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**Center for Strategic and International Studies
1800 K Street N.W.
Washington, DC 20006
(202) 775-3270
For Additional material see: CSIS.ORG
Comment to: Acordesman@aol.com**

Concepts of Arms Control – II

Global Controls and East- West Agreements

**Anthony H. Cordesman
Senior Fellow for Strategic Assessment**

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Part One

The Global Tools at Hand: Strategic Nuclear Forces and the Impact of START

The Nuclear Dimension – Part One

<u>Country</u>	<u>Sea-Based</u>	<u>Land Based</u>	<u>Air Force</u>	
<u>US</u> Active. (33,500 nuclear weapons)*	+1/16 Poseidon C-3 tubes in ex-SSBN 10 SSBN-734 with up to 24 Trident D-5 (240 SLBM) 8 SSBN-726 with up to 24 Trident C-4 (192 SLBM)	18 SSBM/432 SLBM 50 Peacekeeper MX	500 Minuteman II/III 315 START accountable 2/17 B-2A 5/70 B-52H with up to 20 ALCM (AGM-86) each 7/91 B-1B	178

<u>Russia</u> START-accountable (62,500 nuclear weapons)*	3 Typhoon with 20 SS-N-20 each (60) 7 Delta IV with 16 SS-N-23 each (112) 7 Delta II with 16 SS-N-18 each (112) 4 Delta I with 12 SS-N-8 each (48) In addition, 16 SSBN and 228 missiles remain START accountable: 3 Typhoon/60 SS-N-20 6 Delta III/96 SS-N-18 2 Delta II/32 SS-N-8 6 Delta I/70 SS-N-8 11 Oscar SSGN with ABMs 24 SS-N-19 3 Yankee SSGN with 20+ SS-N-21 1 Yankee SSGN/12 SS-NX-24 10 Akula SSN/SS-N-21 3 Sierra SSN/SS-N-21 12 Victor III/SS-N-15	21 SSBN/332 SLBM Mostly Mod 4/5 w/ 10 MIRV 160 SS-19 (RS-18) Mostly Mod 3,6 MIRV 15 SS-27 Topol M2 with 20 entering service SS-24 (RS22) with 10 MIRV 36 Rail in Russia 10 Silo in Russia 370 SS-25 (RS12M) single warhead mobile (360) & silo launch (10) in Russia 36 SH-11 Galosh & 64 SH-08 Gazelle	180 SS-18 (RS-20) 14 Test & 44 in Ukraine 68 Tu-95H6 with AS-15 ALCM 6 Tu-160 (8 more to come from Ukraine) 7 Tu-95 & 5 Tu-160 test aircraft. 158 Tu-22M/MR (92 in storage)	74

* Without nuclear warhead or weapons.

The Nuclear Dimension – Part Two

<u>Country</u>	<u>Sea-Based</u>	<u>Land Based</u>	<u>Air Force</u>
<p><u>France</u></p> <p>(1,400 nuclear weapons)*</p>	<p>4 SSBN/64 SLBM</p> <p>2 L'Inflexible with 16 M-4?TN-70 or 71 each</p> <p>2 Le Triomphant with 16 M-45/TN-75 each</p>		<p>3/60 Mirage-2000N (AMSP)</p> <p>36 Super Etendard AMSP plus 16 in storage</p>

<p><u>United Kingdom</u></p> <p>(1,100 nuclear weapons)*</p>	<p>3 SSBN/48 SLBM</p> <p>3 Vanguard SSBN</p> <p>with up to 16 Trident D-5 each and maximum of 48 warheads per boat. (Each missile can be MIRV'd to 8 warheads, But some had only 1.</p>		

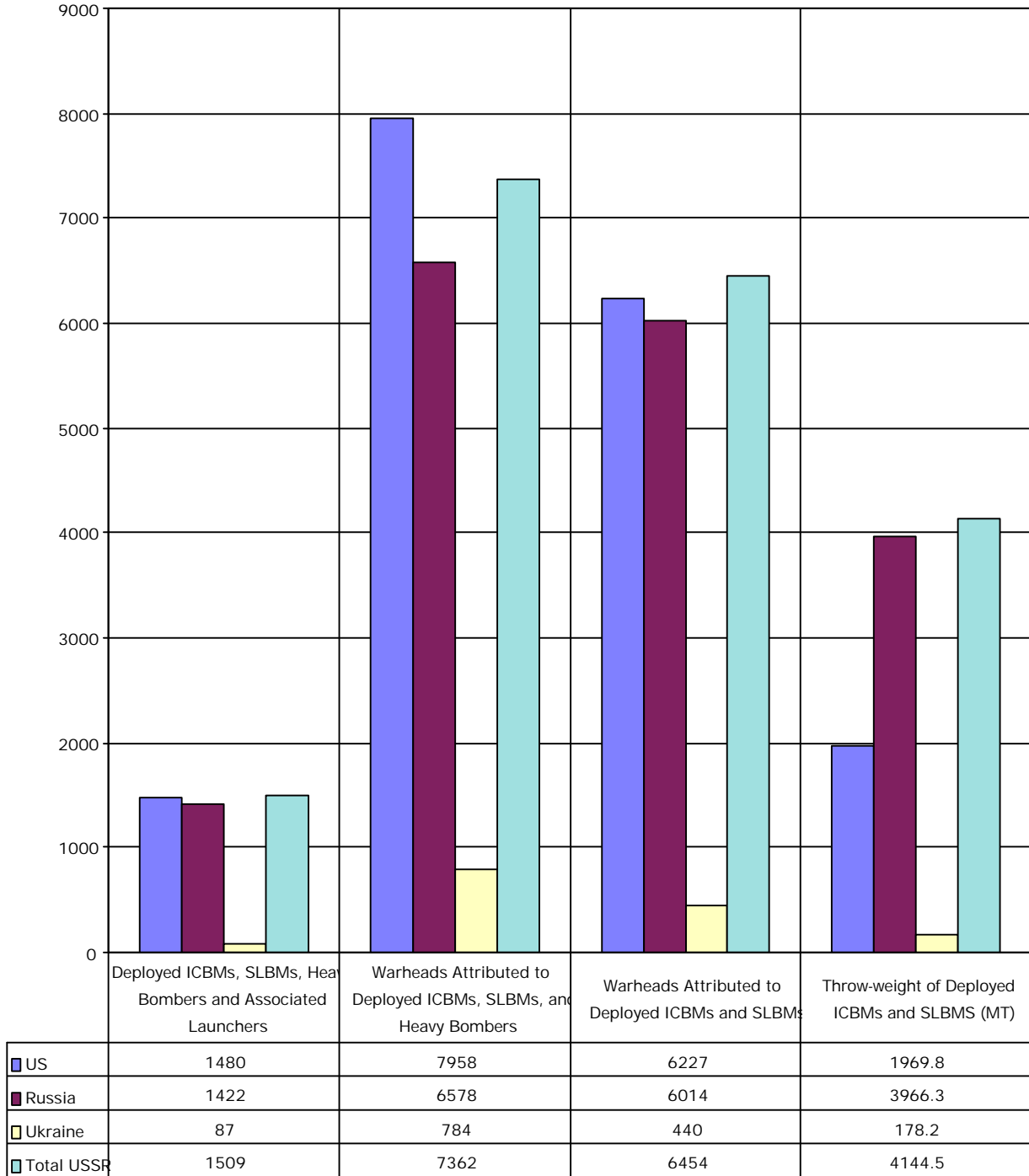
<p><u>China</u></p> <p>(500-1,300 nuclear weapons)*</p>	<p>1 Xia SSBN with 12 CSS-N-3 (J-1)</p> <p>1 Romeo SSGN?</p>	<p>15-20 CC-4 (DF-5) MIRV ICBM</p> <p>20+ CSS-3 (DF-4) ICBM</p> <p>38 CSS-2 (DF-3 IRBM 8 CSS-5 DF-21 IRBM</p> <p>150 DF-15 CSS-6/M-9 SRBM (600 km)</p> <p>? DF-11 CSS-7/M-11 SRBM (120-300 KM)</p>	<p>Up to 120 H-6, Some nuclear capable.</p> <p>200+ H-5?</p>

* Estimate by Sergei Rogov

Source: Adapted by Anthony H. Cordesman from the IISS, Military Balance, 1999-2000

US, Russian, and Ukrainian Strategic Nuclear Forces Declared for Start I

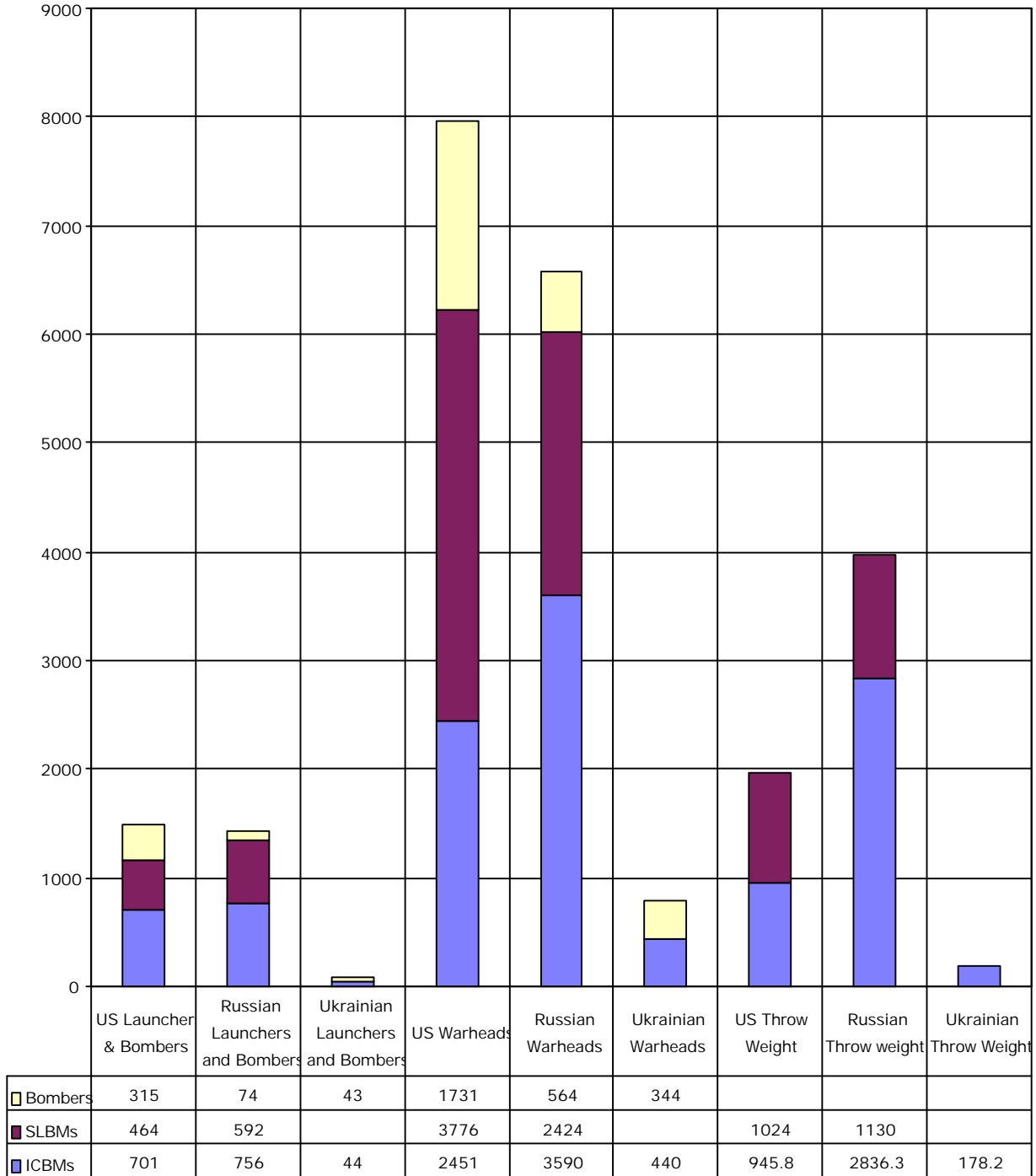
(Declarations as of January 1, 1999)



Source: Adapted by Anthony H. Cordesman from data provided by ACDA on April 1, 1999. Belarus and Kazakhstan report zero in every category.

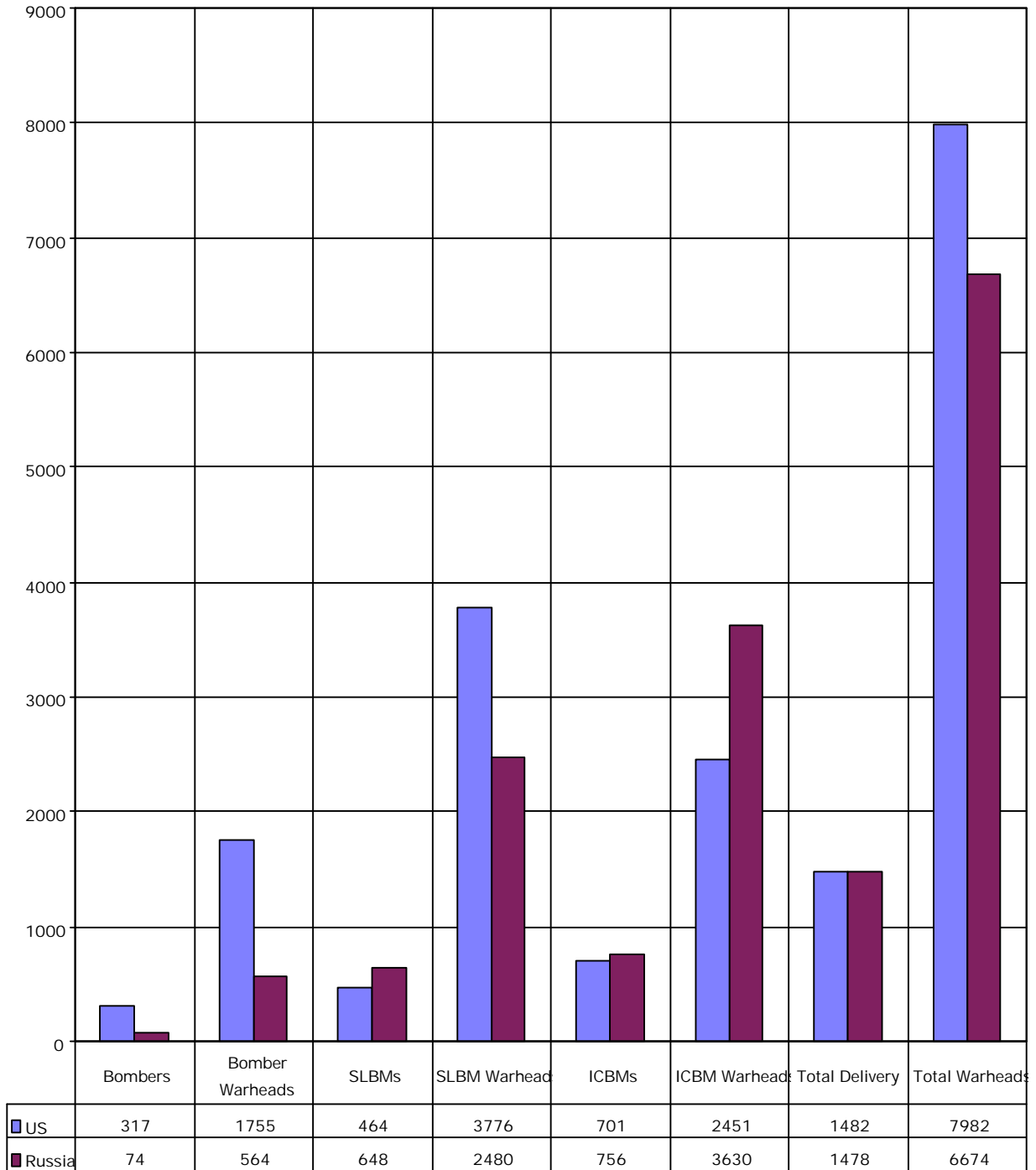
The US, Russian, and Ukrainian Strategic Nuclear Triad Declared for Start I

(Declarations as of January 1, 1999)



Source: Adapted by Anthony H. Cordesman from data provided by ACDA on April 1, 1999. Belarus and Kazakhstan report zero in every category.

