3. Nuclear weapons

Prepared by the *Nuclear Weapons Databook* staff, Washington, DC, and SIPRI.*

Superscript numbers refer to the list of notes and references at the end of the chapter.

I. Introduction

In 1985, for the first time in many years, there was some sense of movement in nuclear arms control talks. Since March, when the Geneva negotiations on nuclear and space arms opened (the first such negotiations since December 1983), both the USA and the USSR have put forward several new arms reduction proposals, culminating in both superpowers offering cuts of 50 per cent in strategic nuclear forces. Both nations also called for the complete elimination of nuclear weapons as their ultimate arms control objective.

Nevertheless, while the words were about reductions, the actions were about increases. During 1985 both the United States and the Soviet Union proceeded with qualitative improvements in their nuclear forces. The first weapons of the Reagan Administration's Strategic Modernization Program (announced in October 1981) began reaching the field. This 'modernization' plan calls for deploying thousands of new nuclear weapons of all kinds before the end of the century. In the Soviet Union, the first ever mobile intercontinental ballistic missile (ICBM), the SS-25, was deployed; US intelligence suggests that this may be the beginning of a major transformation of the Soviet ICBM arsenal. In France, deployment of MIRVed (equipped with multiple independently targetable re-entry vehicles) submarine-launched ballistic missiles (SLBMs) began, the first such capability outside the superpowers. In Britain and China, programmes are proceeding to increase the numbers of nuclear warheads, missiles and aircraft.

Since the Geneva summit meeting between President Reagan and General Secretary Gorbachev, it appears that there is general agreement to cut strategic weapons by 50 per cent and conclude an agreement on intermediate-range nuclear forces (INF). The United States and the Soviet Union have each presented ambitious 'long-term visions' of completely abolishing nuclear weapons. The Reagan Administration seeks the goal through defensive systems which, it suggests, could make nuclear weapons 'impotent and obsolete'. In January 1986 General Secretary Gorbachev presented a three-stage programme calling for the elimination of nuclear arms by the year 2000. Although new ground was broken, especially in the area of verification, the Soviet proposal remains contingent on a ban on developing, testing or deploying strategic defences.

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

It is an open question whether the negotiations will proceed fast enough to prevent the impending deployment of the next generation of nuclear weapons. Numerous problems present serious obstacles to a successful outcome. Debate on compliance issues swept through a sharply divided Reagan Administration which decided, for the time being, to continue to comply with both the SALT II (Strategic Arms Limitation Talks) Treaty and the 'restrictive' interpretation of the Anti-Ballistic Missile (ABM) Treaty. But the USA has yet to decide how to respond to alleged Soviet violations of the two treaties. One possible US response would be to take specific 'proportionate' acts of its own. Any such policy would be both controversial and likely to further erode an already fragile arms control regime.

Perhaps the most elusive question of all concerns strategic defence programmes. Success at Geneva seems to hinge on a seemingly unlikely US–Soviet agreement on strategic defences, with both sides insisting that it is the key to reductions in nuclear arms: the USA demands the right to pursue its Strategic Defense Initiative (SDI) programme, and the USSR demands an end to it.

A nuclear weapon test ban continued to attract attention and support during 1985. The issue is discussed in chapters 6 and 19. The Soviet Union initiated a nuclear test moratorium from August to December 1985, and extended it to the end of March 1986, indicating that it is ready to negotiate a comprehensive test ban (CTB). Neither the United States nor the United Kingdom is prepared to re-open CTB negotiations, nor have they joined the moratorium.

This chapter examines the nuclear weapon developments of the five nuclear weapon states in 1985, and the related arms control activities most likely to affect those nuclear forces. It discusses several treaty compliance issues that arose during the year, and provides a description and explanation of the various arms limitation proposals that were made.

II. US nuclear weapon programmes

A combination of factors, including concerns over the mounting federal budget deficit, and revelations of the waste and fraud among defence contractors, caused the US Congress to cut military budget requests sharply during 1985. Early in the year there was a congressional consensus to freeze the military budget, and most of the year was spent arguing whether that meant funding the Pentagon at the fiscal year (FY) 1985 level with or without compensating for inflation. Congress chose to compensate for inflation and approved a total budget of $289.4 billion for the Department of Defense (DoD) and $7.6 billion for the Department of Energy (DoE).

By the end of 1985, the changed mood about federal spending in general and Pentagon spending in particular was evident in the passage of the Balanced Budget and Emergency Deficit Control Act, better known as the Gramm–Rudman–Hollings bill. If fully implemented, it could have a profound effect on future military budgets. Its impact on the FY 1986 budget will result in $278.5 billion for DoD and $7.2 billion for DoE nuclear warhead activities.

ICBMs

The year saw little change in the US land-based missile force (see table 3.1). The programme of Titan II missile deactivation and silo dismantlement continued. At the end of 1985, 17 Titan II ICBMs remained, with the final missiles to be retired by mid-1987.

A programme to improve the accuracy of the Minuteman III missiles was begun in FY 1982 and is scheduled to end in FY 1987 at a cost of $13 million. At the end of 1985, improvements to approximately 400 of the 550 Minuteman IIIs had been completed. The programme will identify accuracy error sources in missile computer software and hardware, and either eliminate them or compensate for them. A separate programme for the 450 Minuteman II missiles, over the period FY 1984–9, is replacing worn-out parts in the guidance system. These guidance system upgrades have resulted in a 38 per cent improvement in accuracy for the Minuteman II and a 25 per cent improvement for the Minuteman III.[1] Beginning in April 1985, a six-year programme was initiated to modify existing Minuteman launch and control facilities to extend their service lifetime to the turn of the century. The programme, named Rivet Mile, will cost almost a half a billion dollars.[2]

The MX missile remained highly controversial throughout 1985. Two major political battles continued: the first in March over releasing funds from the 1984 budget to buy 21 missiles, and the second over the ultimate size of the programme. In March 1985 President Reagan issued a report addressing several issues related to the need for the MX,[3] which started the process by which Congress would have to vote to release $1.5 billion from the FY 1985 budget to purchase 21 MX missiles. As Congress stated in the FY 1985 budget bill, missiles would not be bought unless the issue passed four subsequent votes of approval, which it did between 19 and 28 March.[4]

Although successful in March, President Reagan's MX programme suffered a serious setback during the summer when Congress limited the total number of missiles to 50 deployed in existing Minuteman III silos. Any further deployments could come about only if the President proposes and the Congress approves a more survivable basing mode.[5]

Having previously studied and rejected more than 30 MX basing modes, the US Air Force began once again to examine new variations emphasizing hardening and mobility. A new mobile scheme reportedly being explored by the Air Force Ballistic Missile Office is called 'carry hard'. This basing mode envisions the MX and its launcher encased in a cement capsule being hauled by a truck among silos filled with water. The capsule is put in a silo and the water is pumped into the truck. One estimate to harden 100 MX silos puts the cost at $20 billion.[6]

Three MX flight-tests were conducted during 1985, on 30 May, 23 August and 13 November. The August test, the 9th in the overall series of 20, was the first test from a silo.

For FY 1986, Congress approved the full Administration request of $624.5 million to continue design and development work on the small ICBM (SICBM), the Midgetman. The missile has always been more a creation of

Table 3.1. US strategic nuclear forces, 1986

Weapon system				Warheads		
Type	No. deployed	Year deployed	Range (km)	Warhead × yield	Type	No. in stockpile
ICBMs						
Minuteman II	450	1966	11 300	1 × 1.2 Mt	W-56	480
Minuteman III	550	1970	13 000	3 × 170 kt/	W-62	825
				335 kt	W-78	1 000
Titan II	17	1963	15 000	1 × 9 Mt	W-53	25
Total	**1 017**					**2 330**
SLBMs						
Poseidon	288	1971	4 600	10 × 40 kt	W-68	3 300
Trident I	360	1979	7 400	8 × 100 kt	W-76	3 200
Total	**648**					**6 500**
Bombers						
B-52G/H	263	1955	16 000	8–24[a]	[a]	4 733
FB-111	61	1969	4 700	6[a]	[a]	360
Total	**324**					**5 093**
Refuelling aircraft						
KC-135	615	1957	. .	. .	. .	. .

[a] Bomber weapons include five different nuclear bomb designs with yields from 70 kt to 9 Mt, ALCMs with selectable yields up to 200 kt, and SRAMs with a yield of 200 kt. FB-111s do not carry ALCMs or the 9-Mt bomb.

Sources: Cochran, T. B., Arkin, W. M. and Hoenig, M. H., *Nuclear Weapons Databook, Volume 1: US Forces and Capabilities* (Ballinger: Cambridge, MA, 1984), updated in *Bulletin of the Atomic Scientists*, Aug./Sep. 1984; Joint Chiefs of Staff, *United States Military Posture for FY 1987*; authors' estimates.

Congress than something the Administration and the Air Force have enthusiastically supported. Although Administration and Pentagon support sounded firm, questions began to be raised about the missile's cost and capabilities. A General Accounting Office (GAO) report identified numerous challenges that must be met and overcome.[7] At year's end an Air Force report on the SICBM, due on 1 October, was still not ready, reportedly owing to Pentagon uncertainties about the missile's place in the overall modernization programme and fears that its huge cost might devour funds from other programmes, especially SDI.[8]

Throughout the year mixed signals were given by the Administration concerning whether mobile intercontinental missiles should be promoted or banned. Initially the Reagan Administration appeared to agree with the 1983 Scowcroft Commission conclusion that small, mobile, single-warhead missiles would be less vulnerable and could contribute to stability, and that the Soviet Union and the United States should move towards substituting them for fixed ICBMs.

The President, in a speech to the European Parliament on 8 May, accused the Soviet Union of 'undermining stability and the basis of nuclear deterrence' by going forward with its new MIRVed SS-X-24 mobile ICBM, which he said was 'clearly designed' to give the USSR a first-strike capability. In November the USA proposed a ban on all mobile ICBMs in its arms control offer at Geneva (see figure 3.1).

Strategic submarine programmes

The Trident submarine and missile programmes continued during the year. The 13th Trident submarine was authorized, while the 7th, the *USS Alaska*, began sea trials on 18 September; the 8th, the *USS Nevada*, was launched on 14 September; and the 6th, the *USS Alabama*, prepared for its first operational deployment in early 1986.

The *Alaska*'s sea trials forced the Reagan Administration to decide whether or not to comply with the SALT II Treaty. President Reagan decided to comply with the treaty for the time being and ordered one Poseidon SSBN (nuclear-powered ballistic-missile submarine) to be deactivated and dismantled.[9] The decision deferred a final choice on compliance and imposed certain stipulations on future US activities, leaving the commitment to the treaty still fragile.

The Trident II SLBM programme went through another year with its budget intact and virtually free of criticism. The Navy has yet to state publicly how large a fleet it wants, thus making it difficult to compute costs and determine the impact that the counterforce capabilities of the Trident II missiles will have on the strategic situation. It is anticipated that some 4000 warheads could be fielded for the Trident II.[10]

Strategic bomber programmes

The strategic bomber programmes are among the most costly of President Reagan's nuclear weapon buildup, totalling over $100 billion. During the year Congress provided $5.1 billion to buy the final 48 B-1B aircraft. The debate

over whether to produce more than the agreed 100 B-1B bombers continued to remain just below the surface. The huge amount of money that is likely to be requested for the Advanced Technology Bomber (Stealth) in 1986, coupled with the economic consequences of abruptly halting B-1B production, will probably force the question in 1986 of buying more B-1Bs.[11] On 27 June the first operational B-1B was delivered to the Strategic Air Command (SAC). Two days later it went to Dyess Air Force Base, Texas, where it officially joined the SAC inventory. Crew selection, training flights and base preparation continued throughout the year to prepare the first wing for its September 1986 operational capability.

Some details about the Stealth bomber came to light during the year. It is generally believed that the first production funds, some $4.5 billion, will be requested in the FY 1987 budget. Having consumed $2.4 billion over the past four years, and with a possible request of $8 billion in FY 1988, the Stealth bomber programme is rapidly becoming very expensive. The programme calls for a prototype to be flown in late 1987/early 1988, probably at Edwards AFB, California, with a squadron of 18 operational in 1992. The total number is estimated to be 132, costing $50–75 billion. Senator Barry Goldwater, Chairman of the Senate Armed Services Committee, said the bomber was designed in the shape of a flying wing. Congress has been authorizing money for Stealth without knowing very much about what the total cost might be or about its performance characteristics.[12] Some evidence of the operational mission conceived for the Stealth (or possibly B-1B) bomber came to light in a remark by General Bennie Davis, former Commander-in-Chief of SAC, when he said that an 'advanced state-of-the art bomber offers the best potential for dealing with the growing threat posed by Soviet relocatable weapon systems'.[13] Current nuclear war plans call for 'enduring' forces which in this instance would mean that, after penetrating Soviet borders, Stealth bombers would roam above the countryside, hunting mobile SS-24 and SS-25 ICBMs along with other targets.

The last of five B-52G bomber wings carrying air-launched cruise missiles (ALCMs) was made operational in December 1984. Throughout 1985 preparations were made to begin outfitting four B-52H wings with ALCMs. The last wing would be operational at the end of 1986. The conversion of the 120th cruise missile-carrying bomber (probably some time in the fall of 1986) will present another SALT problem to the Administration, since ALCM-capable heavy bombers above that number must be counted against the 1320 MIRV launcher ceiling of SALT II.[14] The first of the more sophisticated 'stealth' versions, called the Advanced Cruise Missile (ACM), will probably be deployed in 1987 or 1988.

