Party is thereby prevented from reaching its maximum levels for holdings notified in accordance with Article VII, paragraphs 2, 3 and 5, then amounts equal to the difference between the aggregate numbers in each of the categories of battle tanks, armoured combat vehicles and artillery and the specified numerical limitations for that area may be located by States Parties belonging to that group of States Parties in the area described in paragraph 3 of this Article, consistent with the numerical limitations specified in paragraph 3 of this Article.

Article V

1. To ensure that the security of each State Party is not affected adversely at any stage:

(A) within the area consisting of the entire land territory in Europe, which includes all the European island territories, of the People's Republic of Bulgaria, the Hellenic Republic, the Republic of Iceland, the Kingdom of Norway, Romania, the part of the Republic of Turkey within the area of application and that part of the Union of Soviet Socialist Republics comprising the Leningrad, Odessa, Transcaucasus and North Caucasus Military Districts, each State Party shall limit and, as necessary, reduce its battle tanks, armoured combat vehicles and artillery so that, 40 months after the entry into force of this Treaty and thereafter, for the group of States Parties to which it belongs the aggregate numbers in active units do not exceed the difference between the overall numerical limitations set forth in Article IV, paragraph 1 and those in Article IV, paragraph 2, that is:

(1) 4700 battle tanks;

(2) 5900 armoured combat vehicles; and

(3) 6000 pieces of artillery;

(B) notwithstanding the numerical limitations set forth in subparagraph (A) of this paragraph, a State Party or States Parties may on a temporary basis deploy into the territory belonging to the members of the same group of States Parties within the area described in subparagraph (A) of this paragraph additional aggregate numbers in active units for each group of States Parties not to exceed:

(1) 459 battle tanks;

(2) 723 armoured combat vehicles; and

(3) 420 pieces of artillery; and

(C) provided that for each group of States Parties no more than one-third of each of these additional aggregate numbers shall be deployed to any State Party with territory within the area described in subparagraph (A) of this paragraph, that is:

(1) 153 battle tanks;

(2) 241 armoured combat vehicles; and

(3) 140 pieces of artillery.

2. Notification shall be provided to all other States Parties no later than at the start of the deployment by the State Party or States Parties conducting the deployment and by the recipient State Party or States Parties, specifying the total number of each category of battle tanks, armoured combat vehicles and artillery deployed. Notification also shall be provided to all other States Parties by the State Party or States Parties conducting the deployment and by the recipient State Party or States Parties within 30 days of the withdrawal of those battle tanks, armoured combat vehicles and artillery that were temporar-

ily deployed.

Article VI

With the objective of ensuring that no single State Party possesses more than approximately one-third of the conventional armaments and equipment limited by the Treaty within the area of application, each State Party shall limit and, as necessary, reduce its battle tanks, armoured combat vehicles, artillery, combat aircraft and attack helicopters so that, 40 months after entry into force of this Treaty and thereafter, the numbers within the area of application for that State Party do not exceed:

(A) 13 300 battle tanks;
(B) 20 000 armoured combat vehicles
(C) 13 700 pieces of artillery;
(D) 5150 combat aircraft; and
(E) 1500 attack helicopters.

Article VII

1. In order that the limitations set forth in Articles IV, V and VI are not exceeded, no State Party shall exceed, from 40 months after the entry into force of this Treaty, the maximum levels which it has previously agreed upon within its group of States Parties, in accordance with paragraph 7 of this Article, for its holdings of conventional armaments and equipment limited by the Treaty and of which it has provided notification pursuant to the provisions of this Article.

2. Each State Party shall provide at the signature of this Treaty notification to all other States Parties of the maximum levels for its holdings of conventional armaments and equipment limited by the Treaty. The notification of the maximum levels for holdings of conventional armaments and equipment limited by the Treaty provided by each State Party at the signature of this Treaty shall remain valid until the date specified in a subsequent notification pursuant to paragraph 3 of this Article.

3. In accordance with the limitations set forth in Articles IV, V and VI, each State Party shall have the right to change the maximum levels for its holdings of conventional armaments and equipment limited by the Treaty. Any change in the maximum levels for holdings of a State Party shall be notified by that State Party to all other States Parties at least 90 days in advance of the date, specified in the notification, on which such a change takes effect. In order not to exceed any of the limitations set forth in Articles IV and V, any increase in the maximum levels for holdings of a State Party that would otherwise cause those limitations to be exceeded shall be preceded or accompanied by a corresponding reduction in the previously notified maximum levels for holdings of conventional armaments and equipment limited by the Treaty of one or more States Parties belonging to the same group of States Parties. The notification of a change in the maximum levels for holdings shall remain valid from the date specified in the notification until the date specified in a subsequent notification of change pursuant to this paragraph.

4. Each notification required pursuant to paragraph 2 or 3 of this Article for armoured combat vehicles shall also include maximum levels for the holdings of armoured infantry fighting vehicles and heavy armament combat vehicles of the State Party providing the notification.

5. Ninety days before expiration of the 40-month period of reductions set forth in Article VIII and subsequently at the time of any notification of a change pursuant to paragraph 3 of this Article, each State Party shall provide notification of the maximum levels for its holdings of battle tanks, armoured combat vehicles and artillery with respect to each of the areas described in Article IV, paragraphs 2 to 4 and Article V, paragraph 1, subparagraph (A).

6. A decrease in the numbers of conventional armaments and equipment limited by the Treaty held by a State Party and subject to notification pursuant to the Protocol on Information Exchange shall by itself confer no right on any other State Party to increase the maximum levels for its holdings subject to notification pursuant to this Article.

7. It shall be the responsibility solely of each individual State Party to ensure that the maximum levels for its holdings notified pursuant to the provisions of this Article are not exceeded. States Parties belonging to the same group of States Parties shall consult in order to ensure that the maximum levels for holdings notified pursuant to the provisions of this Article, taken together as appropriate, do not exceed the limitations set forth in Articles IV, V and VI.

Article VIII

1. The numerical limitations set forth in Articles IV, V and VI shall be achieved only by means of reduction in accordance with the Protocol on Reduction, the Protocol on Helicopter Recategorisation, the Protocol on Air-

craft Reclassification, the Footnote to Section I, paragraph 2, subparagraph (A) of the Protocol on Existing Types and the Protocol on Inspection.

2. The categories of conventional armaments and equipment subject to reductions are battle tanks, armoured combat vehicles, artillery, combat aircraft and attack helicopters. The specific types are listed in the Protocol on Existing Types.

(A) Battle tanks and armoured combat vehicles shall be reduced by destruction, conversion for non-military purposes, placement on static display, use as ground targets, or, in the case of armoured personnel carriers, modification in accordance with the Footnote to Section I, paragraph 2, subparagraph (A) of the Protocol on Existing Types.

(B) Artillery shall be reduced by destruction or placement on static display, or, in the case of self-propelled artillery, by use as ground targets.

(C) Combat aircraft shall be reduced by destruction, placement on static display, use for ground instructional purposes, or, in the case of specific models or versions of combat-capable trainer aircraft, reclassification into unarmed trainer aircraft.

(D) Specialised attack helicopters shall be reduced by destruction, placement on static display, or use for ground instructional purposes.

(E) Multi-purpose attack helicopters shall be reduced by destruction, placement on static display, use for ground instructional purposes, or recategorisation.

3. Conventional armaments and equipment limited by the Treaty shall be deemed to be reduced upon execution of the procedures set forth in the Protocols listed in paragraph 1 of this Article and upon notification as required by these Protocols. Armaments and equipment so reduced shall no longer be counted against the numerical limitations set forth in Articles IV, V and VI.