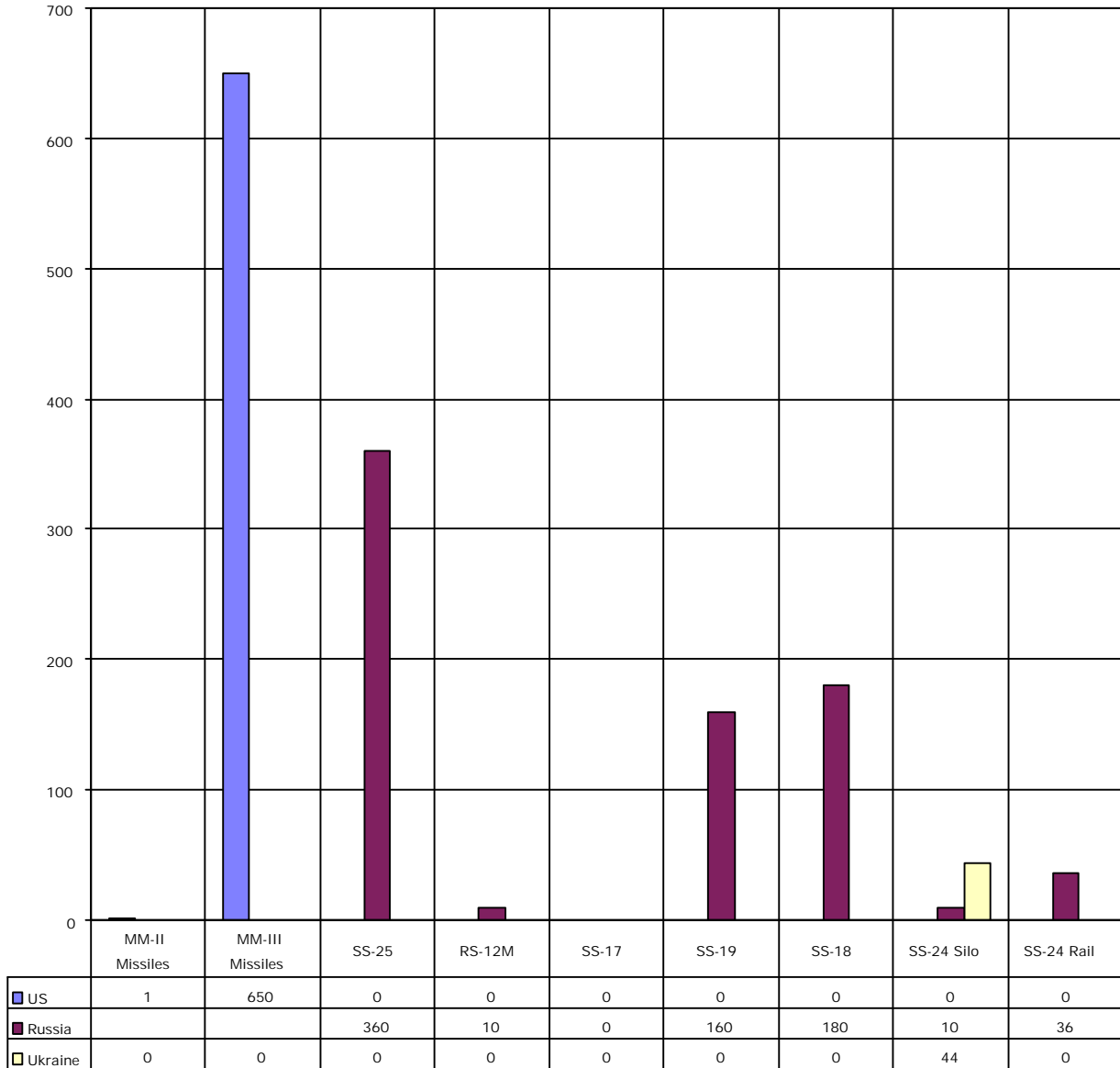
US and Russian Deployed Strategic Nuclear Forces



Source: Adapted by Anthony H. Cordesman from *Jane's Defense Weekly*, February 10, 1998, pp. 23-26.

US, Russian, and Ukrainian ICBMs Declared for Start I

(Declarations as of January 1, 1999)

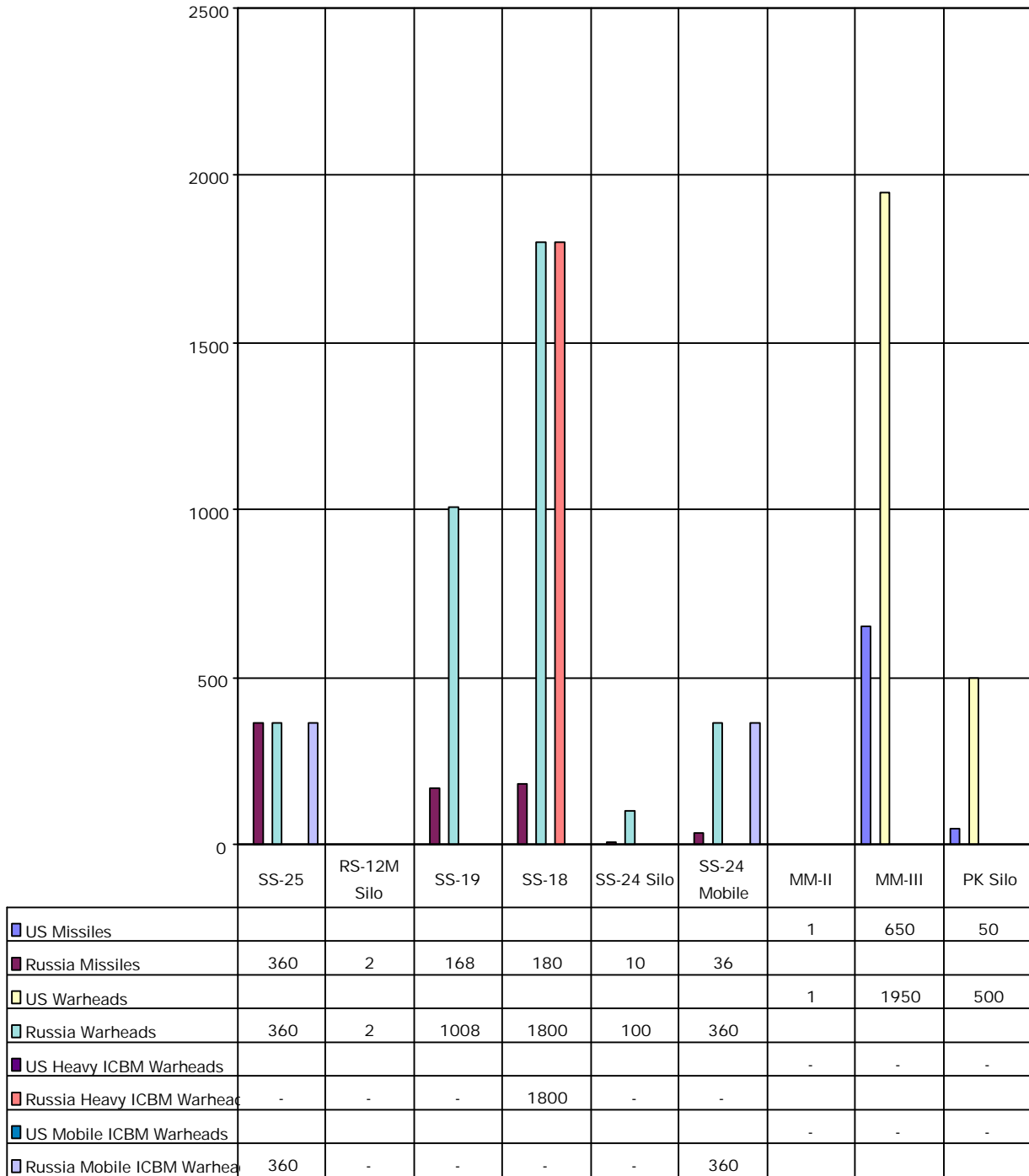


Throw weight (MT)

US	0.80	747.50	-	-	-	-	-	-	-
Russia	-	-	360.00	10.00	0	696.00	1584.80	40.50	145.80
Ukraine	-	-	-	-	-	-	-	178.20	-

Source: Adapted by Anthony H. Cordesman from data provided by ACDA on April 1, 1999. Belarus and Kazakhstan report zero in every category.

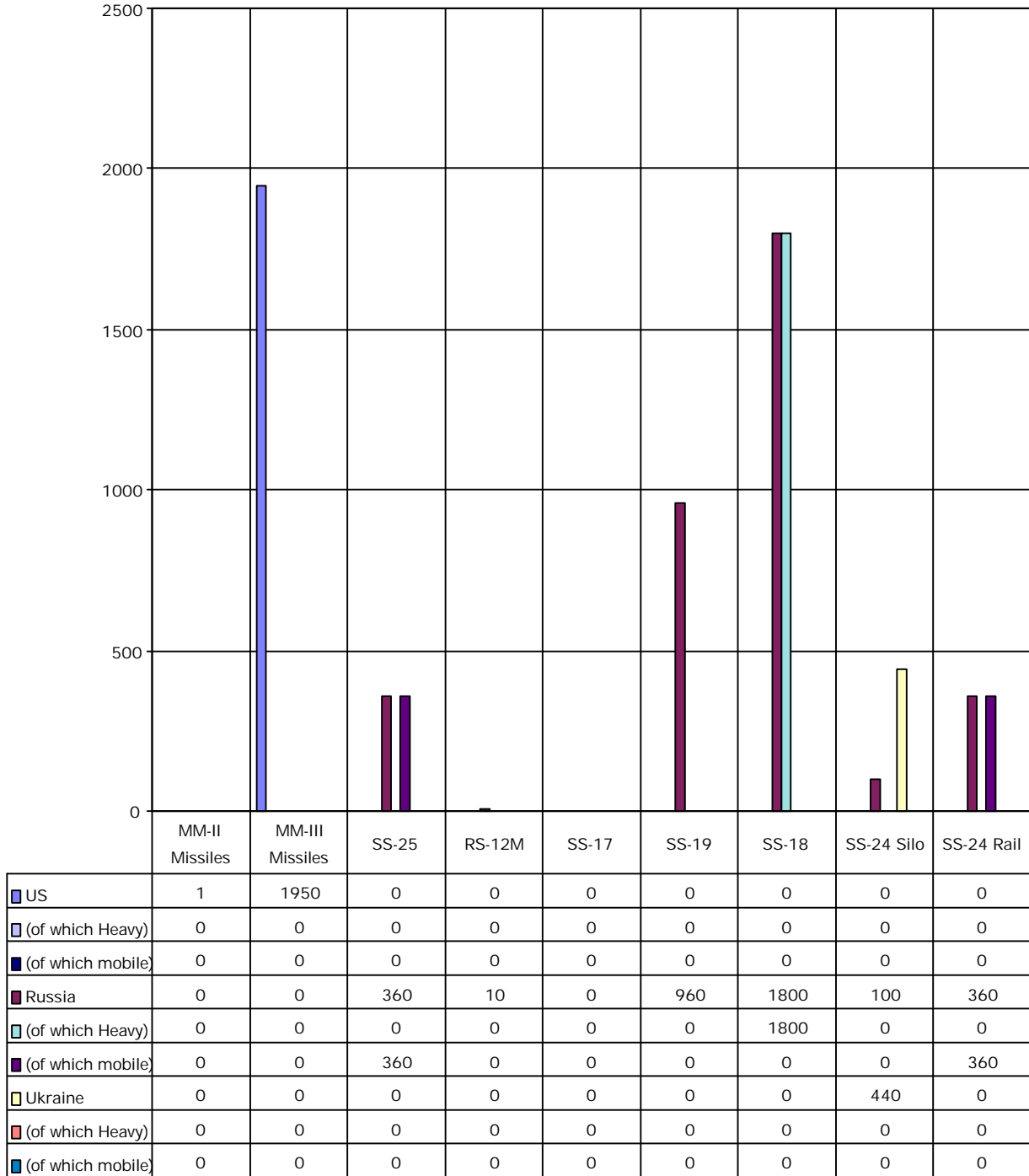
US and Russian Deployed ICBM Missiles



Source: Adapted by Anthony H. Cordesman from *Jane's Defense Weekly*, February 10, 1998, pp. 23-26.

US, Russian, and Ukrainian ICBM Warheads Declared for Start I

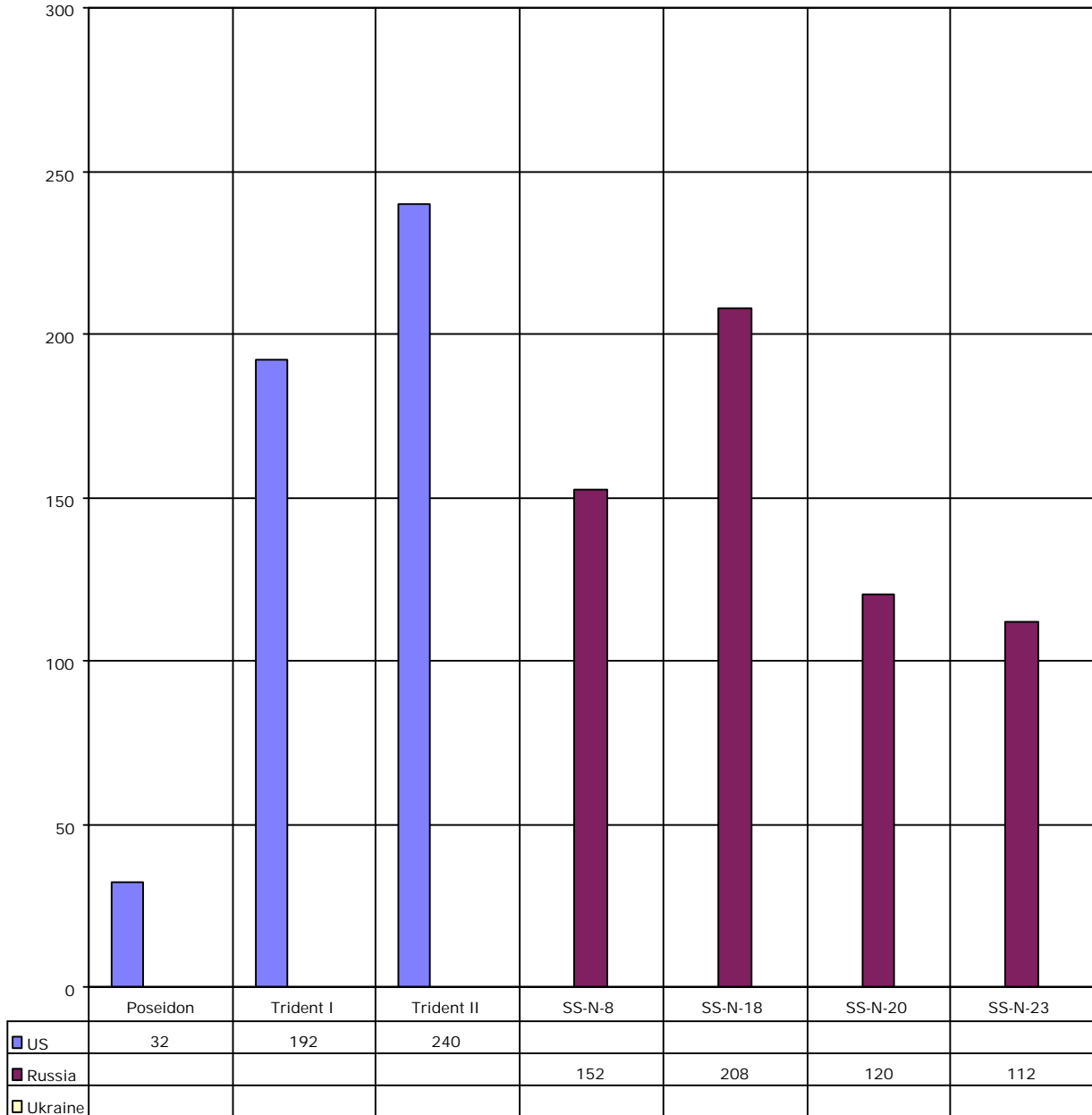
(Declarations as of January 1, 1999)



Source: Adapted by Anthony H. Cordesman from data provided by ACDA on April 1, 1999. Belarus and Kazakhstan report zero in every category.

US, Russian, and Ukrainian SLBMs Declared for Start I

(Declarations as of January 1, 1999)

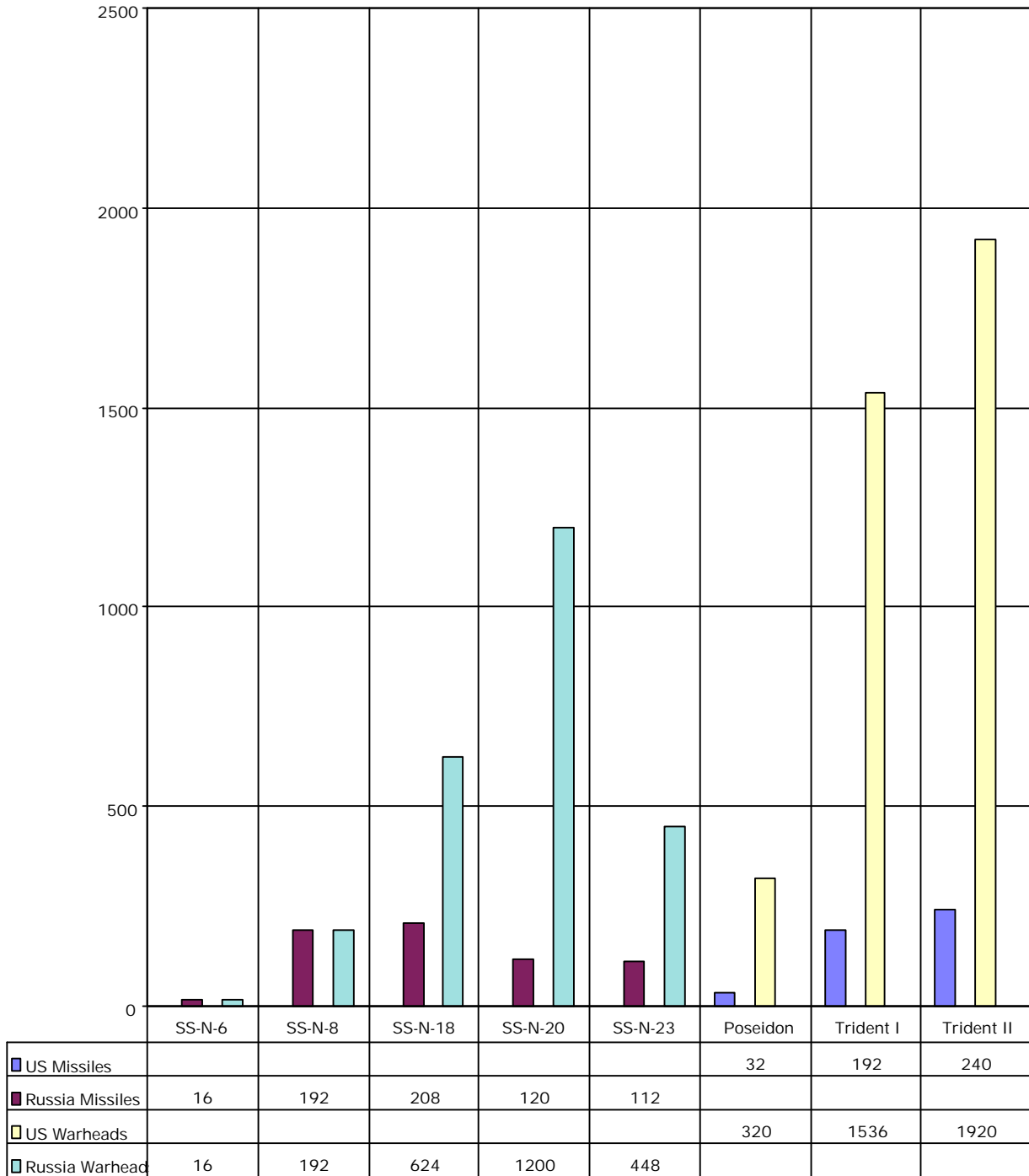


Throw weight (MT)

US	64.00	288.0	672.00	-	-	-	-
Russia	-	-	-	167.20	343.20	306.00	313.60
Ukraine	-	-	-	-	-	-	-

Source: Adapted by Anthony H. Cordesman from data provided by ACDA on April 1, 1999. Belarus and Kazakhstan report zero in every category.