A programme to augment the current short-range attack missile (SRAM) with a longer-range, more accurate missile, called SRAM II, moved forward during 1985, with planned deployment set for 1992. In addition to the SRAM II's primary mission of defence suppression, the missile could also be used to destroy relocatable targets.

Theatre nuclear forces

During 1985 US ground-launched cruise missiles (GLCMs) and Pershing II missiles continued their scheduled European deployments, with the completion of the deployment of 108 Pershing II launchers/missiles in the Federal Republic of Germany in December. By the end of the year, 128 GLCMs were also deployed at three bases: Greenham Common, UK; Sigonella, Italy; and Florennes, Belgium. Sigonella continued to be an 'interim base' pending the completion of construction at Comiso. Deployment of the first flight of GLCMs in FR Germany is scheduled for March 1986. The missiles will reportedly be deployed at Hahn Air Base pending the completion of construction at Wüschheim (Hasselbach).

Although the issue of reloads for the Pershing II seemed to be settled, and there was a slight decrease in the number of missiles and nuclear warheads planned for production, extra Pershing II missiles and warheads are being purchased nonetheless. The 'total quantity required has been reduced', according to congressional testimony, because of 'operational consideration precluding the need for the full previously planned procurements'.[15] According to Army Secretary John Marsh, 'a CONUS [Continental US] reserve is deemed necessary to be able to provide the JCS [Joint Chiefs of Staff] with a worldwide mission flexibility and because the number forward deployed is far short of the recognized requirement'.[16] These missiles are to be stored in the USA 'in case they have to be used in other places or for replacements, in addition to the 108 that [the USA] would have in Europe'.[17]

In other developments related to non-strategic nuclear forces, it was revealed that the new F-15E Dual Role Fighter, which is planned to be deployed in 1989 as an augmentation of the currently deployed air defence F-15 aircraft, 'will be capable of delivering most current and future conventional and tactical nuclear munitions', and will carry the B-61 nuclear bomb.[18] Deployment of the B-61 nuclear bomb for US and NATO F-16 and Tornado aircraft continued during the year, replacing the older and less versatile B-28 and B-43 bombs. Debate about the nuclear follow-on to the Lance missile continued during the year. According to congressional testimony, 'The Army does not currently plan to develop nor integrate a nuclear warhead for the JTACMS [Joint Tactical Missile System]',[19] but NATO's Supreme Allied Commander, Europe (SACEUR) General Bernard Rogers did announce plans to build a nuclear Lance missile follow-on (see table 3.2).

In October 1983 NATO ministers, meeting at Montebello, Canada, agreed on a plan of reductions and 'modernizations' to the NATO nuclear weapon stockpile (the Montebello decision). During 1985 significant steps were taken to implement the decision, which called for the withdrawal of 1400 nuclear warheads from Europe by 1988 as part of the compensation for long-range modernization but also approved the modernization of short-range nuclear forces (see table 3.3). At the Luxembourg meeting of the NATO Nuclear Planning Group in May 1985, a specific plan was agreed to reduce NATO's nuclear stockpile to 4600 warheads as required by the Montebello decision. The reductions will include: (*a*) withdrawal and phasing out of all (approx-

Table 3.2. US theatre nuclear forces, 1986

Weapon system				Warheads		
Type	No. deployed	Year deployed	Range (km)	Warhead × yield	Type	No. in stockpile
Land-based systems:						
Aircraft						
[a]	2 000	. .	1 060–2 400	1–3 × bombs	[a]	2 800
Missiles						
Pershing II	108	1983	1 790	1 × 0.3–80 kt	W-85	125
GLCM	128	1983	2 500	1 × 0.2–150 kt	W-84	150
Pershing 1a	72	1962	740	1 × 60–400 kt	W-50	100
Lance	100	1972	125	1 × 1–100 kt	W-70	1 282
Honest John	24	1954	38	1 × 1–20 kt	W-31	132
Nike Hercules	56	1958	160	1 × 1–20 kt	W-31	250
Other systems						
Artillery[b]	4 300	1956	30	1 × 0.1–12 kt	[b]	2 422
ADM (medium/special)	210	1964	. .	1 × 0.01–15 kt	W-45/54	210
Naval systems:						
Carrier aircraft						
[c]	900	. .	550–1 800	1–2 × bombs	[c]	1 000
Land-attack SLCMs						
Tomahawk	100	1984	2 500	1 × 5–150 kt	W-80	100
ASW systems						
ASROC	. .	1961	10	1 × 5–10 kt	W-44	574
SUBROC	. .	1965	60	1 × 5–10 kt	W-55	285
P-3/S-3/SH-3	630	1964	2 500	1 × <20 kt	B-57	897
Naval SAMs						
Terrier	. .	1956	35	1 × 1 kt	W-45	100

[a] Aircraft include Air Force F-4, F-16 and F-111, and NATO F-16, F-100, F-104 and Tornado. Bombs include four types with yields from sub-kt to 1.45 Mt.

[b] There are two types of nuclear artillery (155-mm and 203-mm) with four different warheads: a 0.1-kt W-48, 155-mm shell; a 1- to 12-kt W-33, 203-mm shell; a 1-kt W-79, enhanced-radiation, 203-mm shell; and a 1- to 10-kt W-79 fission warhead.

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

Sources: Cochran, T. B., Arkin, W. M. and Hoenig, M. H., *Nuclear Weapons Databook, Volume 1: US Forces and Capabilities* (Ballinger: Cambridge, MA, 1984), updated in *Bulletin of the Atomic Scientists*, Aug./Sep. 1984; Joint Chiefs of Staff, *United States Military Posture for FY 1987*; authors' estimates.

Table 3.3. US European nuclear modernization, 1986–92

Weapon system (warhead)	As of 1986	Withdrawals[a]	As of 1992
Stored in Europe			
Pershing II	108	–	108
Pershing 1a	100	180	100
GLCM	128	–	464
Bombs	1 730	–	1 730
Lance	690	–	690
Honest John	132	200	–
Nike Hercules	250	680	–
8-inch (W-33)	930	730	200
8-inch (W-79)	–	–	200[b]
155-mm (W-48)	730	580	150
155-mm (W-82)	–	–	200
Atomic demolition munitions	–	370	–
Depth bombs	190	–	190
Total in Europe	4 988	2 740	4 032
Committed to Europe[c]			
Poseidon	400	–	400
Carrier bombs	360	–	500
Bombs	600	–	800
Depth bombs	140	–	140
Lance	380	–	380
8-inch (W-79) ER	325	–	325
Atomic demolition munitions	100	–	100
Total committed	2 305	–	2 645
Total	**7 293**	**2 740**	**6 677**

[a] Withdrawals in accordance with the NATO modernization decision of 1979 (equal withdrawals for deployments); the Montebello decision of 1983 (1400 additional withdrawals); and (other) anticipated changes in artillery stockpiles.

[b] Deployment of non-enhanced-radiation warheads in Europe.

[c] Warheads committed to Europe or planned for storage in Europe (does not include tactical naval nuclear weapons).

Source: Authors' estimates.

imately 370) ADMs (atomic demolition munitions) from the Federal Republic of Germany and Italy (this occurred during 1985); (*b*) phasing out all (approximately 500) Nike Hercules missile warheads (at the end of the year, all US Nike Hercules systems, consisting of 16 batteries, 144 launchers and some 110 nuclear warheads, had been withdrawn from Europe and a substantial portion of the Greek Nike Hercules force had also been withdrawn); (*c*) phasing out all remaining nuclear-armed Honest John missiles (some 200 warheads) in Greek and Turkish forces (during 1985, some of these warheads were reportedly withdrawn); and (*d*) reduction and modernization of nuclear artillery shells.

In the continuing drama of nuclear artillery modernization, the congressional guidelines discussed in the *SIPRI Yearbook 1985* continued to hold: (*a*) no more than 925 new artillery projectiles can be produced; (*b*) the military must determine the mix of 155-mm and 203-mm shells within this ceiling; (*c*) no new 203-mm enhanced-radiation (ER) warheads can be built beyond the 325

already produced by October 1984; and (*d*) the cost of the overall programme cannot exceed $1.2 billion.

Although SACEUR General Rogers was successful in tying the withdrawal of nuclear warheads to nuclear modernization, the congressional constraints on new nuclear artillery production have strongly influenced NATO's planned nuclear force structure. Prior to modernization, there were some 1660 US nuclear artillery warheads in Europe. Although a one-for-one replacement was never anticipated, the 925-warhead constraint, with 325 203-mm enhanced-radiation warheads already built, means that only some 600 warheads will be available (and some of those will be sent to South Korea or assigned to the US Marine Corps).

It is estimated that only some 400 new 155-mm and 203-mm nuclear artillery shells will be sent to Europe during 1986–92, a reduction of some 1200 from the current stockpile. Coupled with the forced withdrawal of all ADMs from Europe, as table 3.3 shows, there will be only about 4000 nuclear warheads in Europe after the weapons currently anticipated are deployed. This is in contrast to the 4600-warhead ceiling which was created by the Montebello decision and the NATO 1979 nuclear modernization plan. The difference of 600 warheads may be made up by increases in the number of bombs deployed in Europe or new weapons such as an air-to-surface stand-off missile.[20]

The question of whether and when to deploy cruise missiles was a major political issue throughout the year in Belgium and the Netherlands. After months of debate and uncertainty, Prime Minister Martens announced to the Belgian Parliament (on 15 March) that Belgium would accept the first 16 of a scheduled 48 GLCMs. Less than three hours after the announcement, US C-5 and C-141 military transport aircraft began delivering the missiles and their warheads to Florennes Air Base (some 70 km south-east of Brussels). Five days later the Belgian Chamber of Deputies approved the deployment by a 116–93 vote, and on 23 March the Senate approved it by a 97–69 vote.

On 1 June 1984 the Netherlands Parliament established a set of conditions under which they would deploy their share of GLCMs. The main element was that, if the USSR had on 1 November 1985 more than the number of SS-20s that they had on 1 June 1984, the Netherlands would deploy GLCMs, although two years later than originally planned. On 1 November 1985 Prime Minister Lubbers announced that the Netherlands would accept 48 GLCMs with deployment beginning in 1988. To counterbalance the decision, the Prime Minister also announced that, when the cruise missiles are deployed, the Netherlands will discontinue two of its NATO nuclear missions. These are the 32 nuclear-certified Netherlands Air Force F-16s of Squadrons 311 and 312 at Volkel Air Base and the 13 nuclear-certified Netherlands Navy P-3C Orions of Squadron 320 at Valkenburg Air Base. As a result of the 1983 Montebello decision, the two other Dutch nuclear tasks, those involving atomic demolition munitions and Nike Hercules air defence missiles, will be eliminated. The Netherlands Army Lance missile unit at Havelteberg and the 8-inch artillery unit at t'Harde were retained.

Although not strictly a 'theatre' nuclear weapon, the US sea-launched cruise missile (SLCM) programme continues as a high priority for the Reagan

Administration. As of January 1986, some 100 nuclear land-attack SLCMs were deployed on attack submarines and surface ships, including the two renovated battleships *Iowa* and *New Jersey*. The programme retains its goal of 3994 SLCMs, of which 578 will be the nuclear land-attack variant. Over 200 ships and submarines will be capable of carrying the SLCM by the mid-1990s (see *SIPRI Yearbook 1985*, chapter 1). The USA continues to exclude SLCMs from any of its arms control proposals, and refuses to consider them for negotiation.

III. Soviet nuclear weapon programmes

The USSR continued to make technical and qualitative improvements to its operational nuclear forces in 1985. Strategic force improvements included initial deployments of mobile SS-25 ICBMs and preparations for initial deployments of SS-X-24 ICBMs and SS-NX-23 SLBMs on the new Delta IV Class strategic missile submarines (see table 3.4). Additional SS-N-20 SLBMs were also deployed, and the shift towards an ALCM-equipped bomber force continued with additional deployments of the Bear H with the AS-15 missile. Improvements were made in all areas of theatre nuclear forces as well.

The US intelligence community downgraded the estimated capabilities of certain Soviet weapon systems. The estimated range of the Backfire bomber was reduced by approximately one-third, and the estimated accuracy of the SS-19 ICBM was reduced by more than one-third. Previous intelligence estimates of these two weapons strongly influenced the debates about ratifying the SALT II Treaty and the hypothetical vulnerability of the US land-based missile force. Also, with respect to the Soviet short-range missile force, the intelligence community shifted its emphasis from nuclear to conventional capabilities.

The following Soviet actions were taken in 1985 to comply with various arms control treaties:[21] (*a*) retirement of 70 SS-11 ICBMs to compensate for the deployment of 45 SS-25s;[22] (*b*) conversion of 15 Bison bombers to tankers (the Soviet statement on the tanker conversions was not accepted by the USA since conversion could not be verified by external characteristics) and destruction of 15 other Bisons (these were placed in full view at an airfield and had their tail sections cut off) and retirement of at least 10 older Bear bombers to compensate for deployment of Bear H bombers; (*c*) possible placement of SS-16 ICBMs in storage;[23] and (*d*) continuing retirement of Yankee Class submarines from the strategic submarine forces as new Typhoon and Delta IV Class submarines were introduced.