4. Reductions shall be effected in three phases and completed no later than 40 months after entry into force of this Treaty, so that:

(A) by the end of the first reduction phase, that is, no later than 16 months after entry into force of this Treaty, each State Party shall have ensured that at least 25 percent of its total reduction liability in each of the categories of conventional armaments and equipment limited by the Treaty has been reduced;

(B) by the end of the second reduction phase, that is, no later than 28 months after entry into force of this Treaty, each State Party shall have ensured that at least 60 percent of its total reduction liability in each of the categories of conventional armaments and equipment limited by the Treaty has been reduced;

(C) by the end of the third reduction phase, that is, no later than 40 months after entry into force of this Treaty, each State Party shall have reduced its total reduction liability in each of the categories of conventional armaments and equipment limited by the Treaty. States Parties carrying out conversion for non-military purposes shall have ensured that the conversion of all battle tanks in accordance with Section VIII of the Protocol on Reduction shall have been completed by the end of the third reduction phase; and

(D) armoured combat vehicles deemed reduced by reason of having been partially destroyed in accordance with Section VIII, paragraph 6 of the Protocol on Reduction shall have been fully converted for non-military purposes, or destroyed in accordance with Section IV of the Protocol on Reduction, no later than 64 months after entry into force of this Treaty.

5. Conventional armaments and equipment limited by the Treaty to be reduced shall have been declared present within the area of application in the exchange of information at signature of this Treaty.

6. No later than entry into force of this Treaty, each State Party shall provide notification to all other States Parties of its reduction liability.

7. Except as provided for in paragraph 8 of this Article, a State Party's reduction liability in each category shall be no less than the difference between its holdings notified, in accordance with the Protocol on Information Exchange, at signature or effective upon entry into force of this Treaty, whichever is the greater, and the maximum levels for holdings it notified pursuant to Article VII.

8. Any subsequent revision of a State Party's holdings notified pursuant to the Protocol on Information Exchange or of its maximum levels for holdings notified pursuant to Article VII shall be reflected by a notified adjustment to its reduction liability. Any notification of a decrease in a State Party's reduction liability shall be preceded or accompanied by either a notification of a corresponding increase in holdings not exceeding the maximum levels for holdings notified pursuant to Article VII by one or more States Parties belonging to the same

group of States Parties, or a notification of a corresponding increase in the reduction liability of one or more such States Parties.

9. Upon entry into force of this Treaty, each State Party shall notify all other States Parties, in accordance with the Protocol on Information Exchange, of the locations of its reduction sites, including those where the final conversion of battle tanks and armoured combat vehicles for non-military purposes will be carried out.

10. Each State Party shall have the right to designate as many reduction sites as it wishes, to revise without restriction its designation of such sites and to carry out reduction and final conversion simultaneously at a maximum of 20 sites. States Parties shall have the right to share or co-locate reduction sites by mutual agreement.

11. Notwithstanding paragraph 10 of this Article, during the baseline validation period, that is, the interval between entry into force of this Treaty and 120 days after entry into force of this Treaty, reduction shall be carried out simultaneously at no more than two reduction sites for each State Party.

12. Reduction of conventional armaments and equipment limited by the Treaty shall be carried out at reduction sites, unless otherwise specified in Protocols listed in paragraph 1 of this Article, within the area of application.

13. The reduction process, including the results of the conversion of conventional armaments and equipment limited by the Treaty for non-military purposes both during the reduction period and in the 24 months following the reduction period, shall be subject to inspection, without right of refusal, in accordance with the Protocol on Inspection.

Article IX

1. Other than removal from service in accordance with the provisions of Article VIII, battle tanks, armoured combat vehicles, artillery, combat aircraft and attack helicopters within the area of application shall be removed from service only by decommissioning, provided that:

(A) such conventional armaments and equipment limited by the Treaty are decommissioned and awaiting disposal at no more than eight sites which shall be notified as declared sites in accordance with the Protocol on Information Exchange and shall be identified in such notifications as holding areas for decommissioned conventional armaments and equipment limited by the Treaty. If sites containing conventional armaments and equipment limited by the Treaty decommissioned from service also contain any other conventional armaments and equipment subject to the Treaty, the decommissioned conventional armaments and equipment limited by the Treaty shall be separately distinguishable; and

(B) the numbers of such decommissioned conventional armaments and equipment limited by the Treaty do not exceed, in the case of any individual State Party, one percent of its notified holdings of conventional armaments and equipment limited by the Treaty, or a total of 250, whichever is greater, of which no more than 200 shall be battle tanks, armoured combat vehicles and pieces of artillery, and no more than 50 shall be attack helicopters and combat aircraft.

2. Notification of decommissioning shall include the number and type of conventional armaments and equipment limited by the Treaty decommissioned and the location of decommissioning and shall be provided to all other States Parties in accordance with Section IX, paragraph 1, subparagraph (B) of the Protocol on Information Exchange.

Article X

1. Designated permanent storage sites shall be notified in accordance with the Protocol on Information Exchange to all other States Parties by the State Party to which the conventional armaments and equipment limited by the Treaty contained at designated permanent storage sites belong. The notification shall include the designation and location, including geographic coordinates, of designated permanent storage sites and the numbers by type of each category of its conventional armaments and equipment limited by the Treaty at each such storage site.

2. Designated permanent storage sites shall contain only facilities appropriate for the storage and maintenance of armaments and equipment (e.g., warehouses, garages, workshops and associated stores as well as other support accommodation). Designated permanent storage sites shall not contain firing ranges or training areas associated with conventional armaments and equipment limited by the Treaty. Designated permanent storage sites shall contain only armaments and equipment belonging to the conventional armed forces of a State Party.

3. Each designated permanent storage site shall have a clearly defined physical bound-

ary that shall consist of a continuous perimeter fence at least 1.5 metres in height. The perimeter fence shall have no more than three gates providing the sole means of entrance and exit for armaments and equipment.

4. Conventional armaments and equipment limited by the Treaty located within designated permanent storage sites shall be counted as conventional armaments and equipment limited by the Treaty not in active units, including when they are temporarily removed in accordance with paragraphs 7, 8, 9 and 10 of this Article. Conventional armaments and equipment limited by the Treaty in storage and other than in designated permanent storage sites shall be counted as conventional armaments and equipment limited by the Treaty in active units.

5. Active units or formations shall not be located within designated permanent storage sites, except as provided for in paragraph 6 of this Article.

6. Only personnel associated with the security or operation of designated permanent storage sites, or the maintenance of the armaments and equipment stored therein, shall be located within the designated permanent storage sites.

7. For the purpose of maintenance, repair or modification of conventional armaments and equipment limited by the Treaty located within designated permanent storage sites, each State Party shall have the right, without prior notification, to remove from and retain outside designated permanent storage sites simultaneously up to 10 percent, rounded up to the nearest even whole number, of the notified holdings of each category of conventional armaments and equipment limited by the Treaty in each designated permanent storage site, or 10 items of the conventional armaments and equipment limited by the Treaty in each category in each designated permanent storage site, whichever is less.

8. Except as provided for in paragraph 7 of this Article, no State Party shall remove conventional armaments and equipment limited by the Treaty from designated permanent storage sites unless notification has been provided to all other States Parties at least 42 days in advance of such removal. Notification shall be given by the State Party to which the conventional armaments and equipment limited by the Treaty belong. Such notification shall specify:

(A) the location of the designated permanent storage site from which conventional armaments and equipment limited by the Treaty are to be removed and the numbers by type of conventional armaments and equipment limited by the Treaty of each category to be removed;

(B) the dates of removal and return of conventional armaments and equipment limited by the Treaty; and

(C) the intended location and use of conventional armaments and equipment limited by the Treaty while outside the designated permanent storage site.