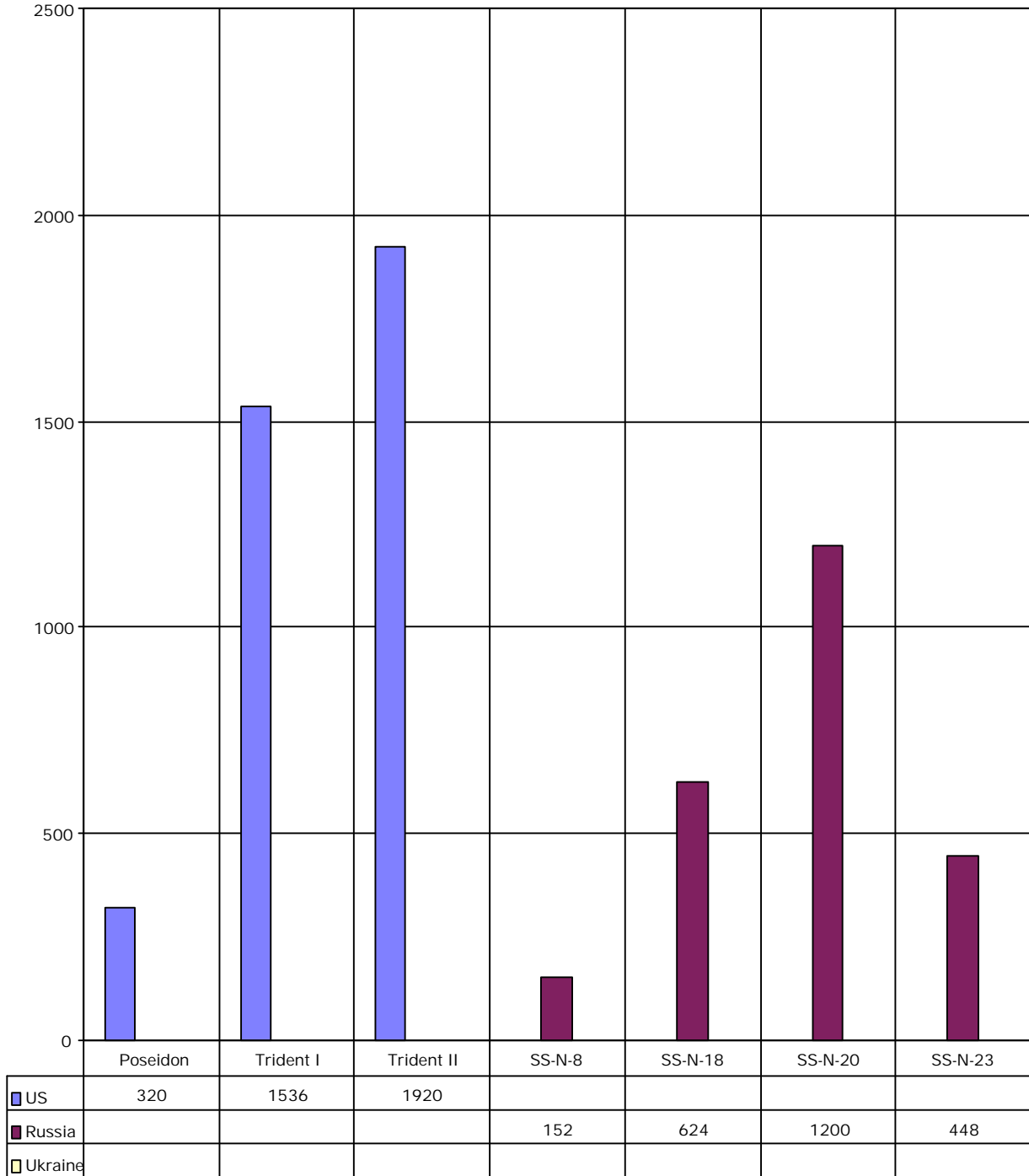
US and Russian Deployed SLBM Missiles



Source: Adapted by Anthony H. Cordesman from Jane's Defense Weekly, February 10, 1998, pp. 23-26.

US, Russian, and Ukrainian SLBM Warheads Declared for Start I

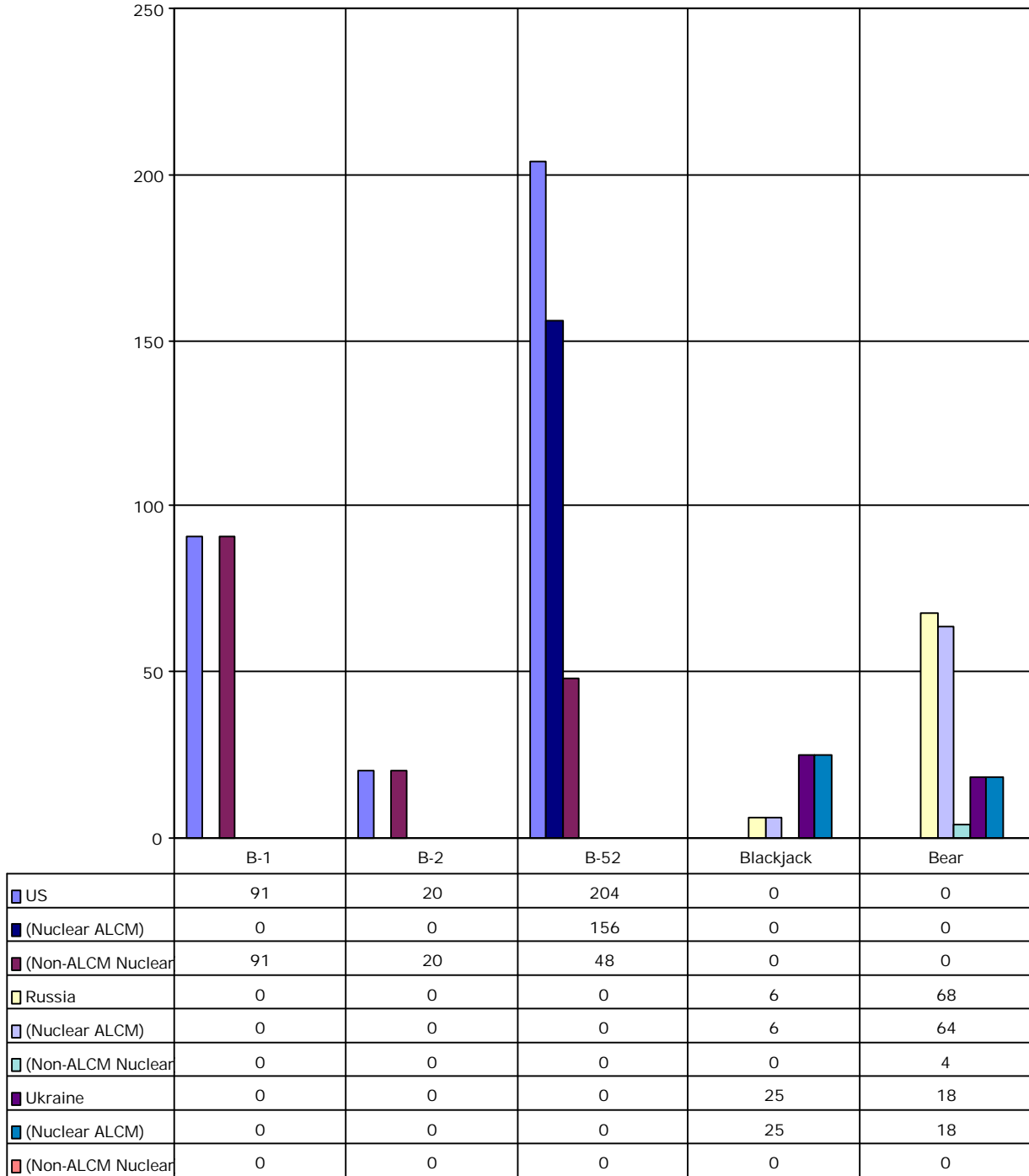
(Declarations as of January 1, 1999)



Source: Adapted by Anthony H. Cordesman from data provided by ACDA on April 1, 1999. Belarus and Kazakhstan report zero in every category.

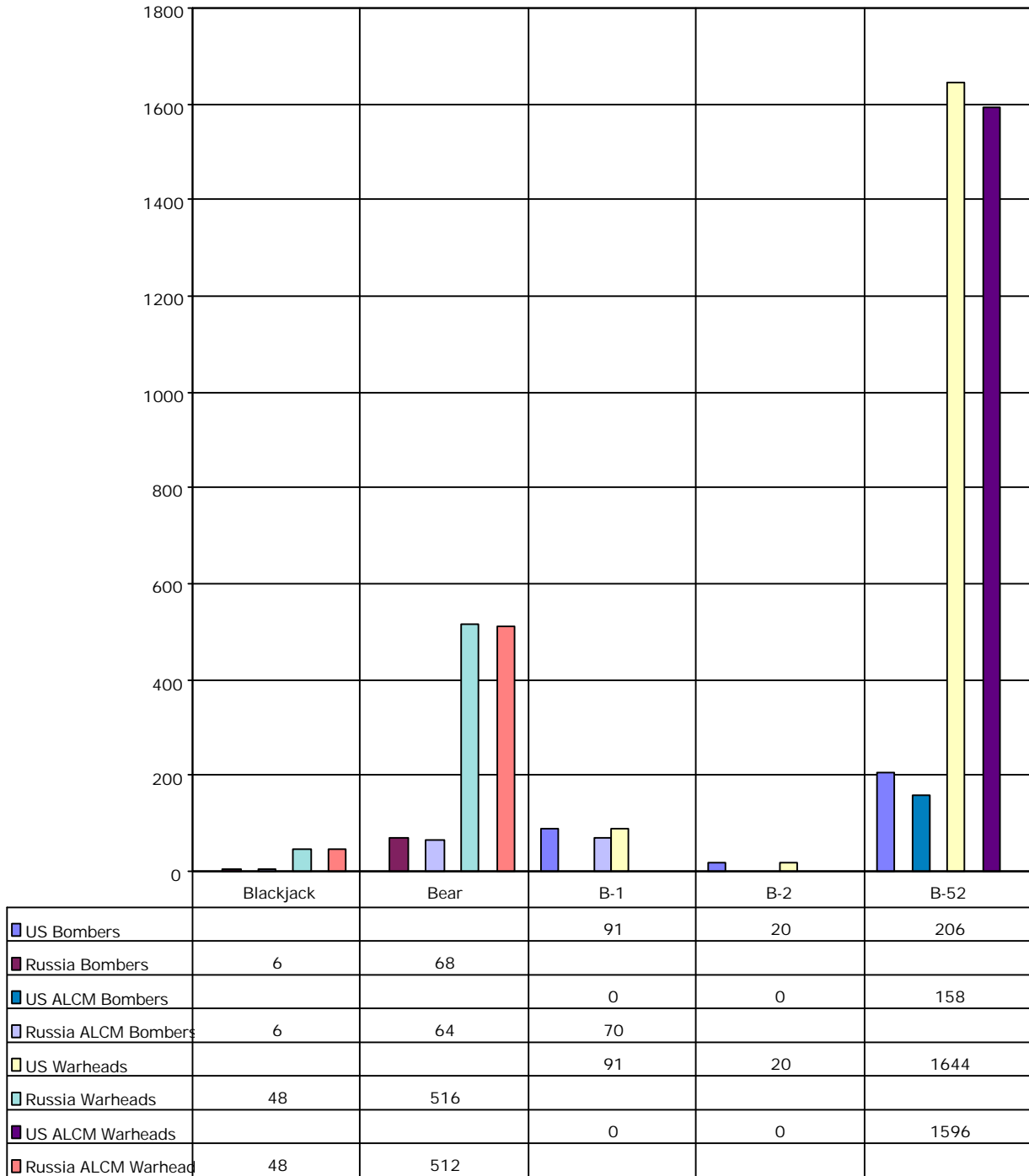
US, Russian, and Ukrainian Bombers Declared for Start I

(Declarations as of January 1, 1999)



Source: Adapted by Anthony H. Cordesman from data provided by ACDA on April 1, 1999. Belarus and Kazakhstan report zero in every category.

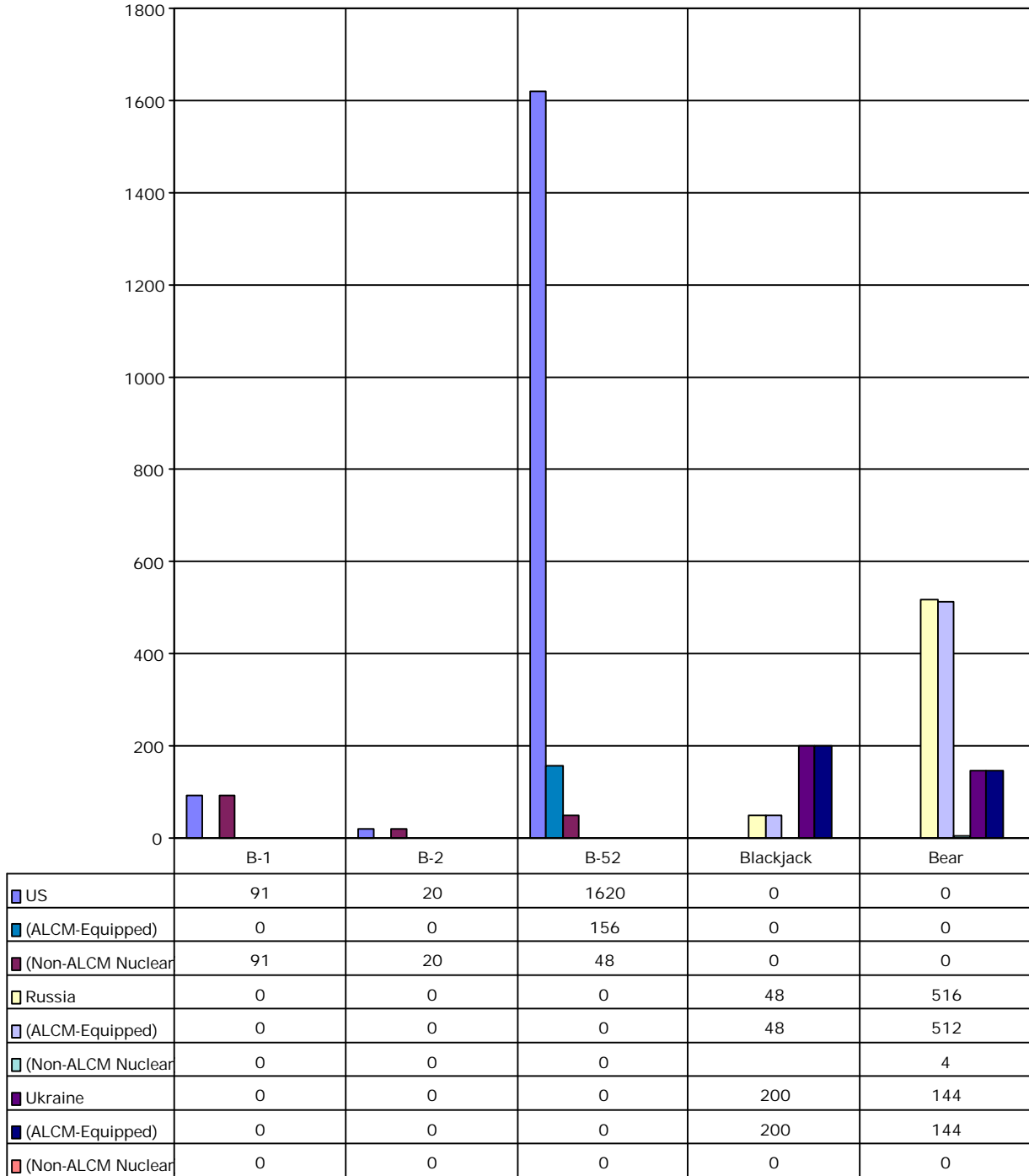
US and Russian Deployed Heavy Bombers



Source: Adapted by Anthony H. Cordesman from *Jane's Defense Weekly*, February 10, 1998, pp. 23-26.

US, Russian, and Ukrainian Bomber Warheads Declared for Start I

(Declarations as of January 1, 1999)



Source: Adapted by Anthony H. Cordesman from data provided by ACDA on April 1, 1999. Belarus and Kazakhstan report zero in every category.

US Strategic Nuclear Forces

	<u>FY1990</u>	<u>FY1999</u>	<u>START I</u> (December 5, 2001)	<u>START II</u> (December 31, 2007)
ICBMs	1,000	550	550	500
Attributed warheads on ICBMs	2,450	2,000	Not over 2000	500
SLBMs	568 ^a	432 ^b	Not over 432	336
Attributed Warheads on SLBMs	4,864 ^a	3,456 ^b	Not over 3,456	Not over 1,750
Ballistic Missile Submarines	31 ^a	18 ^b	Not over 18	14
Attributed Warheads on Ballistic Missiles	7,314	5,456	Not over 4,900	Not over 2,250
Heavy Bombers	324 ^c	115 ^c	97 ^c	97 ^c

(a) Excludes five decommissioned submarines and their associated warheads and missiles that were still START accountable.

(b) Excludes two Benjamin Franklin Class (Poseidon missile SSBNs) converted to special operations that are still START accountable.

(c) Excludes 93 B-1s that are devoted entirely to conventional missions. B-1s are still accountable as a nuclear bomber under START 1.

Source: William Cohen, Annual Report to the President and the Congress, Department of Defense, Washington, February, 1999.

Status of US Nuclear Forces Under the FY2001 Force Plan – Part One

FORCE STRUCTURE AND CAPABILITIES: Until START II enters into force, the United States is protecting options to maintain a strategic nuclear arsenal at essentially START I levels. Accordingly, the FY 2000 budget request included an additional \$104 million to sustain the option of continuing START I levels of strategic nuclear forces. If START II is implemented as amended by the START II Protocol, accountable warheads will be reduced by the end of 2007 to a level of 3,000–3,500, of which no more than 1,750 may be carried on SLBMs. Strategic nuclear delivery vehicles that will be eliminated under START II will be deactivated by December 31, 2003, providing the benefits of a reduced force structure four years prior to the agreed 2007 date for full elimination.