Numerous command changes within the Soviet military were made in 1985 owing to the ongoing reorganization of the Soviet Armed Forces, the consolidation of power of General Secretary Gorbachev, and the advanced age of several top military leaders. The most important changes were: a new Commander-in-Chief for the Strategic Rocket Forces (SRF)—General Yuri Maximov, formerly district commander for Central Asia, replacing Marshal Vladimir Tolubko, head of the SRF since 1972;[24] the apparent establishment by Marshal Nikolai Ogarkov, former Chief of the General Staff, of a new Western

Table 3.4. Soviet strategic nuclear forces, 1986

Weapon system				Warheads	
Type	No. deployed	Year deployed	Range (km)	Warhead × yield	No. in stockpile[a]
ICBMs					
SS-11 Mod 1	30	1966	11 000	1 × 1 Mt	32– 60
Mod 2	360	1973	13 000	1 × 1 Mt	380– 720
Mod 2/3	60	1973	10 600	3 × 250–350 kt (MRV)	190– 360
SS-13 Mod 2	~60	1972	9 400	1 × 600–750 kt	63– 120
SS-17 Mod 3	150	1979	10 000	4 × 750 kt (MIRV)	630– 1 200
SS-18 Mod 4	308	1979	11 000	10 × 550 kt (MIRV)	3 200– 6 200
SS-19 Mod 3	360	1979	10 000	6 × 550 kt (MIRV)	2 300– 4 300
SS-X-24	. .	1986	10 000	8–10 × 550 kt (MIRV)	. .
SS-25 Mod 1	45	1985	10 500	1 × 550 kt	47– 90
Total	**1 373**				**6 800–13 000**
SLBMs					
SS-N-5	39	1963	1 400	1 × 1 Mt	41– 47
SS-N-6 Mod 1/2	304	1967	2 400	1 × 1 Mt	480– 550
Mod 3		1973	3 000	2 × 200–350 kt (MRV)	
SS-N-8	292	1973	7 800	1 × 800 kt–1 Mt	310– 350
SS-N-17	12	1977	3 900	1 × 1 Mt	13– 14
SS-N-18 Mod 1/3	224	1978	6 500	3–7 × 200–500 kt	710– 1 900
Mod 2		1978	8 000	1 × 450 kt–1 Mt	
SS-N-20[b]	80	1983	8 300	6–9 × 350–500 kt	500– 860
SS-N-23[b]	32	1985	7 240	7 × 350–500 kt	240– 270
Total	**983**				**2 300– 4 000**

Bombers						
Bison	18–33	1956	8 000	2 × bombs	36–	130
Bear A/B/C/G	90	1956	8 300	2–4 × bombs/ASMs	240–	480
Bear H	40	1984	8 300	4 × ALCMs	160–	320
Total	**138–163**				**440–**	**930**
Refuelling aircraft [c]	125-140	. .	. .	. .		. .
ABMs						
Galosh	32	1964	750	1 × 3–5 Mt	32–	64
SH-08	(68)	1985	. .	1 × . .	68–	140
Total	**100**				**100–**	**200**

[a] Figures for numbers of warheads are low and high estimates of possible force loadings (including reloads). Reloads for ICBMs are 5 per cent and 100 per cent, and for SLBMs 5 per cent and 20 per cent extra missiles and associated warheads. Half the SS-N-6s are assumed to be Mod 3s, and SS-N-18 warheads are assumed to be 3 or 7 warheads. Bomber warheads are force loadings and force loadings plus 100 per cent reloads. It is assumed that 30 Bear Gs are now deployed (4 warheads each). All warhead total estimates have been rounded to two significant digits. Warhead estimates do not include down-loading for single-warhead SS-17 Mod 2, SS-19 Mod 2 or SS-18 Mod 1/3 missiles, which could be deployed, nor lower estimates for the SS-18 force, which includes some Mod 2 missiles with 8 or 10 warheads.

[b] Includes SLBMs potentially carried on 1 Typhoon Class and 2 Delta IV Class submarines on sea trials.

[c] Includes Badger and Bison A bombers converted for aerial refuelling, with 15 possible new Bison conversions claimed by the USSR.

Sources: Authors' estimates derived from: Arkin, W. M. and Sands, J. I., 'The Soviet nuclear stockpile', *Arms Control Today*, June 1984, pp. 1–7; Department of Defense, *Soviet Military Power*, 1st, 2nd, 3rd, 4th editions; NATO, *NATO–Warsaw Pact Force Comparisons*, 1st, 2nd editions; Berman, R. P. and Baker, J. C., *Soviet Strategic Forces: Requirements and Responses* (Brookings Institution: Washington, DC, 1982); Defense Intelligence Agency, *Unclassified Communist Naval Orders of Battle*, DDB-1200-124-84, May 1984; Joint Chiefs of Staff, *United States Military Posture for FY 1987*; Gordon, M. R., 'U.S. says Soviet complies on some arms issues', *New York Times*, 24 Nov. 1985, p. 18; Senate Armed Services Committee/Senate Appropriations Committee, *Soviet Strategic Force Developments*, S. Hrg. 99–335, June 1985; background briefing by senior US Administration official, 8 Oct. 1985; Hutchinson, R., 'USSR now has 100 ABM launchers', *Jane's Defence Weekly*, 2 Nov. 1985, p. 959; Polmar, N., 'The submarine enigmas', US Naval Institute *Proceedings*, Jan. 1986, p. 129; interviews with US DoD officials, Apr. and Nov. 1985; Sands, J. I., 'A review of *Soviet Military Power 1985*', Nuclear Weapons Databook Working Paper no. 85-2, July 1985.

TVD (theatre of military operations) that may prove to have some authority over the Warsaw Pact;[25] and a new Commander-in-Chief for the Navy—Admiral Vladimir Chervanin (formerly Chief of the Main Naval Staff and one of two First Deputy Commanders-in-Chief of the Navy, replacing Fleet Admiral of the Soviet Union Sergei G. Gorshkov, Commander-in-Chief of the Navy since January 1956).[26]

ICBMs

The start of what could be a significant shift in Soviet land-based missile forces began in 1985 as the first mobile land-based ICBMs entered service. According to an unclassified summary of a recent US National Intelligence Estimate (NIE) on Soviet Strategic Forces, presented to Congress on 26 June 1985,[27] some 90 per cent of the current Soviet land-based missile force will be replaced by the mid-1990s. Just as significantly, some 40 per cent of the missiles and nearly 25 per cent of the warheads in the force will be mobile based. These warheads are projected to account for nearly one-seventh of all Soviet strategic warheads at that time (see table 3.5).[28] Specific changes during 1985 in the Soviet land-based missile force were: the deployment of SS-25s and a compensating deactivation of SS-11s, the preparation for deployment of SS-X-24s, and continued research and development of three new or improved ICBMs. The number of ICBMs declined slightly with these developments, as did the number of warheads (although the number of warheads will increase to some 7000 as SS-24 missiles are deployed) (see table 3.4). Restructuring the Soviet land-based missile force could represent as significant a change as MIRVing did in the mid- to late-1970s.

At the SALT Standing Consultative Commission (SCC) meeting in late April 1985, the Soviet Union informed the US delegation that 20 SS-11s were being removed and 18 SS-25s were being deployed.[29] While the US intelligence community still had not agreed that SS-25 deployments had begun by the end of the summer,[30] Defense Secretary Weinberger officially confirmed the deployment of 27 missiles in late October.[31] The US Department of Defense reported that, by the end of 1985, 45 SS-25s were deployed in five regiments of 9 missile launchers each, with a compensating reduction of 50 in the number of SS-11 missiles.[32] Twenty additional SS-11s have been retired, probably in preparation for an additional 18 SS-25s.[33] While at least three SS-25s have been tested from a modified SS-13 silo, the USA apparently no longer believes that the SS-25 is replacing the SS-13.[34] However, the USSR is expected to retire most, if not all, SS-11 and SS-13 missiles even if they are not required by arms control limitations to do so.[35]

The SS-X-24 is expected to begin deployment in 100 SS-17 silos in 1986, with deployment of rail-mobile launchers at Plesetsk expected in 1987.[36] Three additional ICBM models or modifications are also under development, all expected to be flight-tested in the period 1986–90. These include a new liquid-fuelled, silo-based heavy ICBM to replace the SS-18, a new version of the SS-X-24, and a new version of the mobile SS-25, which could have a MIRVed payload option. These missiles are likely to have better accuracy and

greater throw-weights than their predecessors.[37] Contrary to some accounts, these missiles have not been given designations, and their exact nature and roles are unconfirmed. The 1985 NIE predicted that, in the absence of arms control agreements, more than 1000 SS-25s and nearly 600 SS-24s could be operational by the middle of the next decade, with the ratio of fixed to mobile SS-24s expected to be roughly two-to-one. The liquid-fuelled follow-on to the SS-18 is expected to replace all current SS-18s by the middle of the 1990s. At that time, this missile could account for 5000 warheads, some 38 per cent of the projected Soviet ICBM warhead force and 25 per cent of Soviet strategic warheads (see table 3.6).

In 1984 it was noted that the US Department of Defense presumed that all 308 SS-18s were modernized to the newest modification, with each missile carrying 10 warheads.[38] It now appears that this statement was in error, since the Defense Department believes that some SS-18s appear to be Mod 2s with 8 or 10 warheads, not Mod 4s.[39] It was alleged in 1985 that the current land-based missile warhead totals were much above the reported 6300 level because SS-18 missiles could be deployed with 14 warheads.[40] As Secretary Weinberger noted during a press conference, the USSR has 'more warheads than 10 on some of their missiles. They've got them manufactured. Whether or not they actually put them on or not is a matter of whatever they perceive would be required in any kind of situation that faced them. It is a quantitative difference'.[41] The belief that the SS-18 carries more than 10 warheads stems from the missile's large throw-weight and evidence from three tests—in late 1978, early 1979 and 1983—in which 10 re-entry vehicles were released and the bus 'dipped' or altered course additional times, simulating the release of re-entry vehicles.[42] However, a Defense Intelligence Agency (DIA) official stated in April 1985 that the SS-18 has in fact not been tested with more than 10 warheads and that it 'would be a very risky enterprise' for the missile to carry more than 10 warheads.[43]

Also noteworthy is the revised assessment by the US intelligence community of the accuracy of the SS-19, although the DIA reportedly dissented to this reassessment in a footnote to the NIE. The improved accuracies of the SS-18 and SS-19 missiles were central to the view that the United States faced a 'window of vulnerability' because the USSR was capable of destroying the US land-based missile force. The alleged accuracy of the missiles was also used to justify the need for the MX, which would, it was argued, offset the Soviet lead in prompt hard-target destruction capability and correct the perception that Soviet accuracies were improving without a corresponding improvement in US missile accuracy. The new NIE reportedly reduced the previously estimated accuracy by more than one-third, extending the CEP (circular error probable) from 300 to 400 metres.[44]

Strategic submarine programmes

The Soviet strategic submarine force continues to include 62 modern nuclear-powered submarines. The third Typhoon Class SSBN has entered service, and a fourth Typhoon and two Delta IV Class submarines (launched in

Table 3.5. Soviet theatre nuclear forces, 1986

Weapon system				Warheads	
Type	No. deployed	Year deployed	Range (km)	Warhead × yield	No. in stockpile[a]
Land-based systems:					
Aircraft					
Backfire	144	1974	3 700	2–3 × bombs or ASMs	288
Badger	287[b]	1955	4 800	2 × bombs or ASMs	480
Blinder	136[b]	1962	2 200	1 × bombs or ASMs	136
Tactical aircraft[c]	2 885	. .	700–1 000	1–2 × bombs	2 885
Missiles					
SS-20	441[d]	1977	5 000	3 × 250 kt	1 323–2 205
SS-4	112(<)	1959	2 000	1 × 1 Mt	112
SS-12 Mod 1/2	120	1969/78	800–900	1 × 200 kt–1 Mt	120
Scud B	600	1965	280	1 × 100–500 kt	1 200
SS-23	. .	(1985)	350	1 × 100 kt	. .
Frog 7	406	1965	70	1 × 10–200 kt	406–1 218
SS-21	224	1978	120	1 × 20–100 kt	224– 672
SS-C-1B[e]	100	1962	450	1 × 50–200 kt	100
SAMs[f]	. .	1956	40–300	1 × low kt	. .
Other systems					
Artillery[g]	2 700	1974	10–30	1 × low kt	. .
ADMs	. .	. .	. .	. .	. .
Naval systems:					
Aircraft					
Backfire	132	1974	3 700	2–3 × bombs or ASMs	264
Badger	220	1961	4 800	1–2 × bombs or ASMs	480
Blinder	35	1962	2 200	1 × bombs	35
ASW aircraft[h]	204	1965	[h]	1 × depth bombs	204
Anti-ship cruise missiles					
SS-N-3	264	1962	450	1 × 350 kt	264
SS-N-7	96	1968	56	1 × 200 kt	96
SS-N-9	224	1969	111	1 × 200 kt	224
SS-N-12	120	1976	500	1 × 350 kt	120

SS-N-22	36	1981	111	1 × 200 kt	36
Land-attack cruise missiles					
SS-N-21	. .	1986	3 000	1 × . .	. .
SS-NX-24	(12)	(1986)	<3 000	1 × . .	. .
ASW missiles and torpedoes					
SS-N-14	300	1968	50	1 × low kt	300
SS-N-15	. .	1972	40	1 × 10 kt	. .
SUW-N-1/FRAS-1	10	1967	30	1 × 5 kt	10
Torpedoes	. .	1957	16	1 × low kt	. .
Naval SAMs[i]					
SA-N-1	65	1961	22–32	1 × 10 kt	65
SA-N-3	43	1967	37–56	1 × 10 kt	43
SA-N-6	33	1981	65	1 × 10 kt	33
SA-N-7	9	1981	28–52	1 × 10 kt	9

[a] Estimates of total warheads are based on minimal loadings of delivery systems.