9. Except as provided for in paragraph 7 of this Article, the aggregate number of conventional armaments and equipment limited by the Treaty removed from and retained outside designated permanent storage sites by States Parties belonging to the same group of States Parties shall at no time exceed the following levels:

(A) 550 battle tanks;

(B) 1000 armoured combat vehicles; and

(C) 300 pieces of artillery.

10. Conventional armaments and equipment limited by the Treaty removed from designated permanent storage sites pursuant to paragraphs 8 and 9 of this Article shall be returned to designated permanent storage sites no later than 42 days after their removal, except for those items of conventional armaments and equipment limited by the Treaty removed for industrial rebuild. Such items shall be returned to designated permanent storage sites immediately on completion of the rebuild.

11. Each State Party shall have the right to replace conventional armaments and equipment limited by the Treaty located in designated permanent storage sites. Each State Party shall notify all other States Parties, at the beginning of replacement, of the number, location, type and disposition of conventional armaments and equipment limited by the Treaty being replaced.

Article XI

1. Each State Party shall limit its armoured vehicle launched bridges so that, 40 months after entry into force of this Treaty and thereafter, for the group of States Parties to which it belongs the aggregate number of armoured vehicle launched bridges in active units within the area of application does not exceed 740.

2. All armoured vehicle launched bridges within the area of application in excess of the aggregate number specified in paragraph 1 of this Article for each group of States Parties shall be placed in designated permanent stor-

age sites, as defined in Article II. When armoured vehicle launched bridges are placed in a designated permanent storage site, either on their own or together with conventional armaments and equipment limited by the Treaty, Article X, paragraphs 1 to 6 shall apply to armoured vehicle launched bridges as well as to conventional armaments and equipment limited by the Treaty. Armoured vehicle launched bridges placed in designated permanent storage sites shall not be considered as being in active units.

3. Except as provided for in paragraph 6 of this Article, armoured vehicle launched bridges may be removed, subject to the provisions of paragraphs 4 and 5 of this Article, from designated permanent storage sites only after notification has been provided to all other States Parties at least 42 days prior to such removal. This notification shall specify:

(A) the locations of the designated permanent storage sites from which armoured vehicle launched bridges are to be removed and the numbers of armoured vehicle launched bridges to be removed from each such site;

(B) the dates of removal of armoured vehicle launched bridges from and return to designated permanent storage sites; and

(C) the intended use of armoured vehicle launched bridges during the period of their removal from designated permanent storage sites.

4. Except as provided for in paragraph 6 of this Article, armoured vehicle launched bridges removed from designated permanent storage sites shall be returned to them no later than 42 days after the actual date of removal.

5. The aggregate number of armoured vehicle launched bridges removed from and retained outside of designated permanent storage sites by each group of States Parties shall not exceed 50 at any one time.

6. States Parties shall have the right, for the purpose of maintenance or modification, to remove and have outside the designated permanent storage sites simultaneously up to 10 percent, rounded up to the nearest even whole number, of their notified holdings of armoured vehicle launched bridges in each designated permanent storage site, or 10 armoured vehicle launched bridges from each designated permanent storage site, whichever is less.

7. In the event of natural disasters involving flooding or damage to permanent bridges, States Parties shall have the right to withdraw armoured vehicle launched bridges from designated permanent storage sites. Notification to all other States Parties of such withdrawals shall be given at the time of withdrawal.

Article XII

1. Armoured infantry fighting vehicles held by organisations of a State Party designed and structured to perform in peacetime internal security functions, which are not structured and organised for ground combat against an external enemy, are not limited by this Treaty. The foregoing notwithstanding, in order to enhance the implementation of this Treaty and to provide assurance that the number of such armaments held by such organisations shall not be used to circumvent the provisions of this Treaty, any such armaments in excess of 1000 armoured infantry fighting vehicles assigned by a State Party to organisations designed and structured to perform in peacetime internal security functions shall constitute a portion of the permitted levels specified in Articles IV, V and VI. No more than 600 such armoured infantry fighting vehicles of a State Party, assigned to such organisations, may be located in that part of the area of application described in Article V, paragraph 1, subparagraph (A). Each State Party shall further ensure that such organisations refrain from the acquisition of combat capabilities in excess of those necessary for meeting internal security requirements.

2. A State Party that intends to reassign battle tanks, armoured infantry fighting vehicles, artillery, combat aircraft, attack helicopters and armoured vehicle launched bridges in service with its conventional armed forces to any organisation of that State Party not a part of its conventional armed forces shall notify all other States Parties no later than the date such reassignment takes effect. Such notification shall specify the effective date of the reassignment, the date such equipment is physically transferred, as well as the numbers, by type, of the conventional armaments and equipment limited by the Treaty being reassigned.

Article XIII

1. For the purposes of ensuring verification of compliance with the provisions of this Treaty, each State Party shall provide notifications and exchange information pertaining to its conventional armaments and equipment

in accordance with the Protocol on Information Exchange.

2. Such notifications and exchange of information shall be provided in accordance with Article XVII.

3. Each State Party shall be responsible for its own information; receipt of such information and of notifications shall not imply validation or acceptance of the information provided.

Article XIV

1. For the purpose of ensuring verification of compliance with the provisions of this Treaty, each State Party shall have the right to conduct, and the obligation to accept, within the area of application, inspections in accordance with the provisions of the Protocol on Inspection.

2. The purpose of such inspections shall be:

(A) to verify, on the basis of the information provided pursuant to the Protocol on Information Exchange, the compliance of States Parties with the numerical limitations set forth in Articles IV, V and VI;

(B) to monitor the process of reduction of battle tanks, armoured combat vehicles, artillery, combat aircraft and attack helicopters carried out at reduction sites in accordance with Article VIII and the Protocol on Reduction; and

(C) to monitor the certification of recategorised multi-purpose attack helicopters and reclassified combat-capable trainer aircraft carried out in accordance with the Protocol on Helicopter Recategorisation and the Protocol on Aircraft Reclassification, respectively.

3. No State Party shall exercise the rights set forth in paragraphs 1 and 2 of this Article in respect of States Parties which belong to the group of States Parties to which it belongs in order to elude the objectives of the verification regime.

4. In the case of an inspection conducted jointly by more than one State Party, one of them shall be responsible for the execution of the provisions of this Treaty.

5. The number of inspections pursuant to Sections VII and VIII of the Protocol on Inspection which each State Party shall have the right to conduct and the obligation to accept during each specified time period shall be determined in accordance with the provisions of Section II of that Protocol.

6. Upon completion of the 120-day residual level validation period, each State Party shall have the right to conduct, and each State Party with territory within the area of application shall have the obligation to accept, an agreed number of aerial inspections within the area of application. Such agreed numbers and other applicable provisions shall be developed during negotiations referred to in Article XVIII.

Article XV

1. For the purpose of ensuring verification of compliance with the provisions of this Treaty, a State Party shall have the right to use, in addition to the procedures referred to in Article XIV, national or multinational technical means of verification at its disposal in a manner consistent with generally recognised principles of international law.

2. A State Party shall not interfere with national or multinational technical means of verification of another State Party operating in accordance with paragraph 1 of this Article.

3. A State Party shall not use concealment measures that impede verification of compliance with the provisions of this Treaty by national or multinational technical means of verification of another State Party operating in accordance with paragraph 1 of this Article. This obligation does not apply to cover or concealment practices associated with normal personnel training, maintenance or operations involving conventional armaments and equipment limited by the Treaty.