LAND-BASED INTERCONTINENTAL BALLISTIC MISSILES: At the end of FY 2000, the United States will have 500 Minuteman III ICBMs and 50 Peacekeeper missiles. To meet the overall START I warhead limits, some of the Minuteman missiles have been downloaded to carry only one reentry vehicle (RV). Once START II enters into force, the United States will modify all Minuteman III missiles to carry only one warhead and will retire all Peacekeepers. In this transition, DoD will redeploy the Mark 21 RV, currently deployed on Peacekeeper, on a portion of the single RV Minuteman force. Mark 21 RVs contain features that further enhance nuclear detonation safety and reduce the risk of plutonium dispersal in the unlikely event of a fire or other mishap.

The United States is not currently developing or producing any new ICBMs. However, the Air Force has begun exploratory tasks to plan for a replacement to the Minuteman III around 2020. This makes it difficult to sustain the industrial base needed to maintain and modify strategic ballistic missiles. To maintain the Minuteman ICBM system and to preserve key industrial technologies needed to sustain ICBMs and SLBMs, the budget provides funding to replace guidance and propulsion systems, as well as to preserve a core of expertise in the areas of reentry vehicle and guidance system technology.

SEA-BASED BALLISTIC MISSILES: The SSBN fleet has reached its planned total of 18 Ohio-class submarines. The first eight Ohio-class submarines each carry 24 Trident I (C-4) missiles; the final 10 are each equipped with 24 Trident II (D-5) missiles. The SSBN fleet's survivability and effectiveness are enhanced through the D-5 missile's improved range, payload, and accuracy. The FY 2001 budget provides for continued procurement of D-5 missiles to support the conversion of four SSBNs from the C-4 to the D-5 missile system. Backfits during regularly scheduled ship depot maintenance periods will begin in late 2000. The United States will retain 14 SSBNs armed with D-5s, while the four oldest Ohio-class SSBNs will be eliminated or converted to serve in a non-nuclear role. D-5 missiles aboard the 14 boats, capable of carrying eight warheads apiece, will be downloaded consistent with START limits. The budget also supports Navy planning for a life extension to the D-5 SLBM in order to align missile life to the recently extended Trident submarine service life of 42 years.

HEAVY BOMBERS: The U.S. bomber force consists of 93 B-1s, 94 B-52s, and 21 B-2s. The Air Force plans to reduce the number of B-52s to 76 in FY 2001. Fourteen B-2s, all deployed at Whiteman Air Force Base, Missouri, are Block 30 configuration aircraft. The remaining seven B-2s are being upgraded to Block 30 configuration; six are to be delivered in FY 2000. The twenty-first aircraft is being used for flight testing upgrades and will complete Block 30 modification in FY 2002. B-2 and B-52 bombers can perform either nuclear or conventional missions. The B-1 force is dedicated to, and has been equipped exclusively for, conventional operations.

READINESS: Selected elements of U.S. strategic forces maintain the highest state of readiness to perform their strategic deterrence mission. A credible and effective nuclear deterrent requires proper support for all of its components: attack platforms, other weapons systems, command and control elements, the nuclear weapons stockpile, research and development capabilities, the supporting industrial base, and well-trained, highly motivated people.

Status of US Nuclear Forces Under the FY2001 Force Plan – Part Two

U.S. ICBMs and SLBMs on day-to-day alert are not targeted against any specific country. The missiles, however, can be assigned targets on short notice. The United States maintains two full crews for each SSBN, with about two-thirds of operational SSBNs routinely at sea. On average, about one to two U.S. SSBNs are undergoing long-term overhauls at any given time and are not available for immediate use. All 550 ICBMs, with the exception of a few undergoing routine maintenance, are maintained on a continuous day-to-day alert. The bomber force is no longer maintained on day-to-day alert status, although it can be returned to alert status within a few days if necessary.

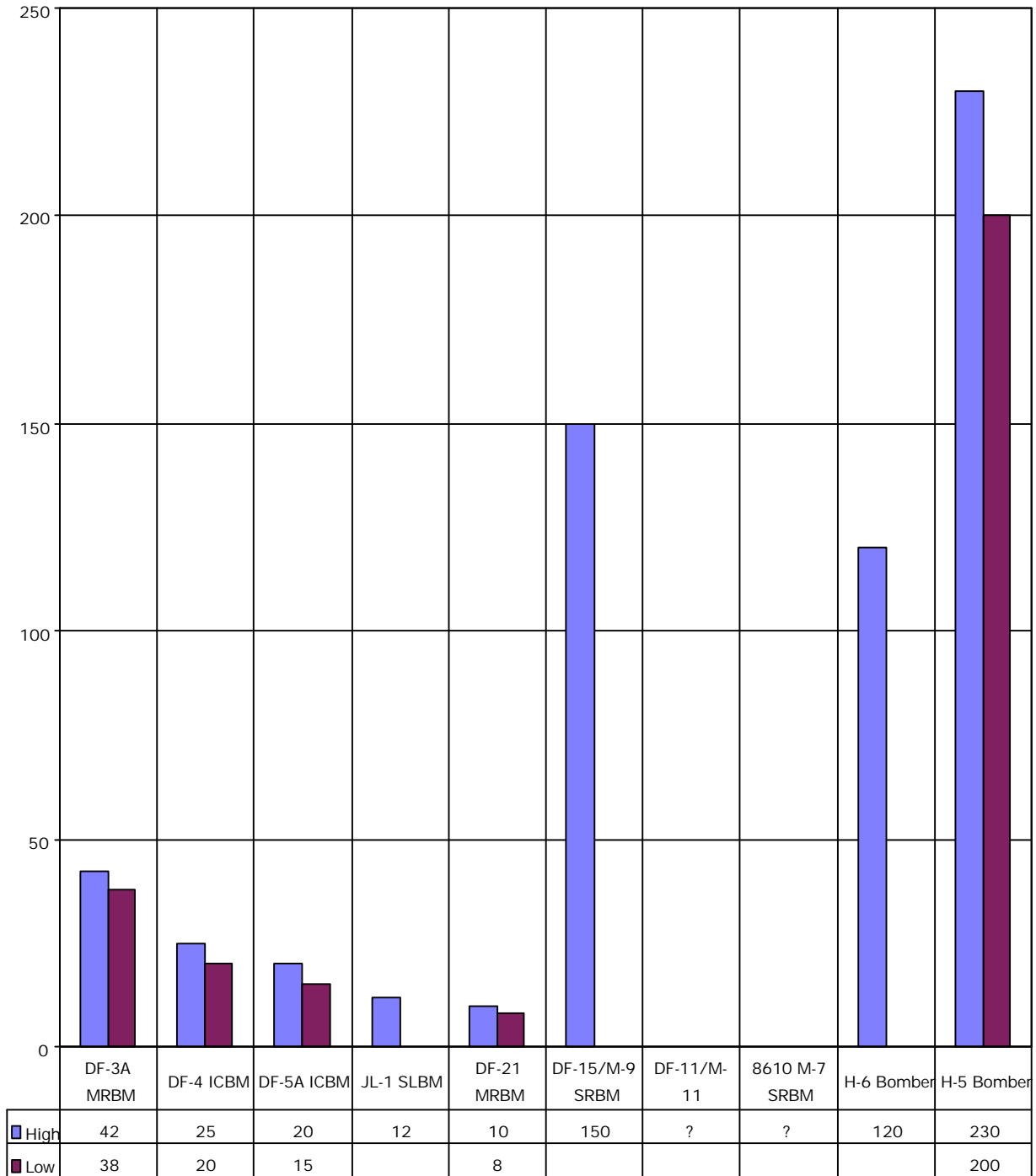
STOCKPILE STEWARDSHIP: The President declared that maintenance of a safe and reliable nuclear weapon stockpile is a supreme national interest of the United States. The Department of Energy's Stockpile Stewardship Program (SSP) is the primary means of ensuring safety and reliability in the nuclear deterrent, absent nuclear testing. SSP develops new tools to supplant nuclear explosive testing as the means to provide confidence in the nuclear stockpile obtained in the past from nuclear explosive testing. There was high confidence in the current stockpile when the United States entered into a nuclear testing moratorium in 1992. Since that time, the SSP, principally its surveillance program, has uncovered problems associated with aging. Through SSP, an understanding of these problems and programs to address them has been developed through a combination of information from past underground tests and early benefits of SSP. The SSP still faces challenges; but as long as it continues to get needed resources, it will keep pace with the complex problems likely encountered in the future. Should annual certification reveal a problem that can only be resolved by nuclear explosive testing, the Secretary of Defense will inform the President and Congress of the need to resume nuclear testing.

FUNDING AND MODERNIZATION: Funding for strategic nuclear forces—ICBMs, SLBMs, and nuclear bombers—has declined in recent years, as has the fraction of the total defense budget devoted to nuclear forces. A few modernization programs for strategic forces are currently underway: B-2 modifications, primarily for conventional missions; D-5 missile procurement; and Minuteman III life extension activities. With most nuclear modernization efforts complete, programs to sustain nuclear forces and their readiness now account for most of the strategic nuclear funding.

THEATER NUCLEAR FORCES: As reaffirmed by NATO in its April 1999 Strategic Concept, theater nuclear forces, in the form of dual-capable aircraft, in the United States and deployed to NATO are an essential link between strategic nuclear and conventional capabilities. They also contribute to the spectrum of retaliatory options to deter aggression. The United States will continue to maintain these weapons in NATO, but at levels significantly below Cold War levels. Nuclear weapons capability on surface ships has been eliminated, but the capability to deploy Tomahawk Land Attack Missiles armed with a nuclear warhead on submarines has been maintained.

Source: Adapted from the FY2000 Annual Report of the Secretary of Defense

Chinese Deployed Nuclear-Capable Delivery Systems



Source: Adapted by Anthony H. Cordesman from IISS, Military Balance, 1999-2000, and Shirley A. Kan, China: Ballistic and Cruise Missiles, Congressional Research Service, CRS 97-391 F, September 28, 1998

Chinese Missile Programs and Developments¹

Type	Chinese Name	US Name	No. Deployed	Range (Km)	Warhead (Kg)	CEP (M)	Launch Platform	Fuel	Status
ICBM	DF-4 ²	CCS-3	10-25	5500+	2200	1370	land-mobile	liquid	in service
ICBM	DF-%A ³	CSS-4	20	13,000	3,200	500	hardened silos	liquid	in service
ICBM	DF-31 ⁴	-	-	8000	700	?	land-mobile	solid	after 2000
ICBM	DF-41 ⁵	-	-	12,000	800	?	land-mobile	solid	after 2010
MRBM	DF-3A ⁶	CSS-2	40+	2800	2150	1000	land-mobile	liquid	in service
MRBM	DF-21 ⁷	CSS-5	10	1800	600	?	Mobile-TEL	solid	in service
MRBM	DF-25 ⁸	-	-	1700	2000	?	land-mobile	solid	after 2000
SLBM	JL-1 ⁹	CSS-N-3	12	1700	600	?	Xia SSBN	solid	in service
SLBM	JL-2 ¹⁰	-	-	8000	700	?	094 SSBN	solid	after 2005
SRBM	DF-15 ¹¹ M-9	CSS-6	4+	600	500	300	Mobile TEL	solid	in service
SRBM	DF-11 ¹² M-11	CSS-7	?	300	500	?	Mobile TEL	solid	in service
SRBM	8610 ¹³ M-71	CSS-8 (mod HQ-2 SAM)	?	150	190	?	Mobile launcher	solid	in service

¹ Adapted from work by Shirley A. Kan in [China: Ballistic and Cruise Missiles](#), Congressional Research Service, CRS 97-391 F, September 28, 199

² Deployed since 1980. Response time of 2.5 hours, strap-down inertial guidance. Stored in caves and mountainside tunnels.

³ Deployed since 1981, most targeted on the US. Gyroplatform inertial guidance with on-board computer and storable liquid fuel. Deployed in hardened underground silos. Normally kept unfueled and without warheads

⁴ Possible MIRVing capability. Booster tested in 1998.

⁵ Supposedly road, rail, river mobile.

⁶ Deployed since 1971, strap-down inertial guidance. Reaction time 110 minutes. China sold 36 to Saudi Arabia.

⁷ Same fuel and guidance as JL-1. Automatic command-control-firing system from TEL. Reports of terminal guidance, possible radar. May be a DF-21A. First regiment deployed in 1985.

⁸ Land mobile for truck transfer from semi-hardened sites to launch sites. No reports of test firings. One report that development has been abandoned

⁹ All on one Jia submarine. Deployed since 1983, successful underwater launch tests in 1988. Operational status uncertain. Gyroplatform inertial guidance with on-board computer.

¹⁰ To be deployed on new 094 SSBN with 16 tubes each. First SSBN that could target US from waters near China.

¹¹ Launch from mobile TEL with preparation time of 30 minutes. Strap-down inertial guidance with on-board computer with terminal velocity correction. May be seeking GPS guidance. Four fired in Taiwan crisis in 1995. Three landed in general target area, one crashed prematurely. Four more fired in Taiwan crisis in 1996. Four landed in general target area. Some reported indicate that 20-30 more had been prepared for firing.

¹² US imposed sanctions on China and Pakistan because this system was sold to China.

¹³ Unconfirmed reports that Iran has acquired this missile technology.

North Korean Missile Programs and Developments

<u>Type</u>	<u>Names</u>	<u>Range (KM)</u>	<u>Warhead (Kg)</u>	<u>Stages</u>	<u>Service Status</u>
SRBM	Hwasong 5, Scud B Storable liquid fuel; TEL launch Sold to Iran and a number of other states.	302-340	1000	1	Since 1985
SRBM	Hwasong 6, Scud C Storable liquid fuel; TEL launch. Sold to Iran and Syria. Deployed in hardened, underground shelters in North Korea.	500	770	1	Since 1989
MRBM	No Dong 1, Rodong 1, Scud D Storable liquid fuel; Uses missile-erector-launcher (MEL). Seems similar to Shihab 3 in Iran and Ghauri program In Pakistan. First test over East China Sea in May 1993, but did not go over 500 kilometers. Iranian and Pakistani observers present at test. Estimate 50-100 missiles no produced.	1,350	1200	1	Since 1997
IRBM	Taep'o-Dong 1, No-Dong 2, Rodong 2, Scud X Some reports is similar to the Chinese DF-3.	1,500- 2,200	700- 1,000	2	1998?
SLV	Taep'o-Dong 1 Space Launch-Vehicle Partially successful test launch on August 23, 1998. Claim launched small satellite.	4,000	50-100	3	1998
ICBM	Taep'o-Dong 2, No Dong 3	4,000- 6,000	700- 1,000	2	2000+
ICBM	?	6,000+	100-500	3	?

Source: Adapted from Joseph S. Bermudez, Jr., "The Rise and Rise of North Korea's ICBMs, International Defense Review, 7/1999, pp. 57-61.

SALT & START: Strategic Nuclear Arms Control

- SALT I/II: The warning:
 - Cosmetic agreement with delivery system limited ceilings that exceeded US and FSU build rate.
 - Led to MIRVing, record numbers of new warheads.
 - Technology increased first strike risk even under SALT II.
 - Russia deployed biological ICBM warheads, and massive new INF force.
 - Break out of INF systems like SS-20 led to new Eurocentric arms race.
- START I:
 - Controls deployed nuclear weapons and active delivery systems.
 - Deployed warheads will massively exceed key countervalue targets.
 - Smaller warhead numbers tend to drive out of counterforce (military) to countervalue (cities) targeting.
 - But, secure systems remove first strike incentives, and hope a “two person. zero sum, game” can be avoided.
 - US and Russia becoming steadily more “fragile,” losing post strike recovery capability.
- ABM Treaty/TMD/SDI Paradox.
- Zero Options versus Extended Deterrence Paradox.

STARTS I, II, and III: An Overview

- **START I:**
 - **6000 accountable warheads on 1,600 offensive strategic delivery vehicles.**
 - **Only 4,900 warheads on ballistic missiles**
 - **Limit of 1,540 warheads on heavy ICBMs.**
 - **Limit of 1,100 warheads on mobile ICBMs.**
 - **Downloading permitted**
 - **Verification through JCIC (Joint Compliance and Inspection Committee), unimpeded NTM (National Technical Means) and SCC, unencrypted telemetry, OSI(On-site Inspection), NRRC**
- **START II:**
 - **3,000 to 3,500 accountable warheads on offensive strategic delivery vehicles..**
 - **Limit of 1,750 warheads on SLBMs**
 - **No multiple warheads on ICBMs.**
 - **Can download maximum of 4 warheads, except for 6 warheads in case of SS-19.**
 - **This means all SS-18s and Peacekeepers must be destroyed.**
 - **Verification through JCIC, unimpeded NTM and SCC, unencrypted telemetry, OSI, NRRC, plus OSI**
- **START III:**
 - **Limit of 2,000-2,500 accountable warheads on offensive strategic delivery vehicles.**
 - **Possible cuts to 1,500 warheads. (Russian proposal)**
 - **Destruction of warheads with transparency.**
 - **Explore limits on nuclear armed, sea-launched cruise missiles. (US withdrew from service in 1991).**
 - **Explore limits and/or destruction of theater nuclear weapons.**

START I: Aggregate Numbers of Strategic Offensive Arms

<u>Category of Date</u>	<u>Belarus</u>	<u>Kazakhstan</u>	<u>Russia</u>	<u>Ukraine</u>	<u>FSU</u>	<u>USA</u>	
Deployed ICBMs and their Associated launchers, Deployed SLBMs and Their Associated Launchers and Deployed Heavy Bombers	0		0	1,397	81	1,478	1,466
Warheads Attributed to Deployed ICBMs, SLBMs, and Heavy Bombers	0		0	6,546	728	7,274	7,815
Warheads Attributed to Deployed ICBMs, SLBMs	0		0	5,990	400	6,390	6,227
Throw-weight of Deployed ICBMs And SLBMs in megatons	0		0	3,941.9	162.0	4,103.0	1,969.8

Source: US State Department, Bureau of Arms Control, as of July 1, 1999

The Agreed Terms of the START I Reductions

Reductions to equal aggregate levels in strategic offensive arms, carried out in three phases over seven years from the date the treaty enters into force. (Now extended to 2007)

Specific, equal interim levels for agreed categories of strategic offensive arms by the end of each phase.