[b] There are some 360 Badger and Blinder strike variants, approximately two-thirds of which are Badgers.

[c] Nuclear-capable tactical aircraft models include MiG-21 Fishbed L, MiG-27 Flogger D/J, Su-7 Fitter A, Su-17 Fitter C/D/H, Su-24 Fencer and Su-25 Frogfoot.

[d] Includes 36 launchers currently unlocated by the USA.

[e] Land-based anti-ship missile.

[f] Nuclear-capable land-based SAMs probably include SA-1, SA-2, SA-3, SA-5 and SA-10 missiles.

[g] Artillery includes M-1981 2S5 152-mm SP gun, M-1976 152-mm towed gun, M-1975 203-mm SP gun, M-1975 240-mm SP mortar and a new howitzer/mortar (probably 152-mm) assigned to airborne and air assault units. An additional 4000 M-1973 2S3 152-mm SP howitzers and older 152-mm towed guns have a potential nuclear capability, as do the 152-mm guns deployed on Sverdlov Class cruisers.

[h] Includes 94 Be-12 Mail (range 2000 km), 50 Il-38 May (range 2500 km), and 60 Tu-142 Bear F aircraft (the Bear F has a range of 8300 km, although it is used in theatre ASW roles). All ranges represent unrefuelled combat radius.

[i] The SA-N-1, SA-N-3 and SA-N-6 are believed to have a definite nuclear capability and the SA-N-7 a possible nuclear capability. Numbers deployed are the number of launch arms (e.g., two twin launchers equals four launch arms) deployed on ships. Overall, there are more than 3300 SAMs of these four types deployed on 70 ships of 11 classes.

Sources: Arkin, W. M. and Sands, J. I., 'The Soviet nuclear stockpile', *Arms Control Today*, June 1984, pp. 1–7; Polmar, N., *Guide to the Soviet Navy*, 3rd edition (US Naval Institute: Annapolis, MD, 1983); Department of Defense, *Soviet Military Power*, 1st, 2nd, 3rd, 4th editions; NATO, *NATO–Warsaw Pact Force Comparisons*, 1st, 2nd editions; Defense Intelligence Agency, 'A guide to foreign tactical nuclear weapon systems under the control of ground force commanders', DST-1040S-541-83 (secret, partially declassified), 9 Sep. 1983; Statement of Rear Admiral John L. Butts, USN, Director of Naval Intelligence, before the Seapower and Force Projection Subcommittee, Senate Armed Services Committee, 26 Feb. 1985; Joint Chiefs of Staff, *United States Military Posture for FY 1987*; Polmar, N., 'The submarine enigmas', US Naval Institute *Proceedings*, Jan. 1986; *Field Artillery Journal*, Jan.–Feb. 1985; Gordon, M. R., 'Pentagon reassesses Soviet bomber', *New York Times*, 1 Oct. 1985, p. A8; interviews with US DoD officials, Apr. and Nov. 1985; Sands, J. I., 'A review of *Soviet Military Power 1985*', Nuclear Weapons Databook Working Paper no. 85-2, July 1985.

Table 3.6. 1985 NIE estimate of Soviet strategic warheads for 1994

Type/ weapon system	Per cent of launchers, by type	Per cent of warheads, by type	No. of warheads[a]	Per cent of total warheads[a]
ICBMs	*100*	*100*	10 400–12 850	*61.6–64.5*
New ICBM fixed	*20.8*	*38.3*	4 000– 4 950	*23.7–25.0*
SS-24 fixed	*26.0*	*31.6*	3 300– 4 050	*19.4–20.8*
mobile	*11.3*	*13.7*	1 400– 1 750	*8.4– 9.0*
SS-25 mobile	*29.4*	*8.6*	900– 1 100	*5.3– 5.7*
SS-19 fixed	*12.5*	*7.8*	800– 1 000	*4.8– 5.1*
SLBMs	*100*	*100*	4 200– 5 650	*25.8–27.1*
New SSBN	*3.1*	*7.2*	300– 400	*1.8– 1.9*
Typhoon	*13.6*	*30.8*	1 300– 1 750	*8.0– 8.4*
Delta III/IV	*27.2*	*49.2*	2 050– 2 800	*12.7–13.3*
Delta I/II	*27.8*	*6.4*	275– 350	*1.7– 1.8*
Yankee	*28.3*	*6.4*	275– 350	*1.7– 1.8*
Bombers	*100*	*100*	1 600– 2 350	*9.7–11.2*
Bear H	*34.2*	*43.9*	700– 1 030	*4.3– 4.9*
Blackjack	*48.9*	*52.5*	840– 1 235	*5.2– 5.9*
Old Bear	*16.9*	*3.6*	60– 85	*0.4*

[a] The low estimates in these columns reflect adherence to the SALT II limits through 1990; the high estimates are the NIE estimates for the case of a break-out from the SALT II Treaty in 1986.

Source: Authors' calculations, derived from testimony of Robert M. Gates, Chairman, and Lawrence K. Gershwin, National Intelligence Officer, National Intelligence Council, before a joint session of the subcommittees of the Committee on Armed Services and the Committee on Appropriations of the US Senate, *Soviet Strategic Force Developments*, Senate Hearing 99–335, 26 June 1985, pp. 6–13.

1984) have begun sea trials.[45] When the SS-NX-23s become operational in 1986 on the Delta IVs and soon thereafter on Delta IIIs, these Soviet SSBNs will be able to target the entire United States without having to travel several hundred kilometres out into the Greenland Sea.[46] Two Yankee I SSBNs and the last remaining Hotel II SSBN have been removed from service to compensate for the new deployments in accordance with the SALT I Interim Agreement. Overall, the current strategic submarine force now carries 983 SLBMs armed with approximately 2500 warheads.[47] This total includes 13 Golf II Class submarines with 39 SS-N-5 missiles and some of the Yankee I Class submarines with SS-N-6 missiles assigned theatre missions, and a Hotel III and Golf III Class most probably assigned to missile trials and training.[48]

The development of survivable, long-range submarine-launched ballistic missiles that can strike the United States from waters contiguous to the Soviet Union is a significant trend in Soviet strategic forces. This trend will continue as Delta IV and Typhoon SSBNs are being completed at the rate of about one per year, and the pace of change will accelerate as SS-NX-23 missiles are retrofitted to the Delta III SSBN force. Additionally, a new class of strategic missile submarine is expected to enter the force in the early 1990s, a replacement for the SS-N-20 on Typhoon submarines is expected to begin flight-testing in the near future, and a missile in the same class as the SS-NX-23 will probably be tested in the 1980s. The NIE estimated in 1985 that, by 1994, SLBM warheads will account for about 26 per cent of all strategic warheads, with half of the

SLBM warheads carried by Delta III and Delta IV submarines, about one-third carried by Typhoon submarines, and the remaining 16–17 per cent evenly split between Yankee, Delta I and II and the new class of submarine (see table 3.6).

Testimony given in 1985 by Admiral Watkins, US Chief of Naval Operations, indicates that the USSR uses a two-crew system for its SSBNs, the first time such a fact has been made public.[49] Previously, it was assumed that the relatively low percentage of Soviet on-station SSBNs was due in part to the fact that the Soviet Union used a single crew for its SSBNs. Given the transition towards longer-range SLBMs, a two-crew system could lead to a large shift in the on-station percentage of Soviet SSBNs.

Strategic bomber programmes

The number of Soviet strategic bombers remained approximately the same in 1985 although the number of deliverable weapons increased with the addition of ALCM-equipped Bear H squadrons. Bear H bombers now reportedly conduct routine intercontinental training to points off the North American coasts.[50] Integration of the ALCM into the Soviet bomber force is reportedly progressing at a slower rate than anticipated. The bomber force continues to have a low alert rate—no bombers are considered to be on standby alert.

It is now believed that the new Blackjack bomber, which was in 1983 expected to enter service in 1986–7, may be operational in 1988 or 1989.[51] The Blackjack will almost certainly carry the AS-15 ALCM, and will probably also be designed for low-altitude high-subsonic penetration of air defences. Both the Blackjack and Bear H are expected to carry improved variants or follow-ons of the AS-15, which are expected by the 1990s.[52] Bison and older Bear bombers are expected to be phased out of service, and the ALCM-equipped bomber force is expected to sustain a fivefold increase by the middle of the decade. At that time, ALCMs are expected to account for some 10 per cent of all Soviet strategic warheads (up from just over 3 per cent today; see tables 3.4 and 3.6).

Strategic defence developments

The Soviet Union continued to upgrade the operational ABM (anti-ballistic missile) system around Moscow in 1985. Since the early 1980s, the system has been expanded to include the full 100 launchers allowed under the limits of the 1972 ABM Treaty. The first new silo launchers for the SH-08 endo-atmospheric missiles, armed with a low-yield nuclear warhead, became operational in 1985, complementing the remaining force of Galosh ABM-1B exo-atmospheric missiles.[53] The Galosh missiles may be replaced by the SH-04 exo-atmospheric missiles; and the new Moscow ABM system, with 100 silo-based endo- and exo-atmospheric nuclear-armed interceptors, could be fully operational by 1987.[54] It is believed that the ABM silo launchers will have the capability of one reload/refire per silo, although the reload/refire time is unclear.[55] The ABM Treaty prohibits 'automatic or semi-automatic or other similar systems for rapid reload' of the permitted launchers, and the existing

evidence is ambiguous as to whether the Soviet Union has a system for rapid reload.[56]

In October 1985, the USA released a report which primarily restated previously released data supporting the contention that the Soviet Union may be preparing an ABM defence of its national territory while also proceeding apace with research and development (R&D) of advanced defences against ballistic missiles.[57] According to this and other US reports, the Soviet Union has embarked on a multi-faceted non-nuclear defensive R&D programme that has made progress in several advanced defence technology areas. This progress, the USA claims, could lead in the next few decades to operational defensive systems, including deployments of: (*a*) high-energy lasers for ground- and space-based anti-satellite (ASAT) missions and ballistic missile defence (BMD), air defence of high-value strategic targets and theatre forces, point defence of ships at sea, and airborne lasers in several roles; (*b*) particle-beam weapons for space-based ASAT and BMD missions; (*c*) ground- or space-based radio-frequency weapons for ASAT or, perhaps, BMD missions; and (*d*) long- and short-range, space-based kinetic-energy systems for BMD, point defence of satellites or space defence, or ASAT missions.[58]

Many of these specific contentions are necessarily speculative, given that all of these activities are being pursued mostly in long-term R&D programmes. The existence of some of the programmes has been publicly confirmed by Soviet officials. General Nikolai Chervov, often a spokesman for the Soviet Defence Ministry, has noted that the present ABM systems 'are becoming outdated [and] need to be replaced and in this respect, there is research being done in our country'.[59] He acknowledged that laser experiments to locate and detect satellites are being carried out from Sary-Shagan.[60]

Theatre nuclear forces

The modernization programme for Soviet theatre forces continued in 1985. Deployments continued, and research and development of follow-on systems progressed in all areas. There are many unresolved questions about Soviet theatre forces: for example, the degree of nuclearization of dual-capable aircraft, missile and artillery systems. In virtually all areas, the USA believes that the USSR, while not de-emphasizing nuclear capabilities, is focusing more on improvements in conventional capabilities. For instance, the USA believes that tactical aircraft are increasingly being given conventional interdiction roles, and the new short-range ballistic missiles are designed to enhance their conventional missions.

Long-range theatre missiles

After new deployments of SS-20 missiles virtually ceased during 1984, 1985 was a period of almost frenetic activity. The USSR continued to retire SS-4 missiles and has renewed deployments of SS-20 missiles. Although 112 SS-4s were in service as of mid-1985,[61] all remaining missiles are expected to be retired during 1986.

The latest count on the SS-20 is 441, 36 of which are not currently located by

the USA.[62] As reported in the *SIPRI Yearbook 1985*, the first two new deployments above the 387 level occurred in late 1984.[63] By 2 April 1985, the number of SS-20s deployed was 414,[64] rising to 423 by late June,[65] and to 441 by September.[66] The number of operational SS-20 missiles facing Europe was reported to have been reduced from 297 to 243 in November, following promises made by General Secretary Gorbachev in Paris on 3 October 1985 to reduce the number of missiles on standby alert. However, the USSR reportedly only dismantled the SS-20 garages at the sites and has not destroyed the missiles.[67] The SS-25 deployments at Yurya have resulted in shifted deployments throughout the Soviet Union of SS-20 regiments and launchers, and whereas detailed information was possible about SS-20 deployment locations in the past, almost on a regimental basis, such detail was not available in January 1986. The overall SS-20 force is expected to grow to over 450 by 1987,[68] despite partial or complete deactivation of some bases in the western USSR to reduce the number targeted against NATO and to convert to the SS-25.