Article XVI

1. To promote the objectives and implementation of the provisions of this Treaty, the States Parties hereby establish a Joint Consultative Group.

2. Within the framework of the Joint Consultative Group, the States Parties shall:

(A) address questions relating to compliance with or possible circumvention of the provisions of this Treaty;

(B) seek to resolve ambiguities and differences of interpretation that may become apparent in the way this Treaty is implemented;

(C) consider and, if possible, agree on measures to enhance the viability and effectiveness of this Treaty;

(D) update the lists contained in the Protocol on Existing Types, as required by Article II, paragraph 2;

(E) resolve technical questions in order to seek common practices among the States Parties in the way this Treaty is implemented;

(F) work out or revise, as necessary, rules of procedure, working methods, the scale of distribution of expenses of the Joint Consultative Group and of conferences convened under this Treaty and the distribution of costs of inspections between or among States Parties;

(G) consider and work out appropriate measures to ensure that information obtained through exchanges of information among the States Parties or as a result of inspections pursuant to this Treaty is used solely for the purposes of this Treaty, taking into account the particular requirements of each State Party in respect of safeguarding information which that State Party specifies as being sensitive;

(H) consider, upon the request of any State Party, any matter that a State Party wishes to propose for examination by any conference to be convened in accordance with Article XXI; such consideration shall not prejudice the right of any State Party to resort to the procedures set forth in Article XXI; and

(I) consider matters of dispute arising out of the implementation of this Treaty.

3. Each State Party shall have the right to raise before the Joint Consultative Group, and have placed on its agenda, any issue relating to this Treaty.

4. The Joint Consultative Group shall take decisions or make recommendations by consensus. Consensus shall be understood to mean the absence of any objection by any representative of a State Party to the taking of a decision or the making of a recommendation.

5. The Joint Consultative Group may propose amendments to this Treaty for consideration and confirmation in accordance with Article XX. The Joint Consultative Group may also agree on improvements to the viability and effectiveness of this Treaty, consistent with its provisions. Unless such improvements relate only to minor matters of an administrative or technical nature, they shall be subject to consideration and confirmation in accordance with Article XX before they can take effect.

6. Nothing in this Article shall be deemed to prohibit or restrict any State Party from requesting information from or undertaking consultations with other States Parties on matters relating to this Treaty and its implementation in channels or fora other than the Joint Consultative Group.

7. The Joint Consultative Group shall follow the procedures set forth in the Protocol on the Joint Consultative Group.

Article XVII

The States Parties shall transmit information and notifications required by this Treaty in written form. They shall use diplomatic channels or other official channels designated by them, including in particular a communications network to be established by a separate arrangement.

Article XVIII

1. The States Parties, after signature of this Treaty, shall continue the negotiations on conventional armed forces with the same Mandate and with the goal of building on this Treaty.

2. The objective for these negotiations shall be to conclude an agreement on additional measures aimed at further strengthening security and stability in Europe, and pursuant to the Mandate, including measures to limit the personnel strength of their conventional armed forces within the area of application.

3. The States Parties shall seek to conclude these negotiations no later than the follow-up meeting of the Conference on Security and Cooperation in Europe to be held in Helsinki in 1992.

Article XIX

1. This Treaty shall be of unlimited duration. It may be supplemented by a further treaty.

2. Each State Party shall, in exercising its national sovereignty, have the right to withdraw from this Treaty if it decides that extraordinary events related to the subject matter of this Treaty have jeopardised its supreme interests. A State Party intending to withdraw shall give notice of its decision to do so to the Depositary and to all other States Parties. Such notice shall be given at least 150 days prior to the intended withdrawal from this Treaty. It shall include a statement of the extraordinary events the State Party regards as having jeopardised its supreme interests.

3. Each State Party shall, in particular, in exercising its national sovereignty, have the right to withdraw from this Treaty if another State Party increases its holdings in battle tanks, armoured combat vehicles, artillery, combat aircraft or attack helicopters, as defined in Article II, which are outside the scope of the limitations of this Treaty, in

such proportions as to pose an obvious threat to the balance of forces within the area of application.

Article XX

1. Any State Party may propose amendments to this Treaty. The text of a proposed amendment shall be submitted to the Depositary, which shall circulate it to all the States Parties.

2. If an amendment is approved by all States Parties, it shall enter into force in accordance with the procedures set forth in Article XXII governing the entry into force of this Treaty.

Article XXI

1. Forty-six months after entry into force of this Treaty, and at five-year interval thereafter, the Depositary shall convene a conference of the States Parties to conduct a review of the operation of this Treaty.

2. The Depositary shall convene an extraordinary conference of the States Parties, if requested to do so by any State Party which considers that exceptional circumstances relating to this Treaty have arisen, in particular, in the event that a State Party has announced its intention to leave its group of States Parties or to join the other group of States Parties, as defined in Article II, paragraph 1, subparagraph (A). In order to enable the other States Parties to prepare for this conference, the request shall include the reason why that State Party deems an extraordinary conference to be necessary. The conference shall consider the circumstances set forth in the request and their effect on the operation of this Treaty. The conference shall open no longer than 15 days after receipt of the request and, unless it decides otherwise, shall last no longer than three weeks.

3. The Depositary shall convene a conference of the States Parties to consider an amendment proposed pursuant to Article XX, if requested to do so by three or more States Parties. Such a conference shall open no later than 21 days after receipt of the necessary requests.

3. In the event that a State Party gives notice of its decision to withdraw from this Treaty pursuant to Article XIX, the Depositary shall convene a conference of the States Parties which shall open no later than 21 days after receipt of the notice of withdrawal in order to consider questions relating to the withdrawal from this Treaty.

Article XXII

1. This Treaty shall be subject to ratification by each State Party in accordance with its constitutional procedure. Instruments of ratification shall be deposited with the Government of the Kingdom of the Netherlands, hereby designated the Depositary.

2. This Treaty shall enter into force 10 days after instruments of ratification have been deposited by all States Parties listed in the Preamble.

3. The Depositary shall promptly inform all States Parties of:

(A) the deposit of each instrument of ratification;

(B) the entry into force of this Treaty;

(C) any withdrawal in accordance with Article XIX and its effective date;

(D) the text of any amendment proposed in accordance with Article XX;

(E) the entry into force of any amendment to this Treaty;

(F) any request to convene a conference in accordance with Article XXI;

(G) the convening of a conference pursuant to Article XXI; and

(H) any other matter of which the Depositary is required by this Treaty to inform the States Parties.

4. This Treaty shall be registered by the Depositary pursuant to Article 102 of the Charter of the United Nations.

Article XXIII

The original of this Treaty, of which the English, French, German, Italian, Russian and Spanish texts are equally authentic, shall be deposited in the archives of the Depositary. Duly certified copies of this Treaty shall be transmitted by the Depositary to all States Parties.

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[1] The Treaty of Friendship, Cooperation and Mutual Assistance signed in Warsaw, 14 May 1955.

[2] The Treaty of Economic, Social and Cultural Collaboration and Collective Self-Defence signed in Brussels, 17 March 1948.

[3] The North Atlantic Treaty signed in Washington, 4 April 1949.

Appendix B. CFE Treaty rules for designated permanent storage sites for TLE (AVLBs included)

Boundary of a site

- a clearly defined physical boundary that consists of a continuous perimeter fence at least 1.5 m high which has no more than three gates providing the sole means of entrance and exit for armaments and equipment.