CENTRAL LIMITS INCLUDE:

- 1,600 Strategic Nuclear Delivery Vehicles (SNDVs).
- 6,000 accountable warheads.
- 4,900 ballistic missile warheads.
- 1,540 warheads on 154 heavy intercontinental ballistic missiles (ICBMs) for the Soviet side. The Soviets also agreed in a side letter to eliminate 22 SS-18 launchers every year for seven years to achieve this level.
- 1,100 warheads on deployed mobile ICBMs.
- Throw-weight ceiling of 3,600 metric tons.

DELIVERY VEHICLES

- 1,600 ceiling on the number of SNDVs, comprising deployed ICBMs and their associated launchers, deployed submarine-launched ballistic missiles (SLBMs) and their associated launchers, and deployed heavy bombers.

WARHEADS

- 6,000 accountable warhead ceiling, comprising the number of warheads attributed to deployed ICBMs and SLBMs, the number of long-range, nuclear-armed air-launched cruise missiles (LRNA) attributed to heavy bombers equipped for LRNA (see LRNA), and one warhead attributed to each heavy bomber equipped only for nuclear-armed gravity bombs and short-range attack missiles (SRAMs).

BALLISTIC MISSILE WARHEADS

- Each ballistic missile warhead attributed to a missile counts as one under the 6,000 warhead ceiling.
- No flight testing of missiles with RVs in excess of attributed number.
- A quota of on-site inspections to verify that deployed ballistic missiles contain no more RVs than the number of warheads attributed to them.
- Ban on new types of ICBMs and SLBMs with more than 10 warheads.
- Ban on increasing warhead attribution on future types of ICBMs and SLBMs.

DOWNLOADING

- The number of warheads on up to three existing types of ballistic missiles and their attribution under START may be reduced (“downloaded”) up to a total of 1,250 RVs.
- Each Soviet SS-N-18 may be attributed with 3 RVs; a total of 896 SS-N-18 warheads count toward downloading limit.
- US Minuteman III may be reduced by 1 or 2 RVs.
- Insofar as permitted by the 1,250 limit, up to 500 RVs may be downloaded on two other existing ballistic missile types (up to 4 RVs per missile).
- Ban on downloading of new types. Ban on deploying a new type with more warheads than on a downloaded type (except for the Minuteman III and the SS-N-18). Ban on downloading of heavy ICBMs.
- If an ICBM is downloaded by more than two RVs, it must be equipped with a new front section platform, and all old platforms destroyed.

HEAVY ICBMs

- In addition to the requirement to reduce deployed heavy ICBMs and their warheads by 50 percent, other constraints on heavy missiles include: no downloading; no increase in launch weight or throw-weight; no mobile launchers for heavy ICBMs; ban on new types of heavy missiles. New heavy ICBM silo construction allowed, but only in exceptional cases for relocation or to replace eliminated heavy ICBM silos in extraordinary circumstances; never to exceed 154 such silos. Modernization and testing of existing heavy ICBM's can continue.

NEW TYPES OF ICBMs AND SLBMs

- An ICBM or SLBM will be considered a new type of ICBM or SLBM if it meets any of the following criteria: change in number of stages; change in type of propellant; 10 percent change in missile or first stage length; 10 percent change in missile launch weight; 5 percent change in diameter; 5 percent change in first stage length combined with 21 percent increase in throw-weight.
- Ceiling of 21 percent on permitted increases to throw-weight of existing types of ICBMs or SLBMs.
- Warhead attribution for future types of ICBMs and SLBMs will be the maximum number of RVs tested and simulated, but no less than the number derived by dividing 40 percent of missile throw-weight by weight of the lightest RV tested on that type of ICBM or SLBM. Application of the 40 percent rule to new systems with unconventional front ends will be discussed at the JCIC.

HEAVY BOMBERS

- Each heavy bomber counts as one SNDV. Each heavy bomber equipped only for nuclear weapons other than long-range nuclear air-launched cruise missiles (i.e., only for gravity bombs and SRAMs), counts as one warhead under the 6,000 limit. An agreed number of heavy bombers could be removed from accountability under the 1,600 SNDV limit by conversion to a non-nuclear capability. Heavy bombers equipped for long-range nuclear ALCMs (LRNA), will be distinguishable from other heavy bombers.
- In exchange for not including the Tupolev 22-M (Backfire) bomber in START, the Soviet Union will make a politically-binding declaration that it will not deploy more than 300 air force and 200 naval Backfires and that these bombers will not be given intercontinental capability.

LONG-RANGE NUCLEAR AIR-LAUNCHED CRUISE MISSILES (LRNA)

- Nuclear-armed ALCMs with a range in excess of 600 kilometers (LRNA) will be affected under START. New long-range conventionally-armed ALCMs that are distinguishable from nuclear-armed ALCMs are not limited in START and may be deployed on any aircraft.
- For the purpose of counting against the 6,000 warhead limit, accountable warheads will be attributed to heavy bombers equipped for LRNA as follows: each current and future US heavy bomber equipped for LRNA will count as 10 warheads (except as noted below) but may actually be equipped for up to 20 LRNA. Each current and future Soviet heavy bomber equipped for LRNA will count as 8 warheads (except as noted below) but may actually be equipped for up to 16 LRNA.
- The United States may apply the above counting rule to 150 heavy bombers equipped for LRNA; the Soviet Union may apply the above counting rule to 180 heavy bombers equipped for LRNA. For any heavy bombers equipped for LRNA in excess of these levels, the number of attributable warheads will be the number of LRNA for which the bombers are actually equipped.
- Multiple-warhead long-range nuclear ALCMs are banned.

MOBILE ICBMs

- Categories of permitted movements and associated notifications have been agreed.
- Non-deployed mobile ICBMs and launchers will be limited numerically and geographically (see NON-DEPLOYED MISSILES below).
- Soviet mobiles are: SS-24 and SS-25. For purposes of reciprocity the US Peacekeeper will be treated as mobile although it has never been tested as a mobile ICBM.

NON-DEPLOYED MISSILES

- There will be a numerical limit of 250 on non-deployed ballistic missiles for all ICBMs of a type that has been flight tested from a mobile launcher; of those, no more than 125 may be non-deployed missiles for rail-mobile launchers. There also will be a numerical limit of 110 on non-deployed launchers for mobiles of which no more than 18 may be non-deployed launchers for rail-mobile ICBMs.
- Other non-deployed ballistic missiles will not be subject to numerical limits, but there will be restrictions on their location and movement and they will be subject to data exchange requirements.
- Various provisions are also agreed to inhibit rapid reload of ICBM launchers.
- The sides have also agreed there will be no restrictions on the number of cruise missiles and other heavy bomber weapons. There will be limited restrictions on the location of LRNA.

EXEMPTIONS FROM TREATY LIMITS

- 75 non-modern heavy bombers equipped for non-nuclear arms, former heavy bombers, and training heavy bombers.
- 20 test heavy bombers.
- 25 test silo launchers and 20 test mobile launchers at test ranges.

SLCMS

- Sea-launched cruise missiles (SLCMs) will not be constrained in the START Treaty. However, each side will provide the other with a politically-binding declaration concerning long-range nuclear SLCMs, i.e., those nuclear SLCMs whose range is over 600 kilometers. In annual declarations, the planned maximum number of these deployed nuclear SLCMs for each of the following five Treaty years will be specified. The planned maximum number will not exceed 880 long-range nuclear SLCMs. Nuclear-armed SLCMs with a range of 300-600 kilometers will be the subject of confidential annual data exchanges. The sides will not produce or deploy multiple warhead nuclear SLCMs.

VERIFICATION

The Strategic Arms Reduction Treaty (START) was designed with verification in mind, and verification measures were negotiated in parallel with other aspects. Thus, the basic structure of the Treaty is designed to facilitate verification by national technical means (NTM). The START Treaty contains detailed, interlocking and mutually reinforcing provisions, which supplement national technical means to establish an effective verification regime. This regime provides for data exchanges and notifications on strategic systems and facilities covered by the Treaty, a ban on the denial of data from telemetry, twelve types of on-site inspection and exhibitions, continuous monitoring at mobile ICBM final assembly facilities, and cooperative measures. These elements are outlined below.

- **NATIONAL TECHNICAL MEANS (NTM)** - START provides for the use of, and non-interference with, national technical means of verification, e.g. satellites. There are explicit provisions prohibiting interference with NTM, or use of concealment measures that impede verification by NTM.
- **TELEMETRY** - Parties are prohibited from engaging in any practice that denies full access to telemetric information during missile flight tests, with certain limited exceptions. Moreover, Parties are obligated to exchange telemetry tapes, interpretative data and acceleration profiles for every test flight.
- **DATA EXCHANGE AND NOTIFICATIONS** - Prior to Treaty signature, the sides will exchange data on numbers, locations, and the technical characteristics of START-accountable weapons systems and facilities and will provide regular notifications and data updates thereafter.
- **COOPERATIVE MEASURES** - Seven times a year, either party may request the other to display in the open road-mobile launchers, rail mobile launchers and heavy bombers at bases specified by the inspecting Party. Additional cooperative measures may be requested following an operational dispersal.
- **CONTINUOUS MONITORING ACTIVITIES** - START establishes continuous monitoring at the perimeter and portals of each side's mobile ICBM assembly facilities. The US has the right to establish a monitoring

facility at Votkinsk, which is the final assembly facility for the SS-25, and at Pavlograd, which is the final assembly facility for the SS-24. The Soviet side has the right to monitor the Thiokol Strategic Operations facility at Promontory, Utah, the final assembly facility for the accountable stage of the Peacekeeper. Such monitoring would also be established at any future facilities at which mobile ICBM assembly takes place.

- **ON-SITE INSPECTIONS (OSI)** - There are twelve types of OSI and exhibitions. These are: baseline data inspections, data update inspections, new facility inspections, suspect site inspections, reentry vehicle inspections, post-exercise dispersal inspections, conversion or elimination inspections, close-out inspections, formerly declared facility inspections, technical characteristics exhibitions, distinguishability exhibitions and heavy bomber baseline exhibitions.
- **COMPLIANCE** - Compliance concerns may be raised by either side in the Joint Compliance and Inspection Commission (JCIC) or any other appropriate forum.

DATA DENIAL

- Agreement to broadcast all telemetric information from test flights of ICBMs and SLBMs and to ban any practice (including encryption, encapsulation and jamming) that denies full access to telemetric information, with certain limited exceptions.
- Requirement to provide full telemetry tapes, acceleration profiles, and certain specified interpretive information after each test flight of an ICBM or SLBM.
- As a goodwill gesture, the sides agreed not to engage in encryption or jamming beginning 120 days after Treaty signature.

TREATY DURATION

- Treaty will have a duration of 15 years, unless superseded earlier by a subsequent agreement.
- If the sides agree, treaty may be extended for successive five year periods.

NON-CIRCUMVENTION/THIRD COUNTRY ISSUES

- No transfer of strategic offensive arms (SOA) to third countries, except that there will be no interference with existing patterns of cooperation.
- There will be no permanent basing of SOA outside national territory and no inspections outside national territory. Temporary stationing of heavy bombers overseas permitted, but certain notifications may apply. Port calls for SSBNs permitted.

START I : Status in 1999

- **Signed July 31, 1991:**
 - **May 1992 protocol has Ukraine, Belarus, Kazakhstan agree to become non-nuclear weapons states, and members of the NNPT, Return warheads to Russia**
 - **US ratifies on October 1, 1992**
 - **Duma approves on November 4, 1992.**
 - **Resolve Ukrainian issue on December 5, 1994**
- **Status of US Forces: (1/99)**
 - **7,858 remaining warheads on 1,480 delivery vehicles.**
 - **All Minuteman IIs out of silos, 449 of 450 silos converted.**
 - **All Poseidon missiles out of service, all but 2 of 31 Poseidon submarines eliminated**
- **Status of FSU Forces: (1/99)**
 - **10,000+ warheads reduced to 7,362.**
 - **2,500 delivery vehicles down to 1,509.**
 - **Eliminate several hundred Russian ICBMs, 50 bombers, and nearly 350 SLBM launchers.**
 - **All nuclear weapons out of Kazakhstan by May 1995.**
 - **All 81 SS-25s in Belarus returned to Russia as of late November 1996.**
 - **All nuclear weapons out of Ukraine by June 1, 1996; eliminate all SS-19 silos and 12 of 56 SS-24 silos. 25 Bear-H and 18 Blackjack bombers remain, but in April 1998, Ukraine says will eliminate 40 of these bombers, display 2, and convert 2.**
- **Compliance Issues:**
 - **Russian conversion of SS-25s to SDLVs. (Resolved in November 1997).**
 - **British tests of Trident with 10-12 warheads while US is only permitted 8. (Not covered by START I).**

- **US modifications of B-1 to ease carrying of cruise missiles (permitted).**

START II Protocol and Letters on Early Deactivation

- Formal title: Protocol to the Treaty Between the United States of America and the Russian Federation on Further Reductions and Limitations of Strategic Offensive Arms of January 3, 1993.
- The Protocol extends the date by which the START II limitations and reductions must be completed from January 1, 2003 to December 31, 2007.
- Extends the date by which the interim limitations and reductions of the START II Treaty must be carried out from seven years after entry into force of the START Treaty (December 5, 2001) to December 31, 2004.
- States that the Parties may conclude an agreement on a program of assistance for the purposes of facilitating and accelerating implementation of the START II reductions and limitations. This provision replaces the START II provision that required early implementation of the START II reductions if the Parties concluded, within one year of START II entry-into-force, an agreement on a program of assistance is subject to ratification by each Party and will enter into force on the date when the instruments of ratification are exchanged.
- Joint Agreed Statement
 - Records the agreement between the United States and the Russian Federation that henceforth Minuteman III ICBM downloading under START II can be carried out at any time before December 31, 2007, the deadline for completing all Treaty-mandated reductions. This ensures that deMIRVing under START II will take place in a stable and equivalent manner. This Joint Agreed Statement has no effect on the downloading provisions of the START I Treaty, which remain unchanged.
 - Exchange of Letters on Early Deactivation
 - Legally codifies the commitment made at Helsinki that the United States and the Russian Federation will deactivate by December 31, 2003 all strategic nuclear delivery vehicles which, under the START II Treaty, will be eliminated by December 31, 2007.
 - Deactivation will be achieved by removing the nuclear reentry vehicles from the missiles, or by taking other jointly agreed steps.
 - The letters on deactivation will enter into force when START II enters into force.
 - Immediately upon entry into force of START II, U.S. and Russian experts will begin work on understandings concerning methods of deactivation and on parameters of a U.S. program of assistance to Russia for implementation of deactivation.
 - The Russian letter contains a unilateral statement: "Taking into account the supreme national interests of the country, the Russian Federation proceeds from the understanding that well in advance of the above deactivation deadline the START III Treaty will be achieved and will enter into force." The U.S. letter takes note of this Russian statement.
 - Relevant Dates
 - The START I Treaty entered into force on December 5, 1994; it was signed on July 31, 1991.
 - The U.S. Senate gave its advice and consent to ratification of the START II Treaty on January 26, 1996. The START II Treaty was signed on January 3, 1993.
 - The Clinton-Yeltsin Helsinki Summit took place on March 20-21, 1997.

START II : Status in 1999

- **Signed January 3, 1993:**
 - **SFRC ratifies on December 2, 1995, US Senate approves 87-4 on January 26, 1996.**
 - **Duma hearings in 1995, 1996, 1997, and 1998. Vote delayed on April 2, 1999 because of Kosovo.**
 - **September 26, 1997: US and Russia sign protocol extending deadlines from 2003 to 2007.**
 - **March, 1997: US and Russia agree to link START II to START III by setting goal of cutting attributable warheads to 2,000-2,500 to eliminate Russian need to modernize to level of 3,500 warheads.**

- **Issues**
 - **Russian ability to raise number of single warhead systems (Topol M or SS-27) to 3,500 warheads if START III is not accelerated.**
 - **Russian complaint that US can keep half of its MIRV'd SLBMs but Russia cannot keep any of its MIRV'd ICBMs.**
 - **US desired to renegotiate ABM Treaty threatens Russian ability to maintain strategic parity and gives US “break out capability” to achieve damage-limiting national missile defense capability.**
 - **Russian indication might accept ABM revision for limited 3 warhead MIRVing of SS-27.**

START III : Status in 1999

- **Proposed by Clinton and Yeltsin during summit meeting on March 20-21, 1997.**
 - **Goal is reductions by December 31, 2007**

- **Issues**
 - **Some Russians want maximum level of 1,500 warheads; Some US experts feel cuts are too deep and too fast, raise issue of Chinese missile modernization.**
 - **Negotiations to start after START II enters into force.**
 - **Explore limits on nuclear armed sea-launched cruise missiles. (US withdrew all such missiles from deployment in 1991.**
 - **Explore limits on tactical and theater nuclear weapons.**
 - **Call for added transparency.**
 - **Destruction of nuclear warheads and weapons.**
 - **August 17-19, 1999: Russia calls for limit of 1,500 warheads, says no negotiations unless US agrees not to modify the ABM Treaty.**

Other US-Russian Measures

- **Aid Russia in Dismantling Nuclear Weapons; Securing Nuclear Systems:**
 - **Dismantle labs,**
 - **Destroy weapons (currently Russia can destroy a maximum of 2000 a year.**
 - **Nunn-Lugar Cooperative Threat Reduction Program**
 - **Safeguard, storage, and destruction of NBC Weapons.**
 - **Halt proliferation.**
 - **Prevent dispersion of weapons-related expertise.**
 - **Have been 6-8 incidents involving significant transfer of nuclear material.**
 - **Nuclear Cities Initiative.**
 - **Duma approves on November 4, 1992.**
 - **Resolve Ukrainian issue on December 5, 1994**
- **Proposed De-alerting**
 - **Take warheads off weapons, move to secure locations..**
- **Common Early Warning**
 - **Help Russia with information and sensors. Russia has EW radar problem, lost geostationary early-warning satellites in June and July 1998, and must rely on older systems.**
 - **September 1998: Proposed shared early-warning agreement.**
 - **Man Y2K Center from December 1999 to January 2000 at Colorado Springs.**