A new modification of the SS-20 is currently being deployed. The accuracy of the new modification reportedly represents an almost threefold improvement over that of the original 1977 version. Additionally, the yield of the primary warhead has been re-evaluated by US intelligence to be 250 kt, not 150 kt, per warhead. The USA also believes that there may be either a 75-kt modification or selectable-yield capability down to that level, in addition to a warhead as large as 600 kt.[69] The 1985 NIE apparently backtracked on the question of reload capability for the SS-20. Although the DIA dissented, the 1985 NIE gave the SS-20 only an 'estimated reload capability', whereas earlier it was considered certain. Apparently, in previous years the intelligence community underestimated the rate of launcher production which, given its missile production estimates, led to an overestimation of the number of missiles per launcher. The follow-on to the SS-20 was also reportedly designated in 1985 as the SS-28.[70] It was first tested in 1984 and is expected to feature improved lethality and accuracy.[71]

The expected introduction date of the SSC-X-4 ground-launched cruise missile has been pushed back again, this time to 1990, five years later than originally expected.[72] It is also believed that another large, land-based, long-range GLCM, a version of the SS-NX-24, is under development.

Tactical rockets, missiles and artillery systems

The buildup of tactical nuclear systems continued in 1985, with new emphasis given to the conventional aspects of the dual-capable systems. This buildup included the continued deployment of new short-range missiles, ongoing phase-out of Frog and Scud missiles, and upgrade of the SS-12 Scaleboard. Improvements in guidance and control, warhead capabilities and accuracies for the Soviet shorter-range missiles are expected over the next few years.[73]

It is now known that the so-called SS-22 is a modification of the SS-12 Scaleboard, designated SS-12 Mod 2, rather than a new missile. The Scaleboards are assigned to the Front level, with a brigade of 12–18 launchers.

It has a range of about 900 km, which is a little longer than the Pershing 1a (740 km). There are a total of 120 launchers, with continued new forward deployments in the German Democratic Republic and Czechoslovakia. It is believed that the SS-12 Mod 2, like the SS-12 Mod 1, is perhaps only a nuclear system, and not dual-capable. It has replaced the SS-20 as the primary Soviet theatre nuclear strike weapon in the Far East, enabling the SS-20 to be concentrated primarily against Chinese fixed targets.

The SS-21 has totally replaced Frogs in all divisions at the highest readiness level (Category I). The missile is believed to be much more accurate and have almost double the range (120 km) of the Frog 7 (70 km), thereby representing an upgrade equivalent to the US upgrade from the Honest John to the Lance missile. There are a total of 630 SS-21 and Frog launchers. The Frog 7s are considered primarily to have a nuclear role, while the SS-21s are thought to be truly dual-capable, with increased emphasis on conventional missions. The SS-21 was first shown publicly in the 9 May 1985 parade in Moscow commemorating Victory Day over Germany.[74]

Forward Armies and homeland Fronts have Scud missile brigades each with 12–18 SS-1c Scud Bs. The SS-23 missile has still not been introduced in any appreciable numbers, and is now about five years behind its original estimated date of initial operation. There are 600 Scud launchers in total. The Scud Bs are thought to be primarily nuclear weapons, with few conventional capabilities.

US statements about the nuclear capabilities of Soviet artillery systems have become increasingly more definitive. For example, where statements in the 1970s noted that theatre nuclear weapons possibly included artillery systems,[75] statements in the early 1980s note that the new systems are nuclear-capable or have been adapted to fire nuclear projectiles.[76] This is partly due to the large expansion and modernization programme for new artillery systems evident since the late 1970s. There has been a 40 per cent increase in artillery tubes opposite NATO since 1979, as well as the deployment of a fourth artillery battalion in Army level brigades and the deployment of artillery tubes with calibres larger than 130 mm for the first time (beginning in 1982) at the division level. Fourteen per cent of all Soviet Army artillery tubes are now self-propelled, and 70 per cent of these tubes are located opposite NATO.

Five artillery pieces of three different calibres are believed to be capable of firing nuclear projectiles: the M-1981 2S5 self-propelled 152-mm gun, the M-1976 towed 152-mm gun (first seen publicly in the 1985 Victory Day parade[77]), the M-1975 self-propelled 203-mm gun, the M-1975 self-propelled 240-mm mortar, and a new howitzer/mortar (probably 152 mm) assigned to airborne and air assault units.[78] Overall, there are reportedly 7700 tubes of three calibres—152 mm, 203 mm and 240 mm—that have a nuclear capability according to the US Defense Department, although 4000 of these tubes are 152-mm guns (M-1973 2S3 self-propelled 152-mm howitzers and older 152-mm towed guns) which have a questionable nuclear capability.

Theatre and tactical aviation

There are now some 150 Tu-22M Backfire medium-range bombers in Soviet Strategic Aviation. The Backfire is the only Soviet medium-range bomber still

in production; in 1984 and 1985 production was slightly below 30 per year,[79] with new aircraft entering both Strategic Aviation Armies and Soviet Naval Aviation regiments. The overall medium-range bomber inventory has been decreasing since Tu-16 Badgers are being retired at an accelerated rate.

The range of the Backfire bomber is still debated, and the USA continues to estimate that the aircraft has an intercontinental capability. In October 1985, a senior US official noted that the Backfire force 'constitutes . . . a strategic threat to the United States' and included the Backfire force (including those assigned to Soviet Naval Aviation) in a count of Soviet strategic nuclear forces—as did the JCS in January 1986.[80] Just before this pronouncement, however, it was reported that the US intelligence community revised its estimate of the Backfire's range. Previously, the DIA had estimated the unrefuelled range of the aircraft as 5000 km, more than one-third higher than the CIA estimate of 3700 km. With the revision, partly a result of a revised estimate of the aircraft's fuel consumption rate, the DIA's estimate reportedly has moved substantially towards that of the CIA.[81]

The tactical aircraft most often used in military exercises in the nuclear delivery role are the MiG-27 Flogger D/J, the Su-17 Fitter C/D/H, and the Su-24 Fencer. Conversion from the Fitter to the Fencer is now complete with the Group of Soviet Forces in the GDR. Fencers are also being deployed with Strategic Aviation, probably replacing the Badgers that are being retired. The deployment of more helicopters in organic units in the Soviet Army, together with the deployment of more capable tactical SAMs (surface-to-air missiles) at division level, have led the US intelligence community to believe that close-air-support roles are increasingly being removed from new-generation tactical aircraft, which are being assigned interdiction roles.

Naval developments

The expansion of Soviet naval capabilities and areas of operation continued in 1985. The Navy conducted three major naval exercises:

1. The largest Soviet exercise ever held in the Pacific took place in April, involving some 75 per cent of the Pacific Fleet's ships and submarines. The focal point was an attack on a simulated US carrier task force designed to recreate and improve upon the Soviet response to the US Navy's 1984 fleet exercises during which Soviet aircraft flew poorly executed simulated attacks against US carriers.[82]

2. The largest co-ordinated and most active limited-area exercise to date, Summerex 85, took place in the North Sea in July, involving 38 surface combatants, 39 attack submarines, 25 auxiliaries and hundreds of aircraft. The aircraft flew some 275 sorties, the highest number since Okean 75, and the exercise lasted twice as long as a typical exercise in the area.[83]

3. The first amphibious landing in the Pacific since 1978 and the largest to date took place in August in the Kuril and Sakhalin Islands, involving more than 30 submarines and surface ships.[84]

Several naval construction programmes continued in 1985. Soviet non-strategic submarine activities, the highlight of 1984 naval developments, were less prominent during 1985. In the cruise missile-carrying category, a third

Oscar Class submarine was introduced, and this class remains in series production at the rate of roughly one per year.[85] Modification of the Echo II Class to carry the SS-N-12 in place of the SS-N-3 is also continuing,[86] and a former Yankee Class SSBN has been rebuilt as the trials vessel for the SS-NX-24 long-range, land-attack cruise missile, with launch tubes for 12 of these missiles. A new nuclear-powered submarine with up to 24 SS-NX-24 missiles is expected to enter service by the end of the decade.[87] In addition, SS-NX-21 cruise missiles are being fitted to at least one and probably several classes of nuclear attack submarine. The candidates for this missile include at least one former Yankee Class SSBN converted to an SSN (others are laid up or in the process of conversion) and the lead ships of three new SSN designs, the Mike, Akula and Sierra Classes.[88] The *Yankee* and *Sierra* were completed in 1984, and the *Mike* and *Akula* in 1985. None of these ships has yet begun full-scale operations or entered series production, and it is not yet clear whether all of the new designs will enter series production. The 'attack' submarine that the USSR selects will most likely replace Delta and Yankee Class SSBNs on patrol off the US coasts.[89] The only Soviet SSN launched in 1985 was another Victor III Class, the 21st (and possibly last) of this class.[90]

The major Soviet surface ship development in 1985 was the launching of the large-deck aircraft-carrier in December in the Black Sea.[91] The carrier is believed to use both nuclear and steam propulsion and to be fitted with a ramp on its bow (similar to a ski jump) and an angled flight deck. It is now estimated that the ship is about 300 m long with a 65 000 ton displacement. Sea trials could begin as early as 1988 with a limited initial operational capability (IOC) in about 1990. Given the limited Soviet experience with sea-based aviation, the carrier is not expected to be fully operational until about 1995.[92] A second carrier is now under construction at the Nikolayev Shipyard.[93] Other surface ship developments during 1985 include the deployment of additional Sovremennyy and Udaloy Class destroyers, the completion of the overhaul on the first Kiev Class carrier, the continued construction of additional Kirov and Slava Class cruisers, and the autumn transfer of the second Kirov Class cruiser to the Pacific Fleet in the company of a Sovremennyy and a Udaloy destroyer, the first Pacific Fleet deployments for each of these classes.[94] Finally, an additional squadron of Backfire bombers was deployed with Soviet Naval Aviation, and improvements have been made to the deployment base and staging facility at Cam Ranh Bay, Viet Nam, with the addition of a sixth floating dock to the base and permanent fuel storage tanks for aircraft.[95]

IV. Britain

Air Force

Nine squadrons of Tornado dual-capable strike aircraft are now in service, of which six squadrons are forward deployed in FR Germany, with a seventh squadron to join in 1986. November 1985 marked the demise of the Jaguar aircraft in the nuclear strike/attack role in FR Germany, with all those squadrons now operating the Tornado.[96]

The Harrier GR.5 Strike Fighter made its first flight in April 1985 at Dunsfold, England.[97] The RAF has 60 of the nuclear-capable aircraft on order, with initial deployment planned for 1987–8 at RAF Gutersloh, FR Germany.

SSBNs

Submarine squadron number 10, comprising four Polaris submarines, has completed a total of some 170 operational patrols (resulting in an average 54 per cent at-sea availability) since the maiden patrol of *HMS Resolution* in 1968, all supposedly without incident or interruption. Nevertheless, in June 1985 the *HMS Resolution* collided with an 18-m fishing boat while preparing to launch a Chevaline-equipped A3-TK missile at the US Eastern Test Range as part of the qualification procedures necessary for patrols with the new missile.[98] With a fleet of only four Polaris submarines, and a 54 per cent at-sea availability, this means that one or two submarines are on patrol at any one time (1.44 average). In addition, an operating British nuclear-powered submarine can be expected to have several reactor incidents a year, some of which result in loss of power or propulsion.[99] Such accidents could result in Britain having no SSBNs on active patrol or ready to commence active patrol at some given time.

Chevaline

Britain is in the process of modernizing its Polaris SLBMs with the Chevaline 'front end', a combination of warheads, guidance package and penetration aids. The Chevaline-equipped missiles, designated A3-TK, have two MRV warheads with improved accuracy, range and flexibility.

As of September 1984, all the operational at-sea SSBNs (*HMS Renown* and *Revenge*) were equipped with the Chevaline re-entry system, prompting the British Ministry of Defence (MoD) to declare the programme completed.[100] This may have been true in terms of expenditure, with 97 per cent of the total funds already spent,[101] but not in terms of the deployment timetable.

After the test firings in June 1985, *HMS Resolution* became the third submarine to deploy the improved Chevaline A3-TK missile system. As of January 1986 the last boat, the *HMS Repulse*, was still having its third refit, which will be completed during the year. After a further nine-month period, which will include similar test firings at the Eastern Test Range, the boat will be ready for its maiden patrol with the Chevaline system in the spring of 1987.[102] New motors are being fitted to the Polaris/Chevaline missiles to enable them to remain operational until the end of the 1990s.

Trident

Britain is proceeding with its plans to build a new class of submarines that will be equipped with Trident SLBMs (and thus provisionally called the Trident Class). The Trident SSBN force will begin to be introduced in the mid-1990s, and will not be completed before the end of the century.

The request for bids for the first of the new class of SSBNs went out on schedule in October 1984, and the MoD expects to place the order with Vickers

Table 3.7. British nuclear forces, 1986[a]

Weapon system				Warheads	
Type	No. deployed	Year deployed	Range (km)[b]	Warhead × yield	No. in stockpile
Aircraft					
Buccaneer S2	30	1962	1 700	2 × bombs	60
Tornado GR-1[c]	180	1982	1 300	2 × bombs	360
SLBMs					
Polaris A3[d]	16	1968	4 600	3 × 200 kt	48
Polaris A3-TK	48	1982	4 700	2 × 40 kt	96
Carrier aircraft					
Sea Harrier	30	1980	450	1 × bombs	30
ASW helicopters					
Sea King	69	1976	. .	1 × depth bombs	69
Wasp	16	1963	. .	1 × depth bombs	16
Lynx	35	1976	. .	1 × depth bombs	35

[a] 34 Nimrod ASW aircraft, 12 Lance launchers and artillery guns (five regiments) are also certified to use US nuclear weapons.