Items allowed within a site

- only facilities appropriate for storage and maintenance, e.g., warehouses, garages, workshops, associated stores and other support accommodation;
- only armaments and equipment belonging to the conventional armed forces of a state party;
- only personnel associated with security or operation of sites, or the maintenance of the boundary of a site;
- a clearly defined physical boundary that consists of a continuous perimeter fence at least 1.5 m high which has no more than three gates providing the sole means of entrance and exit for armaments and equipment stored therein.

Items not allowed within a site

- firing ranges or training areas associated with TLE;
- active units or formations (except for personnel associated with security or operation of a site or maintenance of stored items).

Replacement of TLE

- each state party has the right to replace TLE (battle tanks, ACVs and artillery) located in such sites.

Removal of TLE from and retention outside sites

- TLE may be removed or kept outside sites for maintenance, repair or modification; up to 10%, rounded up to the nearest even whole number, of the notified holdings of each category of TLE in each site, or 10 items of TLE in each category in each site, whichever is less (including AVLBs, for maintenance or modification) may be removed simultaneously without notification;
- except for the above the maximum aggregate numbers for each group of states parties are: 550 battle tanks; 1 000 ACVs; 300 pieces of artillery;
- the aggregate number of AVLBs is up to 50 at any one time and in the event of natural disasters involving flooding or damage to permanent bridges states parties have the right to withdraw AVLBs from sites.

Return of TLE to sites

TLE should be returned to sites no later than 42 days after removal with exceptions for:

- actions not obligatory for notifications;
- battle tanks, ACVs and artillery removed for industrial rebuild. Such items must be returned to sites immediately on completion of the rebuild.

Obligatory notifications

The following must be notified:

- designation and location, including geographic coordinates of sites;
- the numbers by type of each category of TLE at each such storage site;
- removal of TLE at least 42 days in advance;
- withdrawal of AVLBs in the event of disasters involving flooding or damage to permanent bridges, at the time withdrawal takes place;
- location of sites from which TLE is to be removed;
- the numbers by type of TLE of each category to be removed;
- the dates of removal and return of TLE;
- the intended location and use of TLE while outside the site (location of AVLB excluded);
- the number, location, type and disposition of TLE being replaced, at the beginning of replacement.

Appendix C. Main Treaty provisions regarding the reclassification of specific models or versions of combat-capable trainer aircraft into unarmed trainer aircraft and the recategorization of multi-purpose attack helicopters

I. Disarming, conversion and certification

Aircraft

Total disarming by removal of:

(*a*) provisions specifically for the attachment of weapon systems, such as special hardpoints, launching devices, or weapon mounting areas;

(*b*) units and panels of weapon control systems including weapon selection, arming and firing or launching systems;

(*c*) units of aiming equipment and weapon guidance systems not integral to navigation and flight control systems; units and panels of electronic warfare and reconnaissance systems including associated antennas;

(*d*) the wiring (or cutting out of sections of the wiring) in accessible areas in case of electronic circuits of the weapon, electronic warfare and reconnaissance systems described above.

Helicopters

Conversion by removal of:

(*a*) provisions specifically for the attachment of guided weapons, such as special hardpoints or launching devices;

(*b*) all integrated fire control and aiming systems for guided weapons, including wiring.

Certification must be conducted within the area of application.

II. Rules for inspection of certification

1. The right to inspect without refusal.

2. Inspections shall not count against the overall quotas.

3. Inspection teams may be composed of representatives of different states parties.

4. The inspected state party may not accept more than one inspection team at a time at each certification site.

5. An inspection team has the right to:

(*a*) spend up to two days at a certification site, unless otherwise agreed;

(*b*) enter and inspect visually the helicopter or aircraft cockpit and interior to include checking the manufacturer’s serial number;

(*c*) request the escort team to remove any access panels covering the position from which components and wiring were removed;

(*d*) request and observe (with the right of refusal) the activation of any weapon system component in multi-purpose attack helicopters being certified or declared to have been categorized;

(*e*) complete an inspection report at the conclusion of each inspection;

(*f*) depart the territory of the inspected state party or conduct a sequential inspection at another certification site or at reduction site if appropriate notification has been provided by the inspection team.

6. The inspecting party has the obligation to:

(*a*) notify no less than 96 h in advance of the estimated time of arrival of the inspection team at the designated point of entry/exit on the territory of the inspected state party, including the point of entry/exit to be used; the estimated time and the means of arrival at the point of entry/exit; specified information about inspectors and transport crew members and language to be used;

(*b*) notify its intention to proceed to another certification site or to a reduction site at least 24 h before the intended departure time upon completion of an inspection at a certification site.

III. Completion of reclassification and recategorization

Unless (within 30 days of receipt of the notification of completion of the certification, reclassification and recategorization) a state party notifies all other states parties of an ambiguity relating to the process, the process is considered to be complete upon completion of procedures described above. This holds regardless of whether the recategorization and reclassification have been verified by inspection. In the event an ambiguity is raised, however, it must be resolved before the process is considered complete.

Appendix D. Main Treaty provisions regarding inspection

I. Time limits

1. The location of any point of entry/exit in respect of each declared site with its OOV should be such that the inspection team can be transported to the inspection site no later than 9 h after the designation of the site to be inspected. If otherwise agreed between the inspection team and the escort team and if the inspection site is in mountainous terrain or terrain to which access is difficult, the inspection teams must be transported to the inspection site no later than 15 h after designation of that site. Travel time in excess of 9 h is not counted against the inspection team's in-country inspection period.

2. Notification of intent to inspect is to be provided no less than 36 h in advance for declared sites and challenge inspections and 96 h in advance for inspection of certification and reduction.

3. The states parties notified shall acknowledge receipt of notification within 3 h.

4. The inspected state party has the right to utilize up to 6 h after designation of a declared site to prepare for the arrival of the inspection team at that site.

5. If, during an inspection at a declared site, the inspection team decides to conduct at the same declared site an inspection of an OOV not previously designated, the inspection team has the right to commence such inspection within 3 h of that designation.

6. In the case of challenge inspection, the inspected state party shall inform the inspection team within 2 h of the designation of a specified area whether the inspection request will be granted. If access is granted, this party has the right to use up to 6 h to prepare for the arrival of the inspection team at the specified area.

7. In the case of inspection of reductions, the inspection team shall notify the escort team of its intended departure from the reduction site and, if appropriate, of its intention to proceed to another reduction site or to a certification site at least 24 h before the intended departure time.

8. An inspection team's in-country period is up to 10 days, including 48 h for the first inspection plus 36 h for each sequential inspection of an OOV or within a specified area The inspectors can spend no more than 48 h at a declared site and no more than 24 h conducting a challenge inspection.

II. Inspection and escort teams

1. An inspection team may include inspectors from states parties other than the inspecting state party, consist of up to 9 inspectors and may divide itself into up to 3 sub-teams. In the case of simultaneous inspections on the territory of states parties that do not have MDs specified in the zones within the area of Treaty application or within a single MD of a state party with such military districts, only one inspection team may divide itself at the inspection site into 3 sub-teams, the others into 2 sub-teams.

The number of transport crew members must not exceed 10.

2. For declared site and challenge inspections no more than one inspection team may be present at the same time at any inspection site.

3. No more than 2 inspection teams, or a number of inspection teams equal to 2% of the total number of OOV that are to be inspected during a specified time period, whichever number is greater, can be simultaneously on the territory (or in military districts).

III. Equipment of an inspection team

1. Inspectors may take: portable passive night-vision devices; binoculars; video and still cameras; tape measures; dictaphones; tape measures; flashlights; magnetic compasses; lap-top computers; other equipment subject to approval by the host state.