Part Two

The Global Tools at Hand: The Problem of Proliferation and the NNPT, CTBT, CWC, BWC, and MTCR

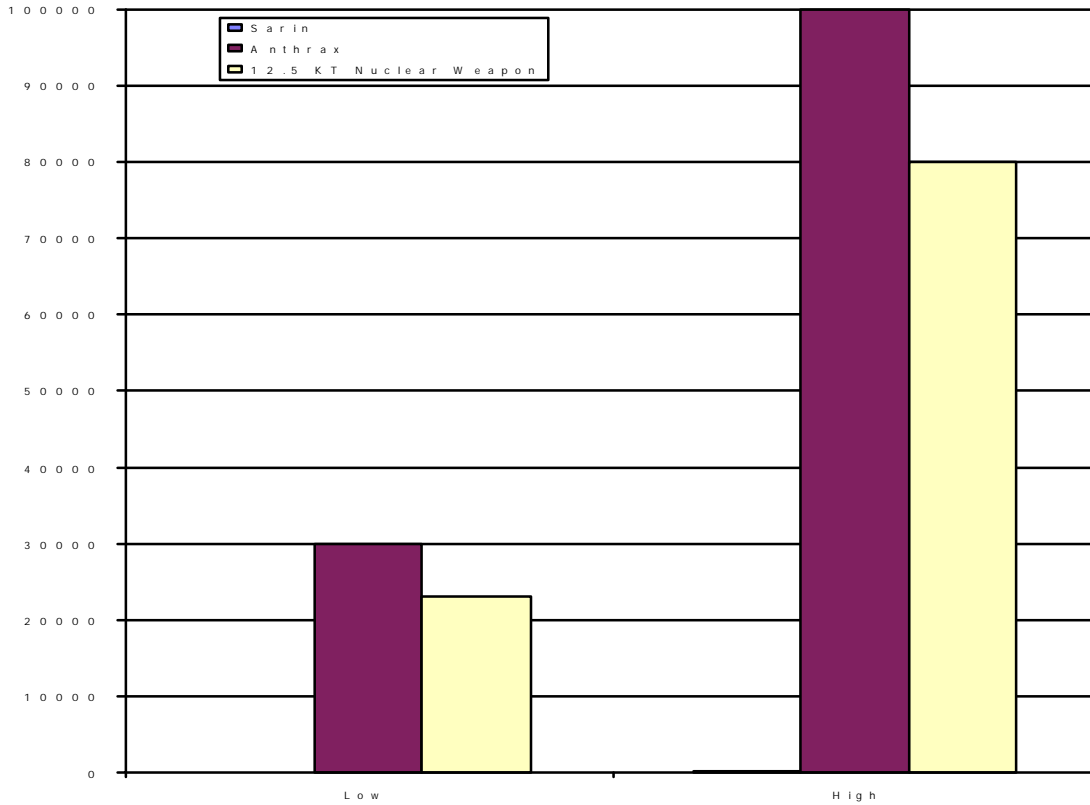
Global Challenges: Arms Control

- Arms control remains an extension of diplomacy and war by other means.
- A wide range of global agreements both support and bind national interests and create a form of “globalization” focused on weapons of mass destruction
 - Start I, II, and III
 - NNPT
 - CTBT
 - BWC
 - CWC
- Agreements affecting conventional arms have been discussed, but have shown little practice; controls on conventional technologies are uncertain.
- Regional agreements present added complications.
- The CNN Factor, the Geneva convention, and impact of international law:
 - Bind the good guys; leave the bad guys free?

Weapons of Mass Destruction: What Are We Really Talking About?

- Differ radically in inherent lethality.
- Chemical weapons have marginal real-world status as weapon of mass destruction.
- Lethality models are terrible, both in terms of prompt and long-term effects.
- The actual process of weaponization is critical in determining effectiveness.
- Missiles are only one of many delivery systems and often not the best one.

The Relative Killing Effect of Chemical vs. Biological Weapons of Mass Destruction Using a 1,000 Kilogram Bomb or Missile Warhead (Prompt Deaths)



The Thermal and Blast Effects of Nuclear Weapons Radius of Effect in Kilometers

Yield in Kilotons	Metals Vaporize	Metals Melt	Wood Burns	3rd Degree Burns	5 psi/ 160 mph Winds	3 psi 116 mph Winds		
10		0.337	0.675	1.3	1.9	1.3	1.6	
20		0.477	0.954	1.9	2.7	2.0	2.5	
50		0.754	1.6	3.0	4.3	2.7	3.3	
100		1.0	2.0	4.3	5.7	3.5	4.3	
200	1.5	2.8	5.7	8.0	4.5	5.4		

Source: Adapted by Anthony H. Cordesman from the Royal United Services Institute, Nuclear Attack: Civil Defense, London, RUSI/Brassey's, 1982, pp. 30-36.

NNPT: Nuclear Proliferation

- NNPT Regime:
 - Most effective regime because requires massive production assets or transfer of fissile material.
 - Inspection regime can work if ruthlessly enforced.
 - IAEA did not enforce in Iran or Iraq.
 - Many nations are not members.
- The Technology
 - No major breakthroughs in enrichment: Cascade, centrifuge, or LIS.
 - FSU loose nuclear material is a risk: Estimate 30,000 weapons and 70,000 weapons equivalents in HEU and Plutonium.
 - Technology for fission weapons now well known. Major problem is to reduce size and boost yield.
 - Improved accuracy reducing need for thermonuclear and/or boosted weapons.
 - Critical uncertainties in terms of “point one safety,” PAL systems, Fusing and height of burst, employment doctrine.

Other Agreements Impacting on Nuclear Proliferation

- Statute of the International Atomic Energy Agency (IAEA): July 29, 1957.
- Zanger Committee (Nuclear Exporters Committee): Nuclear suppliers committee dating back to 1970s.
- Nuclear Suppliers Group (NSG or London Group): Formed in 1975.
- Convention on Protection of Nuclear Material): February 8, 1987.
- Treaty for the Prohibition of Nuclear Weapons in Latin America (Tlatelolco): April 22, 1968, Argentina, Brazil, and Chile join in 1994, Cuba in 1995.
- South Pacific Nuclear Weapons Free Zone (Rarotonga): December 11, 1986. Does not prohibit nuclear transit. US, France, and Britain sign in 1996.
- African Nuclear Weapons Free Zone (Pelindaba): April, 1996.
- Southeast Asia Nuclear Weapons Free Zone (Bangkok): December 1995. (US says inconsistent with the law of the sea.
 - US-North Korean Agreed Framework, October, 1994.

Test Ban Treaties

- 1963 - Limited Test Ban Treaty:
 - Bans air, space, and underwater tests. *

- 1974 – Threshold Test Ban Treaty:
 - Bans any weapons tests of more than 150 kilotons. *

- 1976 – Peaceful Nuclear Explosion Treaty:
 - Extends 150 kiloton limit to peaceful explosions. *

- September 1996 – Comprehensive Test Ban Treaty:
 - Bans all nuclear tests in perpetuity.

* Ratified by the US.

CTBT: Nuclear Testing

- Comprehensive Test Ban Regime:
 - 1 KT may be limit of reliability.
 - Seismic data may, however, be able to locate down to the level of about 1/20th of a KT in a coupled explosion.
 - Problem is may be able to violate to several KT in a decoupled explosion.
 - Inspection regime can work if enforced.
- The Technology
 - 321 planned monitoring stations; 170 (50 primary, 120 secondary) for underground shock waves, 80 radio nuclide to monitor atmosphere, 60 infrasound sonic, and 11 hydroacoustic (6 primary, 5 auxiliary) to monitor undersea booms.
 - Major debates over detectability and need for small tests for point one safety, and stockpile modernization and maintenance.
 - Masking (muffling) and decoupling seem possible ways to hide tests.
 - No longer need testing for fission weapons, and mini explosions are extremely wasteful of material with limited result.
 - Tests of even 4 pounds may affect some aspects of hydronuclear yield, reliability of fission weapons of a few to 10s of kilotons, and point one (1 in 1 million chance of 4 lb. yield) safety.

- But, fission weapons tend to be solid pack, levitated designs that no longer need testing.
- Tests around 10 ton threshold have serious value in reducing warhead size, efficient use of fissile material, and moving towards boosted weapons (deuterium and tritium).
 - Value of ultra-low yield testing in verifying and modifying existing boosted designs still to be tested.
 - Indian tests ambiguous: In tests on May 11, 1999, experts rate at 15 KT to 25 KT, Do not detect two claimed tests, possibly because below 1 KT threshold.
 - Pakistan claims carried out 5 tests on May 28, 1999. Claims one is 30-35 KT. Tests indicate one is 8-15 KT. Cannot detect or characterize others. Another test two days later is claimed to be 18 KT. US feels is less than 2 KT, probably 1 KT.
 - An earthquake or trembler near Novaya Zemlya in Russia was characterized as a possible nuclear event until examination located it 100 kilometers away from the test site in the Kara Sea.

US Policy on the Comprehensive Test Ban Treaty

- **On October 13, 1999, the U.S. Senate rejected the Comprehensive Test Ban Treaty (CTBT).**
- **Nevertheless, the President stated that the United States would not abandon it. Rather, he stated he fully intends that the United States will eventually ratify the treaty. Accordingly, the Administration will work with the Senate to ensure that the merits of the CTBT are well understood and to address Senators' legitimate concerns.**
- **The President also reaffirmed U.S. policy of maintaining a moratorium on nuclear explosions, a policy that has been in place since 1992.**
- **The other nuclear weapon states also have policies of not conducting any nuclear explosions, pending CTBT entry into force.**
- **The United States will continue to urge the nuclear weapon states to maintain the moratorium on nuclear testing that they have declared and all other states to show similar restraint.**
- **The purpose of the CTBT is to ban all nuclear explosions and thus help constrain nuclear proliferation. The CTBT cannot prevent proliferation. However, the prohibition of all nuclear explosions will help make it more difficult for states possessing nuclear weapons to improve existing types or to develop advanced new types of nuclear weapons.**
- **The CTBT would prohibit only nuclear explosions. It would not prohibit stockpile stewardship activities the United States needs to carry out to maintain its nuclear deterrent. Such activities include non-nuclear testing, subcritical experiments, preparations to resume full-scale nuclear testing, computer modeling and simulation of nuclear explosions, and any other stockpile maintenance activities not involving a nuclear explosion.**
- **Similarly, the treaty would not prohibit design, development, production, and remanufacture of nuclear weapons.**

Source: Secretary of Defense, FY2000 Annual Report

BWC: Biological Weapons

- Biological Weapons Convention: The Liar's Contest:
 - Everyone denies, many research, many reach breakout capability, some deploy.
 - Hatred of the weapon leads to false promises for inspection and control.
 - Politically correct to claim capability to control.
- The Technology
 - 60 years of advanced weapons development.
 - Dry storable micropowders in late 1960s.
 - Russia now admits developed and deploy some 37 types of weapons. (Ken Alibek, Biohazard)
 - Russia, China, Germany, and Japan developed and deployed infectious agents.
 - Japan launched over 30 attacks in China.
 - Russia may have used in WWII.
 - Nuclear lethality without the advanced genetically engineered weapons to come.
 - Iraq converted a major pharmaceutical plant to Anthrax production in less than 5 months.
 - BWC may accelerate “liar’s contest. Can only get technology if deny development.

BWC: Biological Weapons Convention

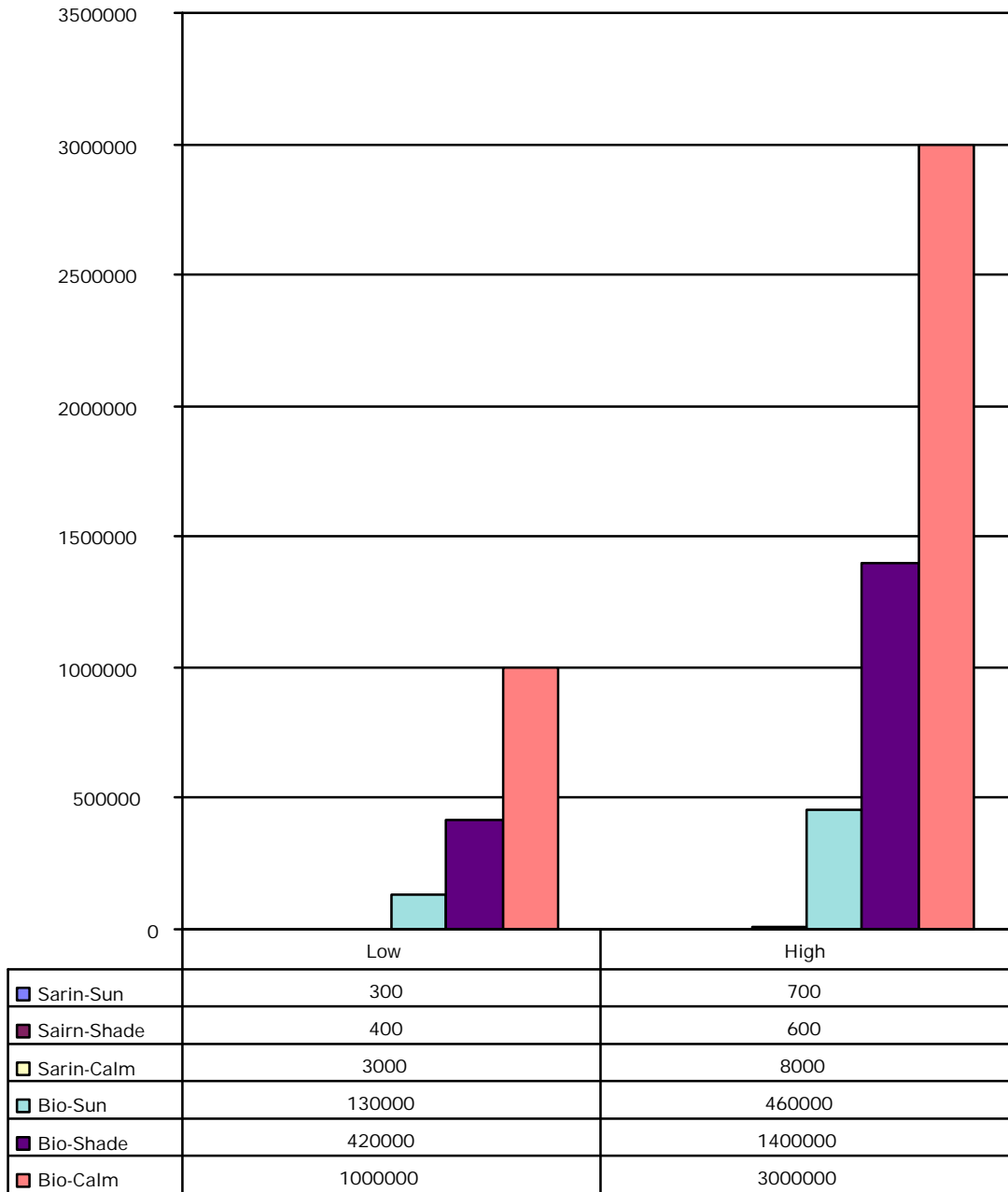
- Concluded in 1972, US ratified in 1975.
- Bans development, production, and stockpiling of biological agents and toxins in types and quantities that have no justification for peaceful purposes.
- US unilaterally declared an end to its biological weapons program in 1968.
- US Biological Terrorism Act on 1989 (PL 101-298) adds criminal penalties to enforce the BWC.
- 1996 BWC Review Conference acknowledges difficulty of developing verification protocol. Left to group of experts to study. Deferred action to 2001.
 - UK strongly argues for control regime..
 - Iran and many developing nations call for the removal of Australia Group controls and increased biotechnical cooperation in return for enhancement of BWC.
 - US argues for transparency of research.