[b] Range for aircraft indicates combat radius, without refuelling.

[c] 220 Tornado attack aircraft (GR-1) are on order for the Royal Air Force. Some Buccaneer and Jaguar aircraft already withdrawn from bases in FR Germany may be assigned nuclear roles in the UK.

[d] The Polaris A3-TK (Chevaline) is deployed on all 3 operational SSBNs. The *HMS Repulse* is credited with 16 Polaris A3-TK missiles, even though it will be in refit until mid-1986 and will not go on its first patrol with Chevaline until 1987.

Sources: Moore, J. (ed.), *Jane's Fighting Ships 1982–83* (Jane's: London, annual); Taylor, J. W. R., *Jane's All the World's Aircraft, 1982–83, 1983–84* (Jane's: London, annual); Beaver, P., *The Encyclopaedia of the Modern Royal Navy* (London, 1982); British Ministry of Defence, Statement on the Defence Estimates, 1980 through 1985 (Her Majesty's Stationery Office: London, annual); Rogers, P., *Guide to Nuclear Weapons 1984–85* (University of Bradford: Bradford, 1984); British House of Commons, Defence Committee Report, Session 79/80, 23 July 1980; Nott, J., 'Decisions to modernise U.K.'s nuclear contribution to NATO strengthen deterrence', *NATO Review*, vol. 29, no. 2 (Apr. 1981).

for the construction of the first submarine early in 1986. Once this order is placed, the main work on the programme will begin and the expenditure will grow accordingly (only 7 per cent has been spent so far).[103] In 1985 a PWR2 nuclear reactor for the Trident Class submarines (among others) was sent to the Royal Navy's Vulcan facility at Dounreay in Scotland, where it will be operated for four years before being committed to a submarine.[104]

The period of substantial expenditure on the Trident programme has yet to begin. Construction is planned at Faslane and Coulport, Rosyth, the Atomic Weapons Reserch Establishment (AWRE) Aldermaston, and the Royal Ordnance Factory (ROF) Burghfield. Production of the warheads was supposed to start in 1986, lasting 8–10 years, although some delays have already occurred. Fissile material will be taken from Polaris missile warheads as they leave service and will be used for the new warheads.[105]

The communications system for submarines is being updated, possibly with Trident in mind. Of the £22 million to be spent on improving the British very-low frequency (VLF) communications system, £1.7 million was spent by the end of April 1985.[106] Britain has also begun studies of the optimum location for its planned extremely-low frequency (ELF) submarine communications system. This ELF system will improve the Navy's ability to broadcast to the submarine fleet while at greater depth and speed than permitted by a VLF system, thus reducing the risk of detection. The British MoD has chosen a site in the Glen Garry forest of Scotland to install an experimental ELF transmitter beginning in 1986.[107]

V. France

The defence budget

Nuclear weapons received priority once again in the 1985 French defence budget, with 19.9 per cent of the total budget going to nuclear forces, and 30 per cent of the expenditure on equipment likewise going to the nuclear forces. (Over the period 1984–8, 31.7 per cent of the equipment budget is earmarked for nuclear weapon programmes.) The Navy will get more money for new construction, a 13 per cent increase over 1985. This will go to beefing up the French strategic submarine force (Force Océanique Stratégique, FOST), procuring a new nuclear-powered aircraft-carrier, and building three more SSNs.

Nuclear tests

France is determined to continue its nuclear testing in the South Pacific, despite mounting pressure from regional governments, an embarrassing scandal following the sinking of the Greenpeace flagship *Rainbow Warrior* and the gradual collapse of the coral reef where France has been detonating warheads for 20 years (see chapter 6 and *SIPRI Yearbook 1984*, chapter 2).

Nuclear weaponry officially scheduled for testing in 1985 included the TN71 warhead for a new generation of SLBM, the warhead for an air-to-ground

Table 3.8. French nuclear forces, 1986

Weapon system				Warheads		
Type	No. deployed	Year deployed	Range (km)[a]	Warhead × yield	Type	No. in stockpile
Aircraft						
Mirage IVA[b]	16	1964	1 500	2 × 70 kt	AN-22	32
Mirage IVP[c]	9	1986	1 500	1 × 150 kt	ASMP	12
Jaguar A	45	1974[d]	750	1 × 6–8/30 kt	[e]	50
Mirage IIIE	30	1972[d]	600	1 × 6–8/30 kt	[e]	35
Refuelling aircraft						
C-135F/FR	11	1965	..	..	..	..
Land-based missiles						
S3	18	1980	3 500	1 × 1 Mt	TN-61	18
Pluton	42	1974	120	1 × 15–25 kt	ANT-51	120
Submarine-based missiles						
M-20	80	1977	3 000	1 × 1 Mt	TN-61	80
M-4	16	1985	4 000	6 × 150 kt	TN-70	96
Carrier aircraft						
Super Etendard	36	1978	650	1 × 6–8/30 kt	[e]	40

[a] Range for aircraft indicates combat radius, without refuelling.

[b] The AN-51 warhead is also possibly a secondary bomb for tactical aircraft, and the AN-52 is also possibly a secondary bomb for the Mirage IVA.

[c] A second squadron of 9 aircraft will be operational by the end of 1986, replacing an equal number of Mirage IVA variants (which have already been deducted from the above total of 16). It is assumed that the remaining 16 Mirage IVAs will no longer operate in a nuclear strike/attack mode.

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

[e] Warheads include ANT-51, ANT-52 and possibly a third type.

Sources: Laird, R. F., 'French nuclear forces in the 1980s and the 1990s', *Comparative Strategy*, vol. 4, no. 4 (1984), pp. 387–412; Langereux, P., 'Missiles tactiques et engins: cibles français en service, en developpement ou en étude', *Air et Cosmos*, 28 May 1983, p. 180; Defense Intelligence Agency, 'A guide to foreign tactical nuclear weapon systems under the control of ground force commanders', DST-1040S-541-83-CHG 1 (secret, partially declassified), 17 Aug. 1984; International Institute for Strategic Studies, *The Military Balance 1983–84* (IISS: London, annual).

medium-range missile, the ASMP, and that of the Hadès surface-to-surface missile, due to enter service in 1992. French scientists are also believed to be conducting final tests on a neutron bomb.[108]

Army

There has been much speculation about the neutron bomb in the past, as to whether it would ever be deployed, and if so in what form. France ordered feasibility studies on the neutron bomb in December 1976, and by June 1980 President Giscard d'Estaing was able to announce that it had tested such a weapon, although not specifying when or where.[109] It is commonly believed, however, that these tests were concerned with the evaluation of components of the neutron bomb, rather than a test of a complete prototype weapon. In 1983 President Mitterrand said that 'France holds itself ready to mass produce the neutron bomb', 'although the decision to do so has not yet been taken'.[110] Also in 1983, Defence Minister Hernu went further and said that neutron weapons should be ready for the start of the Hadès SSM (surface-to-air missile) programme in 1992 and that the military programme 'permits this decision, but does not anticipate it'.[111] France was still testing and refining the procedure in 1985.

Although a political decision has not yet been made concerning the production or deployment of the neutron bomb, it came a step closer in 1985. In September 1985 the French Army high command revealed for the first time that the primary characteristic of the Hadès SSM, due to replace the Pluton in the 1990s, is 'its ability to satisfy the technical requirements attaching to the use of weapons having minor side-effects',[112] in other words, the neutron bomb.

Air Force

Despite an all-round spending squeeze, the French Air Force is maintaining its intensive re-equipment programme. The Airex-85 manoeuvres in March demonstrated this, as they were the biggest and longest war games since World War II.[113]

Qualification firings of the ASMP air-to-surface missile (ASM) from the Mirage IVP and Mirage 2000N aircraft began, and initial deliveries of production missiles were made in 1985.[114] First operational deployment of the ASMP will take place in May 1986 aboard the reworked Mirage IVP aircraft, with the second and last squadron entering service in late 1986.[115] By this time the number of aircraft will have reached a total of 18.

As for the Mirage 2000N, production deliveries are scheduled to start in 1986, and 36 will be in service by 1988, when the Mirage 2000N will become operational as a replacement (or perhaps supplement) for Mirage IIIE and Jaguar nuclear attack aircraft.[116] After 1988 another 49 Mirage 2000Ns will be delivered.

Modification of the first batch of Super Etendard aircraft to carry the ASMP started in 1984, and approximately 43 such aircraft will be updated before their 1988 ASMP operational deployment date, with another 10 following after 1988.

Together with these improvements to the strike aircraft, the Armée de l'Air has also decided to equip its 11 Boeing C-135F strategic refuelling tankers with new engines. The first reworked aircraft was received in November 1985, designated C-135FR, and all 11 are expected to be back in service by late 1987.[117]

Force Océanique Stratégique

The M4 missile was brought into service aboard the new SSBN *Inflexible* with little fanfare in April 1985. This may have been because of the confusion over whether it was an MRV (multiple re-entry vehicle) or a MIRV system. It appears that France has advanced straight from a single-warhead missile to a MIRV system, bypassing the MRV stage. (Both the Commissariat à l'Energie Atomique and Aérospatiale, responsible for design and production of the warhead and the re-entry vehicle, respectively, declare the M4 to be a MIRVed system.)[118] After a total of 159 operational patrols since the maiden patrol of the *Redoutable* in January 1972[119] and after three models of single-warhead SLBMs, France was ready to deploy the multiple-warhead M4 missile. When the *Inflexible* took to the Atlantic on 25 May 1985 for its maiden operational patrol, it doubled, at one stroke, the total number of warheads carried by the submarine fleet.

The M4 is being successively refitted to four of the five Redoutable Class submarines. The exception is the first boat in the class, the *Redoutable*. Even during this period of refits (1985–92), only two submarines will be out of service at any one time, leaving four available for active patrols, with at least three permanently at sea. In 1985 another submarine, *Le Tonnant*, was taken out of service to be refitted with the M4 missile system. Upon its completion in 1987 this SSBN will be the first to deploy the M4 missile with the improved TN-71 warheads. The TN-71 will be smaller and lighter than the current TN-70, thus extending the range of the M4 from 4000 to 5000 km. New penetration aids and hardening devices have been developed to improve the weapon's ability to survive anti-missile defences. Depending upon its mission, M4s are said to carry from one to six independently targeted warheads.[120]

Future nuclear choices

The recent emphasis on strategic defence issues, such as the US Strategic Defense Initiative and the Soviet ABM modernization programme, has had important effects on the French nuclear policy debate. France initiated the Eureka research programme as a European civil alternative to SDI, sharing some of the same technology pursuits (see chapter 7). The French defence community has begun to debate seriously the future composition of French nuclear forces best suited to cope with a Soviet strategic defence system. Although SDI may be viewed with scepticism in France, the possibility of a similar Soviet programme is seen as representing a potential threat to the credibility of French nuclear forces. Since it considers the prospects for developing a perfect defensive shield against ballistic missiles wholly

unrealistic, France is concentrating on improving the penetrability and effectiveness of its offensive nuclear forces.

The French debate over its nuclear modernization programme has generated interservice disputes, particularly between the Air Force and the Navy. It appears that the Air Force and its planned mobile SX missile will lose this battle to the Navy. In a speech to the French National Defence Studies Institute on 12 November 1985, Defense Minister Quilès disclosed officially for the first time that France will soon rely on a sea-based counterforce doctrine.[121] The centrepiece of this policy is a new push to develop nuclear ballistic missiles that will be targeted on Soviet missile sites. Until now, France has targeted its missiles only on 'soft' targets such as cities.

In his speech the Defence Minister vowed to pursue and enlarge the penetration aids programme which was initiated in 1984 for the improved M4 missile. Quilès also made reference to building a new type of SLBM warhead to be launched from the New Generation class of SSBN, the first of which will enter the fleet in 1994. This also includes a 'stealthy' re-entry vehicle that would be 'almost invisible' to enemy detection systems. Development has also started on weapons that will blind Soviet radars with nuclear explosions.[122] It is unclear whether this programme has any common features with the once planned M5 SLBM package.

VI. China

Chinese nuclear weapon programmes are discussed in chapter 5; only developments in 1985 are dealt with in this section.

China continues to modernize and expand its nuclear forces with the construction of three types of land-based ballistic missile (the CSS-2, CSS-3 and CSS-4) and its new submarine-launched ballistic missile, the CSS-N-3, all at rates of 10–20 per year (see table 5.1, chapter 5).