2. Equipment and supplies of the inspected party are to be examined prior to departure to the inspection site from the point of entry/exit and to be observed throughout the in-country period by the escort team. If equipment and supplies do not meet the requirements, they are removed from the territory at the earliest opportunity.

3. Inspectors have the right to take photographs, including video, recording the presence of TLE, including within designated permanent storage sites, or other storage sites containing more than 50 such conventional armaments and equipment. Still cameras are limited to 35-mm cameras and cameras capable of producing instantly developed photographic prints.

4. Photography of interiors of structures other than storage sites specified above is permitted only with the approval of the escort team and when inspectors decide to document an unresolved ambiguity with photographs, the escort team is to co-operate in producing instantly developed photographic prints.

5. Photography of sensitive points is permitted only with the approval of the escort team.

6. Inspectors can take measurements to resolve ambiguities.

IV. Permitted access and observation

1. Access is permitted to the entire specified area or, in case of OOV, the entire territory of the declared site except those areas belonging to another OOV which has not been designated for inspection.

2. Within these areas, inspectors have the right to enter any location, structure or area within a structure in which TLE is permanently or routinely present.

3. Inspectors may look into a hardened aircraft shelter and, with approval of the escort team, enter the interior of such shelters. If such approval is denied and if the inspectors so request, any TLE in such shelters is to be displayed outside.

4. Access is permitted to conventional armaments and equipment only in so far as is necessary to confirm visually their number and type, model or version.

5. In a declared site all territory delineated on the site diagram as belonging to the designated OOV, including separately located areas on the territory of the same state party where conventional armaments and equipment belonging to that OOV are permanently present, may be inspected.

6. During inspection of one OOV at a declared site, access is permitted to the entire territory of that site except those areas delineated on the site diagram as belonging exclusively to another OOV which has not been designated for inspection.

7. Access is permitted to conventional armaments and equipment which have been notified as being held by one OOV at a declared site and present within the area delineated on the site diagram as belonging exclusively to another OOV.

V. Rights of the inspected party

The inspected party may:

(*a*) shroud individual sensitive items of equipment;

(*b*) deny access to sensitive points, to shrouded objects or to containers any dimension of which is less than 2 m; whenever a sensitive point is designated, or shrouded objects or containers are present, they must declare whether they hold any TLE and, if so, state their number, type, model or version; the inspected party must display or declare such conventional armaments and equipment and take steps to satisfy the inspection team that no more than the declared number of such conventional armaments and equipment is present;

(*c*) refuse challenge inspections within specified areas; if access is denied, they must provide all reasonable assurance that the specified area does not contain TLE and, if TLE is present and assigned to organizations and structured to perform in peacetime internal security functions in the flank zone, allow visual confirmation of its presence, unless precluded from doing so by *force majeure*, in which case visual confirmation must be allowed as soon as practicable; also the inspected party may designate another specified area or declared site for inspection or declare the inspection concluded.

VI. Helicopter flights

The inspected state party shall not be obliged to provide a helicopter at any inspection site that is less than 20 km^2 in area and has the right to delay, limit or refuse helicopter overflights above sensitive points, but the presence of sensitive points shall not prevent helicopter overflights of the remaining areas of the inspection site; photography of or above sensitive points during helicopter overflights shall be permitted only with the approval of the escort team; the duration of such helicopter overflights at an inspection site shall not exceed a cumulative total of one hour, unless otherwise agreed between the inspection team and the escort team; any helicopter must carry at least two members of the inspection team and at least one member of the escort team and must afford the inspectors a constant and unobscured view of the ground.

Appendix E. The Joint Consultative Group

1. Within the framework of the JCG states parties shall:

(*a*) address questions relating to compliance with or possible circumvention of Treaty provisions;

(*b*) seek to resolve ambiguities and differences of interpretation that may become apparent in the way the Treaty is implemented;

(*c*) consider and, if possible, agree on measures to enhance the viability and effectiveness of the Treaty;

(*d*) update the list contained in the Protocol on Existing Types of Conventional Armaments and Equipment;

(*e*) make changes to the list of specific non-military purposes of TLE to be converted;

(*f*) resolve technical questions in order to seek common practices among the states parties in the way the Treaty is implemented;

(*g*) work out or revise, as necessary, rules of procedure, working methods, the scale of distribution of expenses of the JCG and of conferences convened under the Treaty and the distribution of costs of inspections between or among states parties;

(*h*) consider and work out appropriate measures to ensure that information obtained through exchanges of information or as a result of inspections is used solely for the purposes of the Treaty, taking into account particular requirements of each state party in respect of safeguarding information which that state party specifies as being sensitive;

(*i*) consider matters of dispute arising out of the implementation of the Treaty;

(*j*) consider, upon the request of any state party, issues relating to the provisions of the Treaty that are applied provisionally;

(*k*) consider, upon the request of any state party, any matter that a state party wishes to propose for examination by any conference to be convened in accordance with Article XXI; such consideration shall not prejudice the right of any state party to resort to the procedures set force in this Article.*

2. The JCG takes decisions or makes recommendations by consensus, i.e. the absence of any objection by any state party to a decision or recommendation.

3. The JCG may propose amendments to the Treaty for consideration and confirmation and may also agree on improvements to the viability and effectiveness of the Treaty. Unless such improvements relate only to minor matters of an administrative or technical nature, they shall be subject to the following procedures before they take effect: the text of a proposed amendment is submitted to the Depositary which circulates it to all states parties; if approved by all states parties, it enters into force after certain procedures set in the Treaty. However, any state party is not prohibited or restricted from requesting information from or undertaking consultations with other states parties on matters relating to the Treaty and its implementation in channels or forums other than the JCG.

* According to Article XXI, the Depositary (the Netherlands) convenes: (*a*) a conference to conduct a review of operation of the Treaty 46 months after entry into force and at 5-year intervals thereafter; (*b*) an extraordinary conference, if requested by any state party, to open no later than 15 days after receipt of the request; (*c*) a conference to consider an amendment, if requested by three or more states parties, which shall open no later than 21 days after receipt of the requests; and (*d*) a conference, if a state party notifies its decision to withdraw from the Treaty, which shall open no later than 21 days after receipt of notice.

Appendix F. Main Treaty provisions regarding notification and exchange of information

I. Information on the structure of each state party's land, air and air defence forces within the area of application

1. Command organization of land forces, specifying the designation and subordination of all combat, combat support and combat service formations and units at each level of command down to the level of brigade/regiment or equivalent level, including air defence formations and units subordinated at or below the military district or equivalent level. Independent battalions (i.e., independent units at the next level below the brigade/regiment level directly subordinate to formations above this level) must be identified, with the information indicating the formation or unit to which such units are subordinated.

2. Command organization of air and air defence aviation forces, specifying the designation and subordination of formations and units at each level of command down to wing/air regiment or equivalent level. Independent squadrons (i.e., independent units at the next level of command below the wing/air regiment level directly subordinate to formations above this level) must be identified, with the information or unit to which such units are subordinate.

II. Information on overall holdings in each TLE category

Overall numbers and numbers by type of holdings of battle tanks, ACVs and artillery limited by the Treaty in the ATTU area, all sub-zones and flank zone.