Biological Weapons: Known Development of Agents by the Major Powers Before the BWC

<u>Agent</u>	<u>Canada</u>	<u>France</u>	<u>Germany</u>	<u>Japan</u>	<u>UK</u>	<u>USA</u>	<u>Russia</u>
<u>Bacteria</u>							
Anthrax	+	+		+	+	+	+
Brucella		+					+
Chlamydia psittaci						+	
Dysentaria		+			+	+	+
Gas gangrene		+			+		
Leperosy					+		+
Tuberculosis							+
Pseudomonas mallei		+		+	+		+
Pseudomonas Pseudomallei		+			+		+
Tetanus		+			+	+	+
Typhoid		+			+	+	+
Typhus		+			+	+	
Vibro Cholera				+	+	+	+
Yersinia Pestis				+	+	+	+
<u>Viruses</u>							
Ebola		+				+	+
Encephalitis		+					+
FMD				+			+
Fowl plague		+					+
Influenza		+			+		+
Newcastle disease							+
Rinderpest	+	+		+			+
Korean haemorrhagic Fever					+		
<u>Toxins</u>							
Botulin	+	+			+	+	+
Ricin		+			+	+	+
Saxitoxin							+
Staphylococcus							+
Enterotoxin B						+	
Snake Toxins					+		
Tetrodotoxin (fish poison)					+		
<u>Arthropods</u>							
Potato beatles		+		+			
<u>Fungi</u>							
Coccidioides immitis							+
<u>Other</u>							
Malaria					+		
Weeds				+			
Phytopathogens							+
Fish pathogens							+

Source: SIPRI and IDA

The Relative Killing Effect in Numbers of Dead for Biological vs. Chemical Weapons with a Optimal Aerosol Delivery



CWC: Chemical Weapons Convention

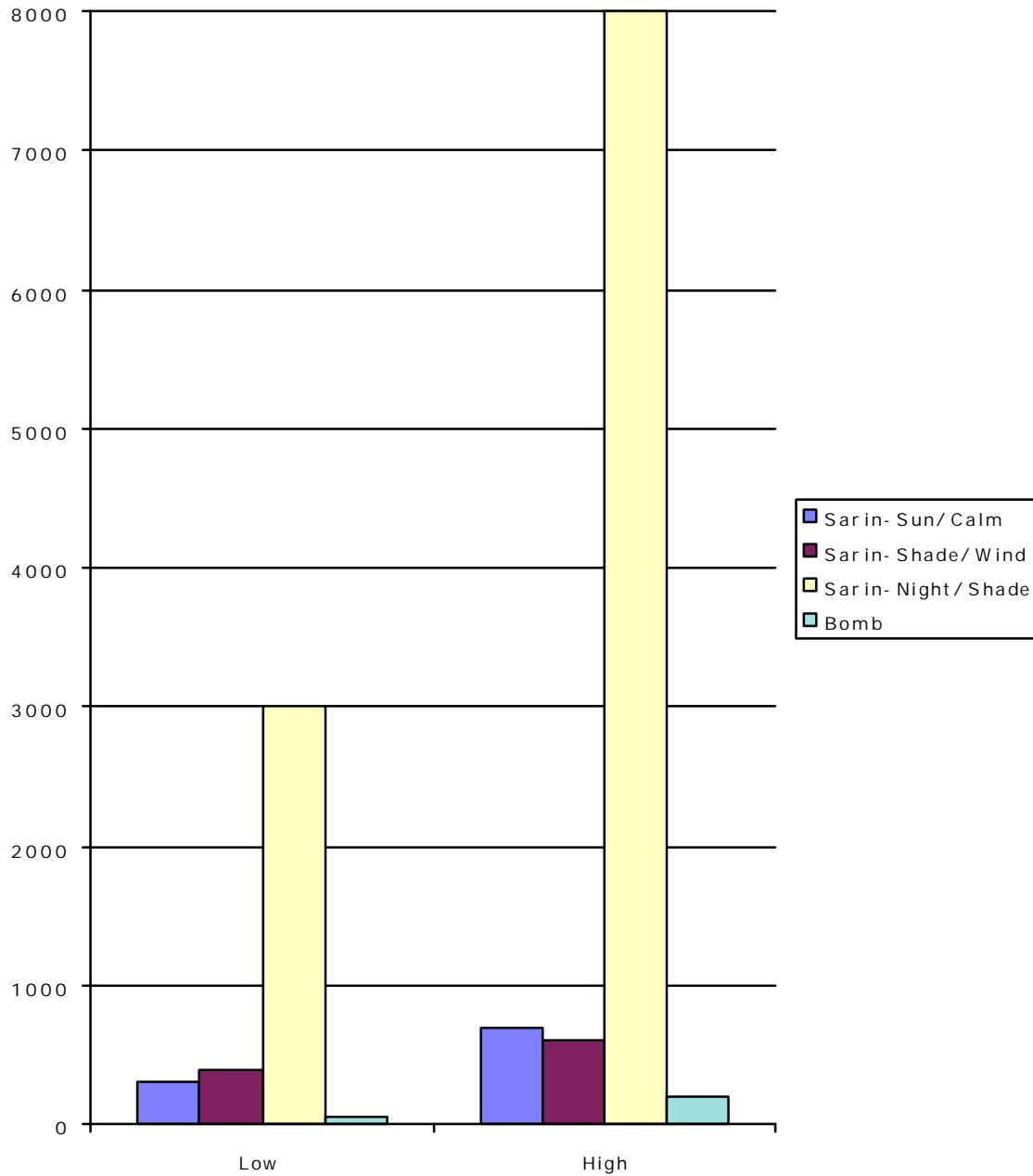
- Opened for signature on January 1993, after 25 years of negotiation. Entered into force on April 29, 1997.
- Prohibits development, production, stockpiling, transfer, and use of chemical weapons.
 - Restricts sale and transfer of precursors, and lists them for control by OPCW.
 - Destruction of arsenals within 10 years.
 - Signatories must declare all facilities and stockpiles of weapons.
 - Scheduled chemicals are categorized as I, II, and III:
 - Schedule I exported only to CWC signatories.
 - Schedule II controlled as of 2000.
 - Schedule III: Controls to be considered as of 2002.
- Organization for the Prohibition of Chemical Weapons (OPCW) headquartered in the Hague
 - Conference of States Parties includes all signatories and meets annually
 - Executive Council includes 41 parties on two-year rotation.
 - Technical Secretariat.
 - Scientific Control Board.

Chemical Weapons

- Chemical Weapons Convention: Preventing the Wrong war?
 - Inspection regime adequate -- if aggressively enforced -- to prevent large scale stockpiling for WW I or Iran-Iraq War-like ground war.
 - Cannot prevent development of breakout capability.
 - Cannot reliably detect stockpile of several hundred weapons needed for strategic-countervalue threat purposes.
- The Technology
 - Real world lethality so far roughly equal to artillery at best – no chemical weapons use has yet equaled artillery casualties at the Somme in WW I.
 - Should not focus on killing, however, Mustard and persistent nerve gas have major impact in inhibiting many types of combat operations/terror effect.
 - No superweapons in spite of rumors.
 - Weaponization, targeting, and weather models critical.
 - CWC may accelerate “liar’s contest. Can only get technology if deny development.

The Relative Killing Effect of Chemical Weapons Under Different Conditions of Aerosol Delivery

(Numbers of dead from delivery of 1,000 Kilograms)



Australia Group: Biological and Chemical Weapons

- Meets since June 1985.
- Set up in reaction to use of chemical weapons in Iran-Iraq War.
- Informal supplier control groups with 30 members.
- Has developed list of chemical and equipment needing control.
- Expanded list to include biological weapons supplies in 1990.
- Does not prohibit sale of listed items, only establishes monitoring and licensing arrangements.
- Export denial only if reason to suspect use for chemical or biological weapons program.

Part Three

East-West Issues and Arms Control Regimes: ABM Treaty, CFE, INF, MTCR, CSCE, Conventional Arms Transfers

Key Regimes

- ABM
- CFE
- INF
- CSCE
- MTCR
- Technology Transfer
- Russian nuclear material security and weapons disposal

The Nature of the ABM Treaty

Basic Framework of the ABM Treaty

- The ABM Treaty, which was signed in 1972 by the United States and the Soviet Union, prohibits deployment of a nationwide defense against strategic ballistic missile attack. In the Treaty, the United States and the Soviet Union agreed that each may have two precisely limited ABM deployment areas (later limited by mutual agreement to one): to protect its capital or to protect an ICBM launch area.
- To promote the objectives and implementation of the Treaty, the Parties established the Standing Consultative Commission (SCC), which meets at least twice a year. Also the terms of the Treaty specify that a review of the Treaty shall be conducted every five years.
- In 1974, the Parties to the Treaty agreed by means of a Protocol to reduce the number of permitted ABM deployment areas to one for each side. The Soviet Union chose to maintain (and Russia continues to maintain) an ABM defense of its national capital, Moscow. The United States chose to complete its Safeguard ABM system designed to defend its ICBM silo launcher area near Grand Forks, North Dakota; however, this system was operational for a very short time and has been inactive since 1976.

Recent ABM Treaty Developments

- In 1993, the Clinton Administration conducted a review of U.S. policy towards Ballistic Missile Defense and the Future of the ABM Treaty. The Administration made a determination that the “traditional” or “narrow” interpretation of the Treaty is the correct one. The Administration therefore reaffirmed that the ABM Treaty prohibits the development, testing, and deployment of sea-based, air-based, space-based, and mobile land-based ABM systems and components without regard to the technology utilized.
- With the dissolution of the Soviet Union, the question of treaty succession arose. The United States has made clear its position that it is willing to accept as Treaty Parties any of the New Independent States (NIS) that want to be Party to the Treaty.
- At the same time, the growing threat posed by theater ballistic missiles, and the need to combine effective protection against such threats while avoiding development of an ABM capability, has prompted the U.S. to propose that the demarcation between ABM and non-ABM defenses be clarified. The ABM Treaty itself does not provide clear guidance on this question. This clarification is being negotiated in the Treaty’s implementing forum, the Standing Consultative Commission.
- Memorandum of succession of September 1997 names Russia, Belarus, Ukraine, and Kazakhstan as successors to FSU and limits all four states to one location with 100 launchers/interceptors.
- Agreed statement of September 26, 1997 says
 - Interceptors can only be tested at speeds greater than 3 kilometers per second if target has speed of less than 5 kilometers per second and range of less than 3,500 kilometers.
 - Allows systems to be tested at speeds of less than 3 kilometers per second at targets with closing speeds of less than 5 kilometers per second and ranges less than 3,500 kilometers.
 - Bans space-based TMD systems.

ABM Treaty: Anti-Ballistic Missile Treaty

- **Signed before proliferation, SDI, NMD, and TMD became key issues.**
- **Key provisions are:**
 - **No development and testing of space, air, or sea-based ABM system or mobile land-based system.**
 - **Initially permitted two fixed land sites, one near capital and one near ICBM silo area.**
 - **Limits on EW radars to periphery of national territory, must look outwards.**
 - **Each site limited to a maximum of 100 ABM launchers and interceptors.**
 - **Protocol in 1974 limited to one site near capital or near ICBM silos.**
 - **Russia deployed system around Moscow, US did not.**
 - **In March 1997, agree that:**
 - **Theater systems can only be tested at speeds greater than 3 kilometers per second if target has speed of less than 5 kilometers per second and range of less than 3,500 kilometers.**
 - **Allows systems to be tested at speeds of less than 3 kilometers per second at targets with closing speeds of less than 5 kilometers per second and ranges less than 3,500 kilometers.**
 - **Bans space-based TMD systems.**

ABM Treaty Status and Issues

- **Treaty is verifiable in terms of both quantity and quality, but Russians feel break out is an issue: Cannot tell if US will suddenly transform a limited NMD system into a national defense system.**
 - **START II and III have become a hostage.**
 - **Some Russians feel could solve with a limited MIRVing (3 warheads) of Topol M (SS-27) ICBM.**
- **Advocates of a US NMD system to deal with rogue threats feel:**
 - **Need different locations from capital and missile silos: Alaska and central US?**
 - **Want two sites and not one.**
 - **Want more advanced radars and space-based sensor systems.**
- **Can deploy tactical and theater missile defense systems, but can't have strategic intercept capability or be tested in ABM mode.**
 - **Prevents national coverage by TMD systems against loose nukes, limited rogue threats.**
 - **May indirectly prevent theater missile defense against threats more sophisticated than Scud.**
 - **Russia and China see such a system as threat to MAD, own status and capabilities.**
- **Any withdrawal from ABM Treaty could drive Russia and China into new arms race or countervalue targeting**
- **Iran/North Korea probably cannot safely saturate US NMD system in near to mid-term; PRC can.**

ABM/TMD Technology

- Can probably deploy effective limited NMD systems to deal with a rogue state threat like North Korea or Iran in 2008-2020 time frame.
 - Costs, performance, technology now unknown.
 - Spent \$52.5 billion through end of 1999.
 - Felt test in September 1999 resulted in intercept but of missile with GPS guidance and interceptor with GPS guidance.
 - First integrated system tests with battle command and control system incorporating all of the system's interceptor launchers and missiles and radars and tracking systems planned for mid-January 1999.
 - Supposed to decide in June 2000 whether technology is ready for deployment in 2005.
- SDI-like system may be impractical and unaffordable in near to mid term as either damage-limiting or leak-proof system for US versus Russia threat at levels about 500-1,000 deployed systems.
- Patriot PAC-3 offers limited TMD point defense capability.
- Aegis and THAAD offer improved area defenses against Scud-like threats
- Wide area theater system like THAAD or AEGIS needed to deal with Shihab 3 and similar threats. (Can close at speeds greater than 5 kilometers per second.)
- Post-Patriot/S-300/S-400 systems have no air or cruise missile defense capability.

ABM Treaty versus NMD Issues

- **Range of US positions.**
 - **Deploy treaty-compliant site (Nunn)**
 - **Withdraw from ABM Treaty and deploy NMD (Helms/Kyl)**
 - **Negotiate NMD with Russia and get agreement to change ABM Treaty (Weldon)**
 - **No funds for SCC (House 4276, August 5, 1998)**
- **Evolution**
 - **1996: Clinton pledges the 3+3 program for NMD: Active R&D during 1997-2000, deploy during 2001-2003.**
 - **January 1998: Clinton adds \$6.6 billion to FY1999-2005 defense budget, delays deployment of NMD to 2003-2005 because of R&D risk.**
 - **April 21, 1999: Senate approves American Missile Protection Act of 1998, calling for deployment as soon as system is ready. Fails in September vote, 59:41.**
 - **Senate and House approve similar bill in 1999, after language is adopted calling for negotiations with Russians to amend ABM Treaty, etc. Senate accepts House version on March 18, 1999, signed July 23, 1999 (97:3, 317:105).**
 - **January 1999: Clinton announces will seek renegotiation of ABM Treaty under Article XIII, which says can do so in response to changes “in the strategic situation.” Yeltsin agrees renegotiation is possible. Some Russians do not.**
 - **June 1999 Summit: Agree to negotiation in late summer.**
 - **When meet during August 17-19, 1999 Russians say cannot renegotiate. (Kosovo may be a key factor as is Russian fear of loss of nuclear status and parity. Some Russians begin to raise the idea of MIRVing the SS-27/Topol M to three warheads to compensate for US NMD.**
 - **Fall 1999: US offers aid on Russian EW radar sites in Siberia.**

INF Treaty: Intermediate Range Nuclear Forces Treaty

- **Signed in 1987.**
- **Affects all land-based ballistic missiles and cruise missiles with ranges of 300-3,400 miles.**
- **Exempts UK and France.**
- **Exempts land and sea-based aircraft and sea-based missiles.**
- **Physical destruction of missiles with joint teams. No physical destruction of warheads.**
- **START III calls for first serious effort to reexamine theater nuclear forces since signing of INF Treaty and end of Cold War.**

NATO/Warsaw Pact Nuclear Delivery Means in 1989-1990 (Excludes Artillery and Land-Based Aircraft)

Category and Type	Countries	NATO Guidelines		Atlantic to Urals		Global		
		Deploying	Area	WP	NATO	WP	NATO	
IRBM								
SS-20	USSR			-	-	-	N.K	318
SSBS-S3	France			-	-	18	-	18
GLGM								
BGM-109G	US			n.k.	-	n.k.	-	98
SS-C-1b	USSR			-	-	-	-	43
MRBM								
Pershing II	US			n.k.	-	n.k.	-	109
SS-4	USSR			-	-	-	43	43
SRBM								
Pershing 1A	FRG			72	-	72	-	72
Pluton	France			-	-	32	-	32
Lance	US			36	-	36	-	65
Lance	Other NATO			52	-	58	-	58
SS-23	USSR			-	-	-	n.k.	76
Scud B	USSR			-	150	-	510	630
Scud A/B	Other WP			-	88	-	151	151
FROG/SS-21	USSR			-	104	-	713	930
FROG/SS-21	Other WP			-	294	-	717	717
SLBM LAUNCHERS								
	France			-	-	96	-	96
	UK			-	-	64	-	64
	USSR			-	-	-	18	36
NUCLEAR ARMED SHIPS								
SLCM								
Land Attack Sub	US			-	-	29	-	45
	USSR			-	-	-	6	10
Land Attack Surf	US			-	-	16	-	19
Anti-Ship Sub	USSR			-	-	-	21	26
Anti-Ship Surf	USSR			-	-	-	40	66
ASW								
SUBROC	US			-	-	12	-	16
SS-N-15	USSR			-	-	-	-	35
ASROC	US			-	-	71	-	132
SS-N-14	USSR			-	-	-	43	65
TORPEDOES	USSR			-	-	-	337	536
MARITIME AIRCRAFT								
Carrier Based	US			-	-	470	-	1,291
	France			-	-	64	-	64
	UK			-	-	46	-	46
Land-Based Bomber	USSR			-	-	-	260	355
Land-Based ASW	US			-	-	27	-	488
	Other NATO			-	-	150	-	150
	USSR			-	-	-	120	195

Missile Technology Control Regime (MTCR)

- **US, Canada, France, FRG, Italy, Japan, and UK sign in April 1987.**
- **Now 25 countries have signed.**
- **China, Israel, Romania, and Ukraine have agreed to observe guidelines.**
- **Restraint on all sales of Category I equipment includes complete rocket, missile, and UAV systems capable of delivering 500 kilograms (1,100 pounds) payloads for 300 kilometers (186 miles) or more.**
- **Controls on components, equipment, material and technologies useful for missiles and UAVs, plus rocket systems and UAVs with shorter ranges and smaller payloads.**
- **Supported by wide range of US sanctions.**
- **Proposals for buyer's regimes – Zero Ballistic Missile (ZBM) treaties.**
- **Questions on what is a conventional arm: E.g. US ATACMS has a range of 250 kilometers. Russia has similar systems.**
- **Growing range of dual-use parts; problems with new suppliers, questions about relation to civilian space-launch vehicles.**

CFE Treaty: Conventional Force Reductions in Europe

- Signed Before Break-up of FSU and Warsaw Pact
 - Involved mass asymmetric reductions. Creating effective parity
 - Key constraints were actively forces, total inventory, and zones.
 - Controlled combat aircraft and highly visible land weapons.
 - Rejected combat unit and manpower approaches.
 - Like SALT and INF, relied largely on national intelligence means.
 - Backed by wide range of confidence building measures under CSCE.
- The Technology
 - Largely ignored technology and quality
 - Freedom to upgrade and down-size selectively.
 - Did not anticipate the “revolution in military affairs.”
 - Largely moot:
 - West and East Europe down-size faster than treaty limits.
 - Russia resource limited.
 - Odd cases like Balkans and Near Abroad create new forms of conflict.

The CFE Treaty and CFE-1A Agreement

Origin and Purpose of Treaty on Conventional Armed Forces in Europe:

The CFE Treaty was signed in November 1990 by 22 states, divided into two groups: the group of 16 (NATO) and the group of six (the USSR and the five remaining former Warsaw Pact states). It has since been adapted to accommodate the break-up of the USSR and Czechoslovakia, augmenting the membership to 30 states parties. The Treaty formally entered into force in November 1992; it is of unlimited duration.

The CFE Treaty's purpose is threefold:

- to promote security and stability in Europe through verifiable lower levels of conventional armed forces;
- to eliminate disparities prejudicial to this objective; and
- to reduce the capability for launching surprise attack initiating large-scale offensives.

There are four core components of the Treaty:

- Phased national reductions of treaty-limited equipment (TLE) over three years (1992-1995);
- Limits on specified military equipment in the Atlantic-to-the-Urals Zone (ATTU) and in the geographic sub-zones, in full effect by November 1995;
- Detailed national data exchanges and notifications on force structure, and equipment holdings; and
- On-site inspections. These four core elements are accompanied by a complex set of rules, procedures, rights, and obligations—including the right to intrusive, short-notice on-site inspection, and detailed procedures covering destruction of TLE, to be completed by November 1995.