China conducted numerous missile tests during 1985, particularly of the CSS-2 and CSS-N-3 missiles. On 28 September China successfully launched a CSS-N-3 SLBM from a submerged submarine into the East China Sea. It is not known whether the submarine used was China's single Golf Class test vessel or one of the new Xia Class SSBNs. There are some indications that at least one of the Xia Class submarines began operational patrols in 1985, although China has not announced this explicitly.[123]

While China continues to build about five Tu-16 Badger bombers per year, it is planning to augment the nuclear bomber force in the 1990s. Chinese officials told visiting US aerospace executives that China has begun to design a new supersonic bomber at the Xian aircraft plant in central China.[124]

Although no Chinese nuclear weapon tests were recorded in 1985, Chinese students staged several protests against the continued use of Lop Nor, in Xinjiang Province, as the nuclear test site. A Chinese Foreign Ministry spokesman stated that 'in the present international situation it is necessary to conduct a small number of nuclear tests to safeguard China's security'.[125]

VII. Nuclear arms control

Major developments

During 1985, the outlook for arms control was mixed. On the one hand, both superpowers continued to build new nuclear weapon systems, while accusing the other of violating past arms control agreements. On the other hand, many necessary elements for successful arms control are now in place between Washington and Moscow. Widespread expectations have been created that there will be some serious results: public pressure is strongly in favour of some agreement.

In January 1985 the USA and the USSR agreed to convene negotiations on three arms control topics in one combined set of meetings, thus effectively merging the START (Strategic Arms Reduction Talks) and stalled INF (intermediate-range nuclear forces) talks with space and strategic defence issues. Since they began the negotiations in March, the USA and the USSR have both produced proposals to reduce 'strategic' forces by 'one-half'. It is the first time that both the USA and the USSR agree to this common objective. Following the Geneva summit meeting it appears that both sides also intend to pursue a separate agreement on intermediate-range forces. So the INF talks, as of February 1986, are to some extent independent of progress at the other two negotiations.

The Soviet Union has maintained its position that it will not agree to reduce strategic offensive forces unless there is also an agreement constraining possible developments in defensive forces. The United States remains, so far, unwilling to accept any limitations on its Strategic Defense Initiative, other than those imposed by the existing Anti-Ballistic Missile Treaty, as the USA interprets it.

During 1985 compliance issues were constantly raised in the course of the arms control debate. The United States initially publicized its accusations of Soviet treaty violations and produced a number of reports, stating the details of its allegations.[126]

Amidst much bureaucratic infighting over the appropriate policy on compliance with the SALT II Treaty, US President Reagan announced on 10 June that the USA 'will continue to refrain from undercutting existing strategic arms agreements to the extent that the Soviet Union exercises comparable restraint, and provided that the Soviet Union actively pursues arms reduction agreements in the currently ongoing nuclear and space talks in Geneva'.[127] One element of this compromise decision was that the USA reserved the right to make 'proportionate responses' to any Soviet treaty violations that the USA deems to warrant response. As requested by President Reagan, the Defense Department prepared a two-part secret report entitled 'Responding to Soviet Violations Policy Study' (also known as 'RSVP') that suggested some US options for such responses.

A new compliance issue arose in October 1985, when the Reagan Administration declared a new US interpretation of the ABM Treaty that would permit all but the *deployment* of any new strategic defence system.

However, after much controversy and criticism, Secretary of State Shultz announced that while a 'broader interpretation' of the treaty was 'fully justified', the USA would honour the 'restrictive interpretation of the treaty's obligations'. This decision could be reversed at any time.

SALT II compliance

The SALT II Treaty, signed by the superpowers in 1979, formally expired at the end of December 1985. Although never ratified by the USA (and consequently not ratified by the USSR), each state repeatedly pledged to abide by its provisions, provided the other state did the same.

Currently, the USA has about 2000 operational delivery systems accountable under SALT, whereas the USSR has about 2500, a number which would have been reduced to below the 2250 limit had the USA ratified the treaty. Both parties have taken measures to comply with the provisions of SALT I and II, including deactivating older delivery systems when new ones have been introduced. For example, the USSR and the USA have both deactivated submarines to compensate for new deployments. There is no doubt that the main provisions, setting numerical limits on strategic nuclear weapon systems, have been observed.

On a number of occasions the present US Administration has accused the USSR of not complying with specific SALT II provisions. Its strongest accusation concerns the new Soviet mobile SS-25 single-warhead missile, which Defense Secretary Weinberger called 'an unquestionable violation of Soviet assurances given to us under the SALT II accord'.[128] Under SALT II, both parties are limited to developing and deploying one 'new type' of ICBM. The USSR announced that its one permitted 'new' ICBM is the SS-24 missile with 10 MIRV warheads. But the USA claims that the SS-25, which was first deployed in 1985, constitutes a second 'new' ICBM, thus violating SALT II. The USSR states that the SS-25 is a permitted modification of an earlier Soviet missile, the SS-13. SALT II does permit modification of missiles that were flight-tested before May 1979 if the changes fall within certain percentage limits of missile characteristics such as length, diameter, launch-weight and throw-weight. The USA maintains that even if the SS-25 is a modification of the SS-13, its single re-entry vehicle weighs less than half of the missile's throw-weight, in violation of a treaty obligation. The issue rests on whether the USA knows enough details about both missiles to press its allegations.

A second SALT II compliance question concerns the Soviet Union's commitment not to increase the number of strategic nuclear delivery vehicles (SNDVs) in its arsenal. The United States charged in its 23 December 1985 compliance report that the Soviet Union has deployed SNDVs above the 2504 total deployed when SALT II was signed in 1979. However, according to the US Joint Chiefs of Staff, as of 1 January 1986 the Soviet Union had 2477 SNDVs.[129]

Another issue which has been raised by the US Administration concerns the encryption of telemetric data produced during Soviet missile tests. According to the treaty, national technical means of verification must not be impeded

from assessing missile characteristics which are relevant to the treaty, like throw-weight or the number of warheads. Encryption of telemetry is, however, not prohibited in general, and the USSR has therefore argued that the compliance question could be resolved if only the USA would specify precisely which telemetry data are lacking for verification purposes. The USA refuses to do so on the grounds that this would reveal the capabilities and weaknesses of its intelligence systems.

With the formal expiration of the SALT II Treaty, it is unclear whether the superpowers will continue their official policy of not undercutting specific treaty provisions in 1986. For the USA the problem will again be posed when the eighth Trident submarine is sent on sea-trials, scheduled for May 1986. To stay within the SALT limits, the USA would have to dismantle a compensating number of launchers, probably two Poseidon submarines. Similarly, the USSR has taken action to compensate for its new missile deployments (see section III).

ABM Treaty compliance

The ABM Treaty of 1972 was a companion to the SALT I Interim Agreement, and ABM and SALT compliance issues are interrelated. The ABM Treaty is of indefinite duration but is reviewed every five years and will be up for review in 1987. If the US SDI programme continues beyond a certain level of development and testing of space-based systems, it will contravene the ABM Treaty.

There has been no suggestion that the Soviet Union has violated the main provisions of the treaty, which set out the number of ABM launchers permitted. The primary allegation is that the Soviet phased-array radar near Krasnoyarsk is being built in violation of a treaty provision that requires early-warning radars to be located at the periphery of the national territory and to be oriented outwards. The USA has also asserted that the Krasnoyarsk radar exceeds limits on power output.

The USSR has stated that the Krasnoyarsk radar is not an early-warning radar, but instead is a satellite tracking radar which does not have to comply with the ABM constraints on location, power output and antenna area. However, the radar's orientation, design and physical characteristics show that the radar is designed as an early-warning system, in violation of the ABM Treaty. The Krasnoyarsk radar belongs to a class of 'grey area' systems which might erode the ABM Treaty framework.

The USSR has raised a number of questions regarding US early-warning radars located in Greenland and England, which it states may have ABM potential. These radar systems are being upgraded with phased-array technology, and will have the kind of improved tracking, discrimination and impact prediction capabilities that could contribute to battle management—the very concerns that the USA voices about Krasnoyarsk. However, the USA asserts that, since they are not on its national territory, their capabilities do not fall under the terms of the treaty.

Allegations have also been made that the PAVE PAWS radars being

installed in Georgia and Texas may have such a wide angle coverage that they cannot be considered to fulfil the requirements of the ABM Treaty that they should be oriented outwards from the national territory.[130]

Geneva proposals

Following the meeting between Secretary of State Shultz and then Foreign Minister Gromyko in January 1985, the USA and the USSR agreed to pursue arms control agreements that would: 'End the arms race on earth and prevent one in space; limit and reduce nuclear weapons; and strengthen strategic stability'.[131]

The USA announced its four objectives for the Geneva talks as:

> Radical reductions in the number, and destructive power, of offensive strategic arms; the elimination of intermediate-range forces, or their reduction to the lowest possible equal global limits; a reversal of the erosion of the 1972 Anti-Ballistic Missile (ABM) Treaty . . .; and a discussion of the possibility of both sides moving away from deterrence based solely on the threat of massive nuclear retaliation toward increased reliance on non-threatening defenses, whether ground- or space-based, against nuclear ballistic missiles.[132]

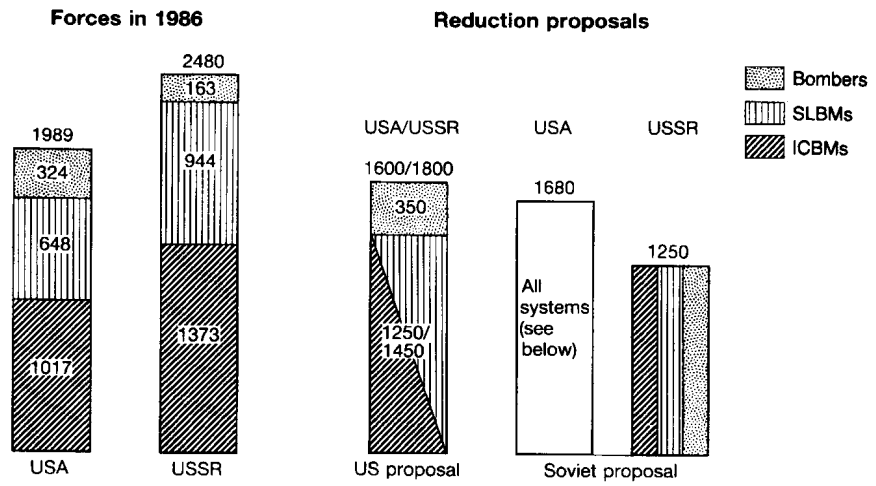
Since the negotiations opened at Geneva, there has been a succession of proposals and counter-proposals. The USA took to the Geneva talks its standing proposals from the START negotiations, which included a limit of 5000 warheads on strategic ballistic missiles and a sublimit of 2500 warheads on ICBMs. On 30 September 1985, Soviet Foreign Minister Shevardnadze presented to President Reagan the first concrete Soviet proposals for Geneva. Meanwhile, General Secretary Gorbachev unveiled many of the points of his new proposal in Paris and sought separate negotiations with France and Britain on their nuclear forces (both governments refused this offer).

On 31 October 1985, President Reagan announced that the USA had formulated a package of counterproposals which was formally presented at Geneva the next day. Reagan described the goals of the new proposals simply as, 'deep cuts, no first-strike advantage, defensive research—because defense is safer than offense—and no cheating'.[133] These offers were something of a compromise between the US START position and the Soviet proposals, although there remain considerable differences.

On 15 January 1986, General Secretary Gorbachev presented a three-stage plan to eliminate nuclear weapons by the year 2000. The first stage, lasting five to eight years, is explicitly concerned with US and Soviet nuclear weapon systems. On strategic offensive weapons, it appears to embody the proposals discussed below and set out in figures 3.1 and 3.2. It includes the requirement that 'the USSR and the USA renounce the development, testing and deployment of space-strike weapons', and also that they both agree to stop all nuclear weapon tests. This proposed first stage does embody a new suggestion on intermediate-range missiles, an important new proposal from the Soviet side.

The second stage, which should start no later than 1990, would bring in other nuclear weapon powers; it would involve, *inter alia*, the elimination of all

Figure 3.1. US and Soviet strategic nuclear weapon systems: launchers



US proposal

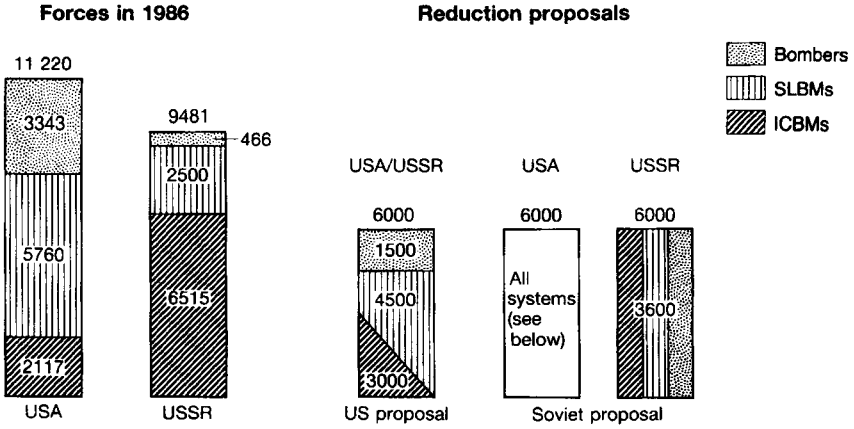
ICBMs and SLBMs would be reduced to an equal level between 1250 and 1450, to be chosen in any combination allowed under the warhead limits. If the USSR accepts this limit on missiles, the USA 'could' accept an equal limit of 350 on 'heavy' bombers (which is higher than the current active US and Soviet 'strategic' bomber totals). Modernization of heavy strategic ballistic missiles (Soviet SS-18s) would be banned, as would any new development or deployment of such missiles. All mobile ICBMs would be banned, including mobile versions of Soviet SS-24s and SS-25s, and the US small ICBM (SICBM) or possible mobile variants of the MX.