III. Information on location, numbers and types of conventional armaments and equipment in service with the conventional armed forces of states parties

1. For each formation and unit described above, as well as separately located battalions/squadrons or equivalents subordinate to those formations and units:

(*a*) the designation and peacetime location at which TLE is held, including headquarters (HQ), specifying the geographic name and co-ordinates;

(*b*) the holdings of formations and units notified pursuant to (*a*), giving numbers (by type in case of formations and units at the level of division or equivalent and below) of TLE and of combat support helicopters, unarmed transport helicopters, AVLBs (specifying those in active units), AIFV look-alikes, APC look-alikes, primary trainer aircraft, reclassified combat-capable trainer aircraft, Mi-24R and Mi-24K helicopters;*

(*c*) the designation and peacetime location of formations and units, other than those notified pursuant to (*a*), at which the categories listed in (*b*) are held, including HQ, specifying the geographic name and co-ordinates;

*For convenience conventional armaments and equipment listed in 1(*a*) and 1(*b*) are mentioned below as *a*+*b*

(*d*) the holdings of formations and units notified pursuant to (*c*) giving numbers (by type in case of formations and units at the level of division or equivalent and below) in each category, and, in the case of AVLBs, those which are in active units.

2. For conventional armaments and equipment in service but not held by land forces or air or air defence forces:

(*a*) designation and peacetime location of formations and units down to the level of brigade/regiment, wing/air regiment or equivalent as well as separately located or independent battalions/squadrons or equivalent units, at which TLE is held, including HQ, specifying the geographic name and co-ordinates;

(*b*) holdings of formations and units notified pursuant to (*a*), giving numbers (by type in case of formations and units at the level of division or equivalent and below) of categories listed in 1(*b*).

3. Location of designated permanent storage sites, specifying geographic name and coordinates, and the numbers and types of conventional armaments and equipment in categories *a*+*b* held at sites.

4. Location of military storage sites not organic to formations and units identified as objects of verification (OOV), independent repair and maintenance units, military training establishments and military airfields, specifying geographic name and coordinates, at which categories *a*+*b* are held or routinely present, giving the holdings by type in each category at such locations.

5. Location of sites at which the reduction of TLE will be undertaken, specifying the location by geographic name and coordinates, the holdings by type in each category of TLE awaiting reduction at such locations, and indicating that it is a reduction site.

IV. Information on location and numbers of TLE within the area of application but not in service with conventional armed forces

1. For battle tanks, artillery, combat aircraft, specialized attack helicopters and armoured infantry fighting vehicles held by organizations down to the independent or separately located battalion or equivalent level designed and structured to perform in peacetime security functions, including geographic name and coordinates and types in these categories held by each such organization.

2. For APCs, HACVs and multi-purpose attack helicopters held by such organizations the aggregate numbers in each category in each administrative region or division.

3. For all TLE awaiting disposal after decommissioning, including geographic name and coordinates of sites at which they are held, and types at each site.

4. For all TLE an identifiable location of each site at which there are normally more than a total of 15 battle tanks, ACVs and artillery or more than 5 combat aircraft or more than 10 attack helicopters which are awaiting or being refurbished for export or re-export and are temporarily retained within the area of application, and numbers of such categories.

5. For battle tanks and ACVs which have been reduced and are awaiting conversion, including geographic name and coordinates, of each site at which they are held, and type at each site.

6. For all TLE used exclusively for the purpose of research and development (R&D) the aggregate numbers in each category.

V. Information on OOV and declared sites

1. Total number and designation of each OOV and enumeration of declared sites.

2. With regard to each site:

(*a*) designation and location, including geographic name and coordinates;

(*b*) designation of all OOV at that site. It is understood that subordinate elements at the next level of command below the brigade/regiment or wing/air regiment level located in the vicinity of each other or of the HQ immediately superior to such elements may be deemed not separately located, if the distance between such separately located battalions/squadrons or equivalent or to their HQ does not exceed 15 km;

(*c*) overall numbers by type in each category *a*+*b* held at that site and by each OOV, as well as those belonging to any OOV located at another declared site, specifying the designation of each such OOV;

(*d*) in addition, for each declared site, the numbers of categories not in service, indicating those that are TLE awaiting disposal having been decommissioned, or reduced and awaiting conversion, or held by organizations designed and structured to perform internal security functions in peacetime;

(*e*) declared sites that hold TLE awaiting or being refurbished for export and temporarily retained within the area of application or used exclusively for R&D must be identified as such, and the aggregate numbers in each category at that site must be provided;

(*f*) point(s) of entry/exit associated with each declared site, including geographic name and coordinates.

Note: The timetable for information categories I–V is as follows: upon signature, with corrections within 90 days, other than on structure and overall holdings; with notification of reduction liability within 30 days after entry into force of the Treaty; on 15 December of the first year (unless entry into force occurs within 60 days of 15 December) and on 15 December of every year thereafter, with the information effective on 1 January the following year; following the completion of the 40-month reduction period.

VI. Information on the location of sites from which conventional armaments and equipment have been withdrawn

Location of sites which have been notified previously as declared sites from which all categories *a*+*b* have been withdrawn since the signature of the Treaty if such sites continue to be used by the conventional armed forces of a state party.

The information is provided annually, coincident with the annual exchange of information, and for three years following such withdrawal.

VII. Information on changes in organizational structures or force levels

1. At least 42 days in advance of any permanent change in the organizational structure of conventional armed forces within the area of application.

2. For any change of 10% or more in any one category of TLE assigned to any combat, combat support or combat service support formation or unit down to levels described above since the last annual exchange of information. Such notifications are to be given no later than 5 days after such change occurs, indicating actual holdings after the notified change.

VIII. Information on entry into and removal from service of TLE

Aggregate information on the numbers and types of TLE entered into service or removed from service within the area of application during the previous 12 months.

To be provided coincident with each annual exchange of information.

IX. Information on entry into and exit from the area of application of TLE in service with the conventional armed forces

Aggregate information on the numbers and types of each category of TLE that entered, was removed from, or remained outside the area of application in the past 12 months; whether any of the TLE that entered was organized in a formation or unit; last reported locations within the area of application of TLE removed and remaining outside the area of application.

Information on TLE in service which exit and re-enter the area of application, including that of training or military activities, within a 7-day period.

X. Information on conventional armaments and equipment in transit through the area of application

Categories *a+b* if they remain within the area of application for a period longer than 7 days.

XI. Information on any new type, model or version of conventional armaments and equipment

Any new type which meets one of the TLE definitions postulated in Article II or which falls under a category listed in the Protocol on Existing Types of Conventional Armaments and Equipment and any new model or version of a type listed in this Protocol upon entry into service with the armed forces within the area of application with the technical data and photographs required by the Protocol. No later than 60 days after this notification, the states parties initiate update actions for the lists of existing types of conventional armaments and equipment.

XII. Technical data for each model or version of existing types of conventional armaments and equipment

The following are agreed categories of technical data:

1. Existing type, national nomenclature, main gun calibre and unladen weight for battle tanks and HACVs.

2. Existing type, national nomenclature, and type and calibre of armaments (if any) for APCs and AIFVs and their look-alikes.

3. Existing type, national nomenclature and calibre for guns, howitzers and artillery pieces combining the characteristics of guns and howitzers, mortars, multiple launch rocket systems.

4. Existing type, national nomenclature and type of armaments (if any) for primary trainer aircraft.

5. Existing type and national nomenclature for combat aircraft, attack helicopters, combat support helicopters, unarmed transport helicopters and AVLBs.

XIII. Photographs

Technical data are provided together with photographs showing the right or left side, top and front views for each existing type of TLE. In addition, photographs of APC look-alikes and AIFV look-alikes include a view of such vehicles so as to show clearly their internal configuration illustrating the specific characteristic which distinguishes this particular vehicle as a look-alike. Additional photographs may be provided at the discretion of each state party.