Soviet proposal

All 'strategic delivery systems', those able to reach the other's territory, would be reduced by 50 per cent. This would include only Soviet ICBMs, most SLBMs and all 'heavy' bombers (not Backfires), while including all US ICBMs, SLBMs, bombers, Pershing IIs, GLCM launchers and all other nuclear-capable aircraft and missiles able to reach Soviet territory. By Soviet counting, this gives the USA 3360 launchers and the USSR 2504, thus limiting them to 1680 and 1250 launchers, respectively. All cruise missiles with a range over 600 km would be banned, thus cancelling all long-range ALCM, GLCM and SLCM programmes. 'New' delivery systems would be banned, although it is unclear what systems would be included and when the ban would take effect.

Note: All figures assume active systems at full deployment. See tables 3.1 and 3.4 for breakdown.

Figure 3.2. US and Soviet strategic nuclear weapon systems: warheads



US proposal

The number of warheads on ballistic missiles would be limited to 4500, with a sublimit of 3000 on ICBMs, and, if there is agreement on these figures and the 50 per cent throw-weight limits proposed by the USA, equal limits of 1500 would be set on long-range ALCMs (one warhead each). This would bring both sides up to a total limit of 6000 warheads on the systems the USA is willing to limit. It would not limit gravity bombs or short-range attack missiles (SRAMs) on US strategic bombers, nor would it limit SLCMs.

Soviet proposal

Strategic 'nuclear charges' (those warheads that could strike the territory of 'the other' nation) on ballistic missiles, cruise missiles, bombs and other bomber weapons would be limited to 6000, of which no more than 60 per cent (3600) could be carried by any one component of the nuclear forces (ICBMs, SLBMs or bombers). This would include all US warheads on all systems potentially able to strike the USSR.

Note: All warhead figures assume normal loading of available systems. See tables 3.1 and 3.4 for breakdown.

tactical nuclear weapons—those with ranges up to 1000 kilometres. Stage three, beginning no later than 1995, should complete the elimination of nuclear weapons.

For the verification of the destruction of nuclear weapons and associated systems, the Soviet Union suggests a number of measures in addition to national technical means, including on-site inspection and other complementary possibilities.

The present negotiating stance

Figures 3.1 and 3.2 and accompanying text summarize the negotiating proposals of the two sides as of 1 February 1986. Several important issues are discussed below.

1. Although both sides have made proposals for some 'interim' INF agreement, it is clear that they are interested in eliminating these missiles, at least from Europe and perhaps also from Asia. The USA maintains its previous proposal to eliminate all SS-20s, Pershing IIs and GLCMs, the so-called 'zero-zero' option. The new Soviet proposal on intermediate-range missiles in Europe, which was included in General Secretary Gorbachev's statement on 15 January 1986, appears to be a big change from the Soviet Union's previous position. It offers the complete elimination of the SS-20s in the 'European zone' (presumably those located west of the Urals—243 missiles) in exchange for the removal of the US Pershing II and ground-launched cruise missiles from Europe. There remains the question of whether it would include also SS-20s located east of the Urals which are targeted on Europe. Further, it has been suggested that it might also include the removal of the SS-21s and SS-12 Mod 2s from the GDR and Czechoslovakia.[134] There is a stipulation that France and Britain should undertake not to increase their nuclear weapon capabilities. One report suggests that this would mean that the United States should not sell its Trident D5 missile to the United Kingdom. The Soviet Union no longer demands equivalence to the French and British nuclear forces, as it did before. There are reports that the Soviet Union would be willing to make some reductions in its SS-20 missiles facing Asia if such reductions are coupled with cuts in US weapons in the Pacific.[135]

In further elaboration of the offer, it appears that the Soviet Union is willing to dismantle the infrastructure connected with the SS-20s, as well as the missiles and launchers themselves. This would mean that it would not be possible to redeploy them rapidly from the eastern part of the Soviet Union. Further—although this is not yet clear—it appears that this offer on intermediate-range nuclear forces is not dependent on an agreement that the United States forgoes its SDI programme.

2. With respect to 'strategic' offensive nuclear forces, the USA and the USSR appear to have the same objective—6000 warheads. However, this apparent agreement conceals major disagreement about the definition of 'strategic'. The USSR has maintained for decades that it considers any nuclear weapon that can strike its territory to be 'strategic' and that this should be the agreed definition. The USA basically has a range definition that the USSR has

agreed to in the SALT negotiations—any weapon that can be delivered from 5500 km or more is considered 'strategic'. So the similar figure of 6000 warheads on strategic systems covers very different systems according to which definition is used. The Soviet proposal would include *all* US systems potentially capable of striking the USSR: intercontinental-range ballistic missiles and bombers, aircraft and missiles of medium range or less in Europe and in Asia (within range of the USSR), and all nuclear-capable aircraft on aircraft-carriers. (The intermediate-range missiles on either side in Europe are dealt with in the separate proposal for their elimination. The fact that the USSR is engaged in separate INF negotiations with the USA calls into question how far it will push this wider definition of 'strategic'.) Unlike the US proposal, the USSR would also include gravity bombs and short-range attack missiles (SRAMs) in addition to the air-launched cruise missiles (ALCMs) carried on bombers, as well as sea-launched cruise missiles (SLCMs), which make up an increasingly important segment of the US arsenal.

3. The US preoccupation with Soviet heavy ICBMs is seen in several facets of the US proposal: the ICBM warhead limit of 3000, the limit on throw-weight, and the ban on modernizing or replacing the SS-18. Since the Soviet SS-18 force could currently carry a maximum of 3080 warheads, the US proposal requires a cut in this force regardless of what mix of missiles the USSR might choose. The Soviet warhead limit of 3600 on any one component of the strategic forces would permit all 308 SS-18s to remain only if the vast majority of its other ICBMs were scrapped. In any event, the Soviet offer would also bring down its own throw-weight to a level close to the US limit of about 3 million kg.

4. The Soviet proposals continue to emphasize cruise missiles, calling for a ban on all such missiles except ALCMs with a range of 600 km or less. In this regard the USSR is either currently deploying or preparing to deploy several models of long-range cruise missiles, including ALCMs, SLCMs and GLCMs. The USA continues to exclude SLCMs from any of its proposals, although they can hardly be excluded from either the 'strategic' or 'intermediate-range' categories of weapon.

5. Congress generally supported the idea, following the 1983 Scowcroft Commission suggestion, that both superpowers should move from MIRVed, stationary ICBMs to mobile, single-warhead systems such as the US small ICBM (Midgetman). However, in a surprising policy shift the USA now proposes to ban all mobile ICBMs (including the Soviet SS-24 and SS-25, and any mobile versions of the US MX or SICBM), presumably because they are harder than fixed ICBMs to locate and destroy, or to defend against with a strategic defence system.

6. The United States argues that there is no way in which constraints on strategic defence research can be embodied in a treaty, and that in any case the Soviet Union is also heavily engaged in research on BMD systems—research which (unlike the United States) it does not disclose. Further, the United States points out that it has (for the time being) decided to keep SDI within the 'restrictive' interpretation of the ABM Treaty. However, it will certainly continue to argue that the eventual development of defensive systems is a sensible concomitant of a reduction of offensive systems.

These issues demonstrate the need for much work before any success is achieved at Geneva. New ideas and weapon systems are being discussed for the first time, and there is some movement on certain issues. Both sides proclaim their ultimate goal to be the elimination of all nuclear weapons—nuclear disarmament. Although it is encouraging to see both superpowers seriously discussing such a wide array of nuclear weapon reductions, their nuclear weapon programmes have far more momentum than their arms control talks. The time is right for them to match their words with deeds.

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[17] SASC, FY 1985 DoD, Part 2, p. 538 (see note 6).

[18] SAC, FY 1985 DoD, Part 2, pp. 471–2 (see note 6).

[19] SAC, FY 1985 DoD, Part 3, p. 424 (see note 6).

[20] SASC, FY 1986 DoD, Part 2, p. 1424 (see note 6).

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[22] The initial confirmation of SS-11 retirements came in late Apr. at the SALT Standing Consultative Commission, when the Soviets told the US delegation that they were deploying 18 SS-25s and removing 20 SS-11s (see Pincus, W., 'Moscow says it will honor SALT II missile limits', *Washington Post*, 9 May 1985, p. A-22).

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buildup foreseen', *Defense Week*, 17 June 1985, p. 15), although the number is more likely closer to 60. All SS-16 missiles were produced before the SALT II Treaty was signed. SALT II does not require that the missiles be dismantled, yet support equipment for mobile missiles, such as transporters for warheads, was moved during 1985 on to railcars at Plesetsk, possibly indicating the removal of equipment for the SS-16 missiles from the test site; Gordon (note 21).

[24] 'Soviets identify new chief of Rocket Forces', *Washington Post*, 19 Nov. 1985, p. 21; Eaton, W. J., 'Rocket commander replaced, Kremlin says', *Los Angeles Times*, 26 July 1985.

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[27] Committee on Armed Services and Committee on Appropriations, United States Senate, *Soviet Strategic Force Developments*, Joint Hearings, S. Hrg. 99–335, 26 June 1985 (hereafter cited as SASC/SAC, S. Hrg. 99–335). The summary of the NIE (NIE 11–3/8–84/85) was made in testimony by Robert M. Gates, Chairman, and Lawrence K. Gershwin, National Intelligence Officer, National Intelligence Council.

[28] Authors' calculations derived from SASC/SAC, S. Hrg. 99–335, pp. 6–13 (see note 27).

[29] Pincus (note 22).

[30] Gertz, B., 'US skeptical of Soviets' reports on SS-25 missiles', *Washington Times*, 21 Aug. 1985, p. 2.

[31] Weinberger's confirmation came on 22 Oct. during a speech before the Ethics and Public Policy Center in Washington; Weisskopf, M., 'Soviets said to deploy missile', *Washington Post*, 23 Oct. 1985, p. A4; see also, 'New Soviet SS-25s violate SALT II, Weinberger says', *Baltimore Sun*, 7 Dec. 1985, p. 2.

[32] Hiatt, F., 'Weinberger urges more for defense', *Washington Post*, 10 Jan. 1986, p. A8. It has been reported that the US intelligence community believes that 10 SS-25 launchers are deployed with each regiment, one of which is always in the field; Samuel, P., 'Big Soviet buildup foreseen', *Defense Week*, 17 June 1985, p. 15, and Samuel, P., 'What you'll hear on the threat', *Defense Week*, 24 June 1985, p. 16. This could explain why 10 SS-11s are being removed for each regiment of 9 SS-25 launchers. An alternative explanation is the deployment of SS-11s in regiments of 10 launchers each.

[33] The Organization of the Joint Chiefs of Staff, *United States Military Posture for FY 1987*, p. 19 (hereafter cited as JCS, FY 1987).

[34] Samuel (note 23).

[35] SASC/SAC, S. Hrg. 99–335, p. 57 (see note 27).

[36] Deployment numbers are reported in Samuel (note 23); deployment dates are from SASC/SAC, S. Hrg. 99–335, p. 9 (note 27).

[37] US Department of Defense, *Soviet Military Power*, 4th edition (1985), p. 1 (hereafter cited as *SMP 1985*); SASC/SAC, S. Hrg. 99–335 (note 27); US Department of Defense, *Annual Report to the Congress Fiscal Year 1987*, p. 59 (hereafter cited as DoD, FY 1987). The SS-25 has been reported to be capable of carrying three MIRVs (see, for example, Samuel (note 23)). However, such a capability is inferred from inconclusive estimates of the missile's throw-weight and not from test results (i.e., release or simulated release of warheads).

[38] See *World Armaments and Disarmament: SIPRI Yearbook 1985* (Taylor & Francis: London, 1985), chapter 1.

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[56] The White House, Office of the Press Secretary, *The President's Unclassified Report to the Congress on Soviet Noncompliance with Arms Control Agreements*, 1 Feb. 1985, and 23 Dec. 1985; *Soviet Strategic Defense Programs* (note 54), p. 5.

[57] *Soviet Strategic Defense Programs* (note 54), pp. 1, 5.

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[125] See Davies, H., 'Students mount anti-nuclear demo in Peking', *Daily Telegraph*, 24 Dec. 1985; and 'Nuclear tests protested by 400 in China', *International Herald Tribune*, 24–5 Dec. 1985.

[126] The White House (note 56).

[127] Quoted in USIS Defense Policy Document '1985: Major US Arms Control Initiatives', 20 Dec. 1985, p. 8.

[128] Weisskopf (note 31).

[129] JCS, FY 1987 (note 33), p. 19; the apparent reason for the changed assessment is that the accusation previously made, that the USSR had deployed SS-16 missiles in contravention of the SALT II Treaty, has been withdrawn (see note 23).

[130] See, for example, Federation of American Scientists, *Public Interest Report*, vol. 37, no. 3 (Mar. 1984).

[131] From the joint US–Soviet communiqué, quoted in USIS, 1985 (note 127), p. 5.

[132] USIS, 1985 (note 127), p. 5.

[133] See note 132.

[134] Chairman Erich Honecker, in 'Burying the German hatchet', *Newsweek*, 10 Feb. 1985, p. 4.

[135] Oberdorfer, D., 'Kennedy says summit tied to arms pact', *New York Times*, 9 Feb. 1986, pp. A1, A14.