Each existing type listed in the Protocol on Existing Types of Conventional Armaments and Equipment shall have a model or version of that type designated as an exemplar, and photographs shall be provided for each; photographs are not required of models and versions with no significant externally observable differences from the exemplar of that type. The photographs shall contain an annotation of the existing type designation and national nomenclature for all models and versions of the type shown. The photographs of each type exemplar contain an annotation of the technical data for that type in accordance with agreed categories, also indicating all models and versions of the type that the photographs represent. Such technical data shall be annotated on the side view photograph.

Photographs shall be black and white and the object photographed shall contrast with the background of the photograph. All photographs shall be of high definition, with continuous tone and in sharp focus, and should measure 13 cm by 18 cm, excluding the border. The object shall fill at least 80% of the photograph in either horizontal or vertical aspect. A reference gauge shall be included in each photograph together with the object, with alternating half-metre sections in black and white and long enough to provide accurate scaling and be placed on or against the object or in close proximity to it. The date of the photograph shall be provided.

XIV. Reclassification and recategorization

Each state party must provide the following information to all other states parties:

1. Aircraft (total disarming):

(*a*) a basic block diagram portraying all major components of weapon systems including aiming equipment, weapon guidance systems, provisions for weapon attachment as well as components of electronic warfare and reconnaissance systems; the basic function of the components described above and their functional connections to each other;

(*b*) a general description of the process including a list of components to be removed;

(*c*) a photograph of each component to be removed illustrating its position prior to removal, and a photograph of its position after removal.

2. Helicopters (conversion):

(*a*) a basic block diagram portraying all major components of guided weapon integrated fire control and aiming systems as well as components of equipment designed for the attachment of guided weapons, the basic function of the components described above, and their functional connections to each other;

(*b*) as 1(*b*);

(*c*) as 1(*c*).

Information is to be provided no less than 42 days in advance: of the total disarming of the first aircraft of each model or version; of the conversion of the first helicopter of a type or at entry into force of the Treaty in the event that a state party declares both multi-purpose attack helicopters and combat helicopters of the same type.

3. Certification:

(*a*) the site at which certification is to take place, including geographic coordinates;

(*b* scheduled dates of the certification process;

(*c*) estimated number and type, model or version to be verified;

(*d*) manufacturer's serial number for each item;

(*e*) the unit and location to which the items were previously assigned and will be assigned in the future;

(*f*) the point of entry/exit to be used by an inspection team;

(*g*) the date and type by which an inspection team shall arrive at the point of entry/exit in order to inspect certification.

In the event of the first certification of an aircraft that does not require total disarming, the state party that intends to conduct certification should provide the information for total disarming. The information should be provided no less than 15 days before certification. On completion of the certification the information by the responsible state party is to be provided within 7 days of completion of certification with specified number, types, models or versions and manufacturer's serial numbers of certified items, the certification site involved, actual dates of the certification, and the units or locations to which the recategorized helicopters or reclassified aircraft will be assigned.

XV. Other notifications

1. Number of battle tanks and ACVs planned for conversion (to be given at least 15 days in advance), specifying the number and types of vehicles to be converted, the starting and completion dates as well as the specific non-military purpose vehicles to emerge after conversion.

2. Completion of the certification and recategorization of multi-purpose attack helicopters.

3. Total number of each specific model or version of combat-capable trainer aircraft that the state party intends to disarm and certify or to certify alone.

Appendix G. Elements of the Annex on the format for the exchange of information

Chart I. Command organizations of the land forces and air and air defence aviation forces of (state party) valid as of (date)

In this chart a state party must inform about:

- formation or unit record number. Each organization is identified by a formation or unit record number which shall be used on subsequent listings with that organization and for all subsequent information exchanges;
- designation of formation or unit. National designation of each organization is specified (i.e., name). In the case of divisions, brigades/regiments, independent battalions, and wings/air regiments, independent squadrons or equivalent organizations, where appropriate, the formation or unit type (e.g., infantry, tank, artillery, fighter, bomber, supply);
- subordination (1st higher echelon, 2nd higher echelon). For each organization, the two levels of command within the area of application immediately superior to that organization are to be designated.

Chart IIA. Overall holdings of battle tanks, armoured combat vehicles and artillery subject to numerical limitation of (state party) valid as of (date)

The chart must specify: area; category; sub-category; type; overall number (including in designated permanent storage sites—DPSS); number in DPSS. Data on ACVs include the total numbers of heavy armament combat vehicles, armoured infantry fighting vehicles and armoured personnel carriers.

Chart IIB. Overall holdings of combat aircraft and attack helicopters subject to numerical limitation of (state party) valid as of (date).

This chart includes category; sub-category; type; overall number.

Charts IIIA and IIIB. Information on the location, numbers and types of conventional armaments and equipment provided pursuant to Section III of the Protocol on Information Exchange (i.e. in service with the conventional armed forces) of (state party) valid as of (date)

Chart IIIA specifies: formation or unit record number; designation of formation or unit; peacetime location; battle tanks; armoured combat vehicles; APC and AIFV look-alikes; artillery; AVLBs; attack helicopters; combat support helicopters; unarmed transport helicopters.

Chart IIIB applies to aircraft and helicopters: formation or unit record number; peacetime location; combat aircraft; reclassified CCT aircraft; primary trainer aircraft; attack helicopters; combat support helicopters; unarmed transport helicopters; other.

Location includes the geographic name and co-ordinates accurate to the nearest 10 seconds. For locations containing stationed forces, the host state party is also

included. For each level of command down to the division/air division level overall total of armaments and equipment in each category is specified. For example, the overall total held by division would be the sum of the holdings of all its subordinate organizations. There is also information on the number of types for each level of command at the division level and below as well as of subcategories of armoured combat vehicles. The column labelled 'other' includes battle tanks, ACVs, artillery, ACV look-alikes; AIFV look-alikes and AVLBs, if any, in service with the air and air defence aviation forces.

Chart IV. Information on the location of conventional armaments and equipment provided pursuant to Section IV of the Protocol on Information Exchange (i.e. of TLE within the area of application but not in service with conventional armed forces) of (state party) valid as of (date)

This chart specifies: protocol reference; location; battle tanks; armoured combat vehicles; artillery; attack helicopters; combat aircraft.

It demands location with the geographic name and coordinates accurate to the nearest 10 seconds of sites containing such equipment. With respect to armoured personnel carriers, heavy armament combat vehicles and multi-purpose attack helicopters held by organizations designed and structured to perform in peacetime security functions, the national designation of the administrative region or division containing such equipment must be defined. With respect to such equipment and to battle tanks, artillery, combat aircraft, specialised attack helicopters and AIFVs held by organizations down to the independent or separately located battalion or equivalent designed and structured to perform in peacetime internal security functions, the national-level designation of organization must be specified. The numbers in each category of APCs, HACVs, and multipurpose attack helicopters held by organizations designed and structured to perform peacetime internal security functions, solely for the administrative region or division specified.

Chart V. Information on objects of verification and declared sites of (state party) valid as of (date)

The information in the chart must include: declared site record number (i.e. a unique designator); location (the site's name and location with geographic name and coordinates accurate to the nearest 10 seconds); point of entry/exit associated with the declared site; a unique sequential number and the designation and formation or unit record number of all OOVs stationed at the declared site; the overall number of battle tanks, ACV, APC and AIFV look-alikes, artillery, AVLB, attack helicopters, combat support helicopters, unarmed transport helicopters, combat aircraft, reclassified CCT, primary trainer aircraft at the site and by each OOV.

Chart VI. Points of entry/exit (POE) of (state party) valid as of (date)

The list must assign a record number for POEs of each site (a unique sequential numerical designator which is used to indicate the POE(s)).

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