CFE Treaty Limits

The CFE Treaty sets equal ceilings from the Atlantic to the Urals on key armaments essential for conducting surprise attack and initiating large-scale offensive operations. Collectively, the treaty participants have agreed that neither group of states in Europe may have more than:

- 20,000 tanks
- 20,000 artillery pieces
- 30,000 armored combat vehicles (ACVs)
- 6,800 combat aircraft
- 2,000 attack helicopters

To further limit the surprise attack potential of armed forces, the treaty sets equal ceilings on equipment that may be held in active units. Other ground equipment must be in designated permanent storage sites. The limits for equipment each group may have in active units are:

- 16,500 tanks
- 17,000 artillery pieces
- 27,300 armored combat vehicles (ACVs)

The treaty limits the proportion of armaments that can be held by any one country in Europe to about one third of the total for all countries in Europe—the “sufficiency” rule. These limits are:

- 13,300 tanks
- 13,700 artillery pieces
- 20,000 armored combat vehicles (ACVs)
- 5,150 combat aircraft
- 1,500 attack helicopters

CFE Regional Arrangements

- The Treaty divides the ATTU (with the cumulative group totals) into four nested zones with group limits on TLE in each zone, beginning with the Central European states; separate sublimits for equipment are assigned in the outer northern and southern zone known as the “flanks”.
- Limits are imposed concentrically to avoid concentration of armed forces. This configuration has the effect of permitting free movement of forces centrifugally from, but not centripetally toward, Central Europe, thus inhibiting a surprise attack in this critical region.
- Following the disintegration of the USSR in 1991, its eight successor states signed the “Tashkent Agreement” in 1992, in which they divided the equipment entitlements of the USSR among themselves, thus permitting implementation of the Treaty.

CFE Destruction/Reduction

- Equipment reduced to meet the ceilings was destroyed, or, in a limited number of cases, converted to non-military purposes. The difference between a State Party's entitlement in a given equipment category and the higher of its holding at Treaty signature and entry into force (EIF) nominally constituted its reduction liability.
- The prescribed reduction process followed a graduated schedule, requiring 25 percent completion by November 1993, 60 percent by November 1994, and 100 percent by November 1995, after which the CFE limits are fully in force.
- During the reduction period, well over 48,000 pieces of equipment have been destroyed, including tanks, armored combat vehicles, artillery, combat aircraft, and attack helicopters. More than 2,500 on-site inspections have been undertaken, including inspections of declared sites, specified sites, and reduction sites.
- Specifically, at the end of the reduction period, the parties to the Treaty have destroyed more than:
 - 18,000 battle tanks
 - 8,900 artillery
 - 17,500 armored combat vehicles
 - 280 combat aircraft
 - 2,100 attack helicopters

CFE Verification

- The treaty includes provisions for detailed information exchanges, on-site inspections, challenge inspections, and on-site monitoring of destruction. NATO has established a system to cooperate in monitoring the treaty. Parties have rights to monitor the process of destruction without quota limits.
- A Protocol on Notification and Exchange of Information stipulates an annual exchange of mandated data that helps ensure verification of compliance with the Treaty.
- A Protocol on Inspection details procedures for verification. Inspections are conducted routinely during the (indefinite) duration of the Treaty; they focus on “objects of verification” (e.g., military organizations), and are conducted at “declared sites” (e.g., military facilities). These OOVs and sites are listed in each information exchange.
- The CFE Treaty enjoined States Parties to seek additional measures to limit conventional military manpower within the ATTU. Consequently, the Parties signed a political agreement in July 1992 -- The Concluding Act of the Negotiation on Personnel Strength of Conventional Armed Forces in Europe outlined below.

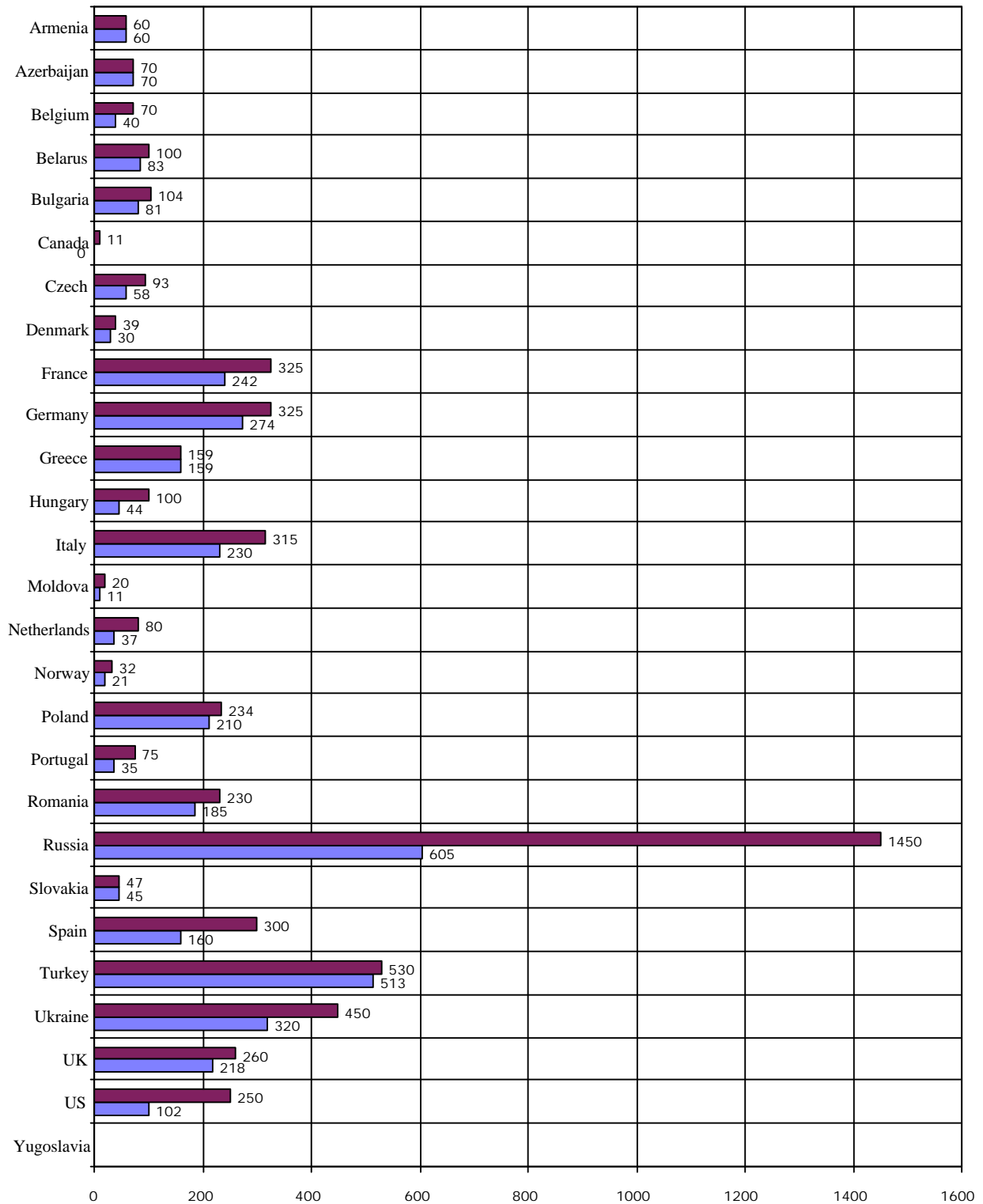
CFE-1A

- Article XVIII of the CFE Treaty called for follow-up negotiations with the objective of concluding agreement on additional measures to strengthen security and stability in Europe, including limitations on military manpower. These negotiations, known as the CFE-1A talks, involved the same participants and used the same mandate as the negotiations on the CFE Treaty. They were concluded on July 6, 1992. CFE-1A was implemented beginning July 17, 1992.
- CFE-1A constitutes a political commitment by its signatories to limit (and, where applicable, reduce) the personnel strength of their conventional armed forces. In contrast to the CFE Treaty, CFE-1A is not a legally binding agreement, and thus not subject to ratification by parliaments.
- The heart of the CFE-1A agreement is a “ceiling” on the military personnel of each participating state within the CFE Treaty’s area of application. Each participating state determined its own ceiling, taking into consideration its national defense plans and security interests. These numerical ceilings were not subject to negotiation among the participants, although the levels were open to discussion prior to adoption of the agreement. In general terms, the CFE-1A limitation applies to military personnel based on land in the area of application.
- The CFE-1A agreement also provides for a broad, detailed exchange of information on the military manpower of the participating states.
- In general, information provided for most categories is broken down to show the strength of individual units at the level of brigade/regiment and higher.
- To further enhance security and promote transparency among the participating states, the CFE-1A agreement includes three stabilizing measures, requiring notification of significant increases in unit strength, call-up of reserves or resubordination of units.

Continuing CFE Implementation Issues

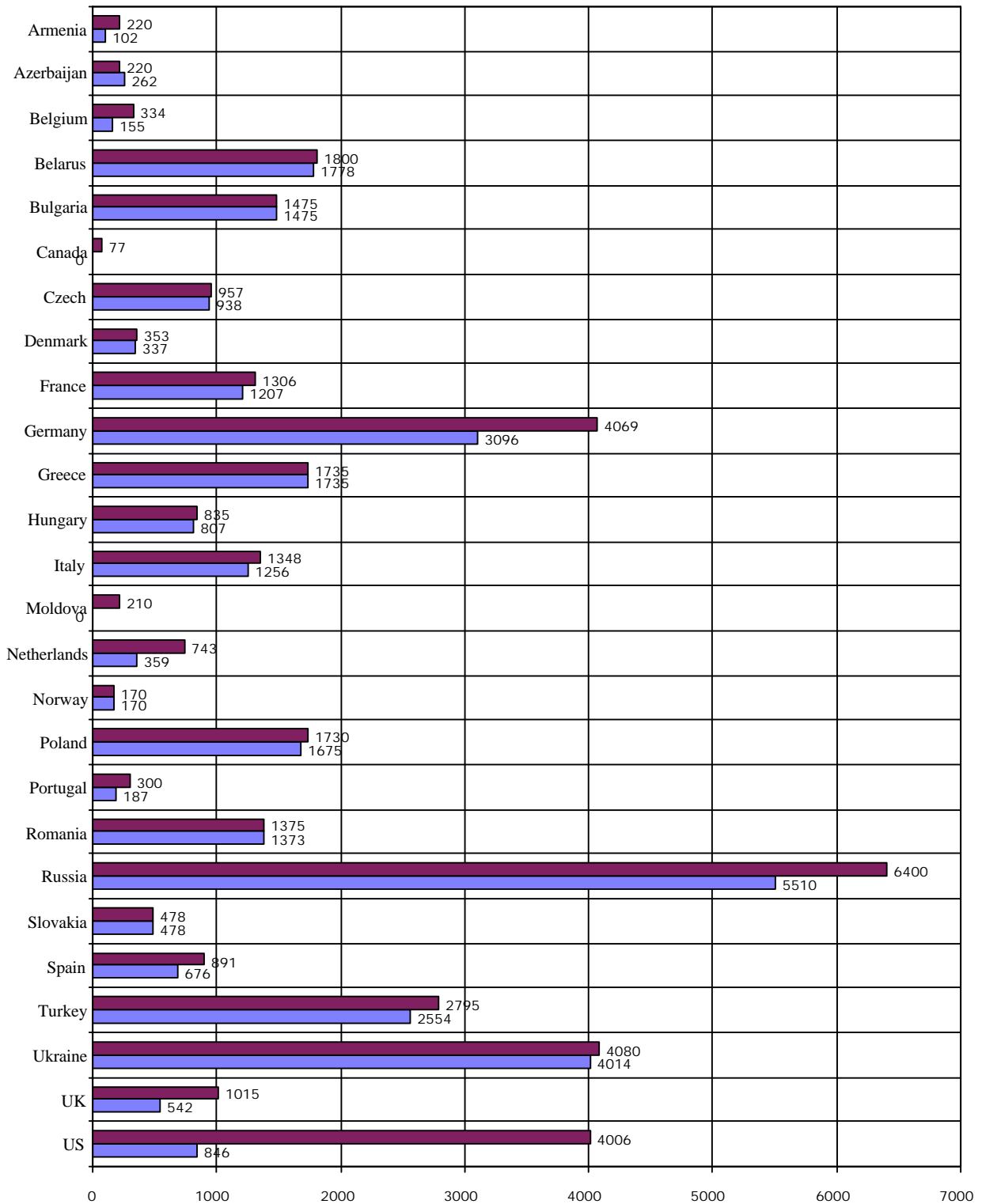
- **Unfinished equipment reductions by a few parties are prompting consideration of administrative means to continue Treaty reduction procedures and monitoring to conclusion.**
- **Some accounting still remains in order for FSU states' reduction liabilities to reach collectively the obligation formerly attributable to the Soviet Union, a commitment made at the 1992 Oslo Conference implementing their succession.**
- **A legally binding agreement bringing Soviet, and consequently Russian and Ukrainian, naval infantry and coastal defense forces within overall CFE limits requires reductions in those categories that remain to be completed.**
- **A politically binding agreement on destruction of Russian military equipment redeployed east of the Urals still requires considerable reductions there.**
- **The Joint Consultative Group (JCG) is the multilateral forum, located in Vienna, charged with addressing and, where possible, resolving these issues. This group meets on a regular and continuing basis.**
- **In November 1999, 30 nations of OSCE meet in Istanbul and sign agreements further reducing main battle tanks, artillery, and other controlled weapons.**
 - **MBT s down from 39,142 to 31,740.**
 - **The US level of permitted MBTs dropped from 4,006 to 1,812, but the US only had 846 in Europe.**
 - **ACVs down from 59,822 to 56,570.**
 - **Artillery down from 38,286 to 35,312.**
 - **Attack helicopters up by 102 to 3,994.**
 - **Combat aircraft up by 80 to 13,282**
- **Russian levels higher than permitted in Caucasus and Chechnya.**

Military Manpower: Actual versus CFE Limit in 1999 (1,000s)



Source: Adapted by Anthony H. Cordesman from the IISS, Military Balance, 1999-2000

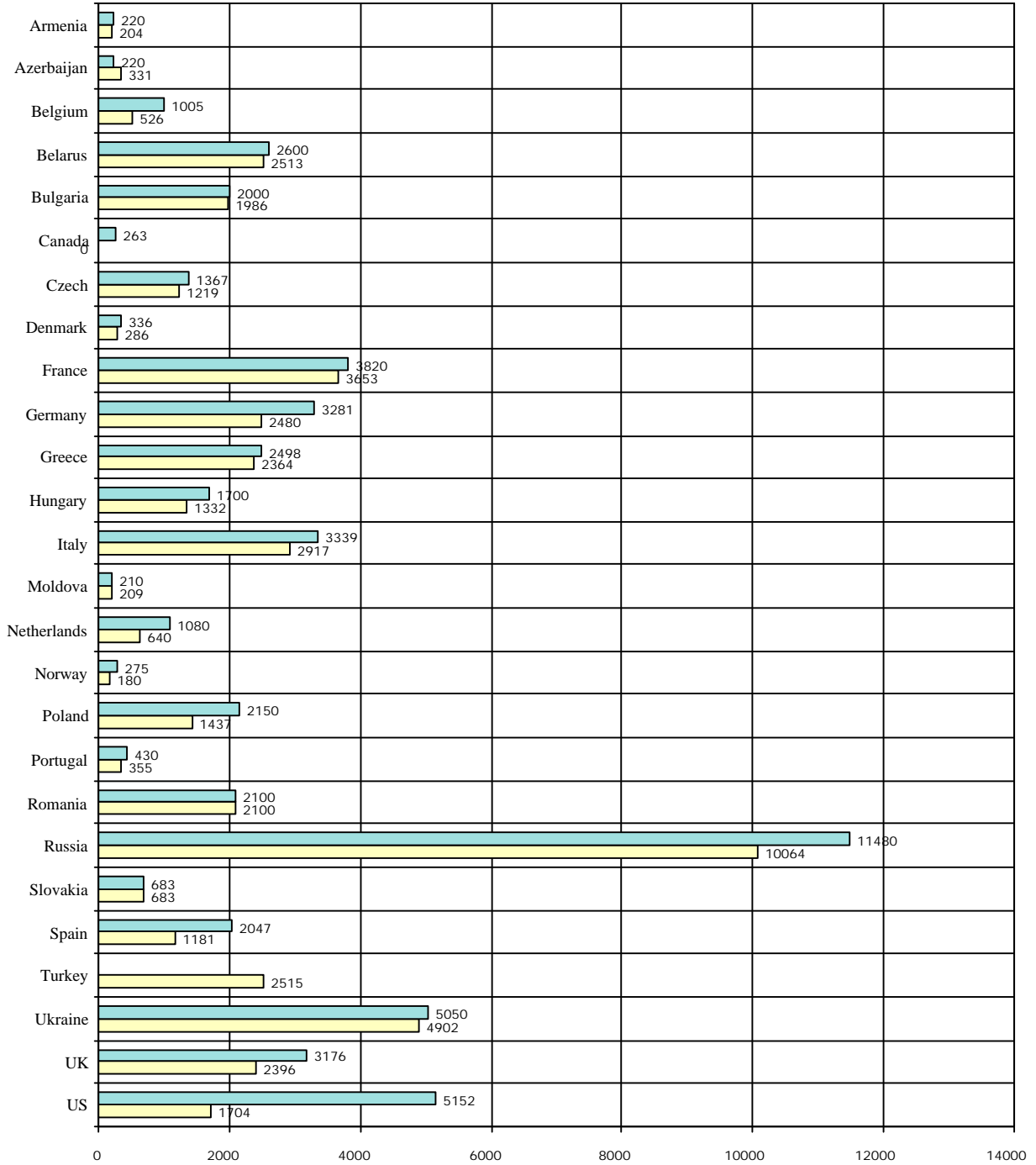
Tanks: Actual versus CFE Limit in 1999 (1,000s)



Source: Adapted by Anthony H. Cordesman from the IISS, Military Balance, 1999-2000

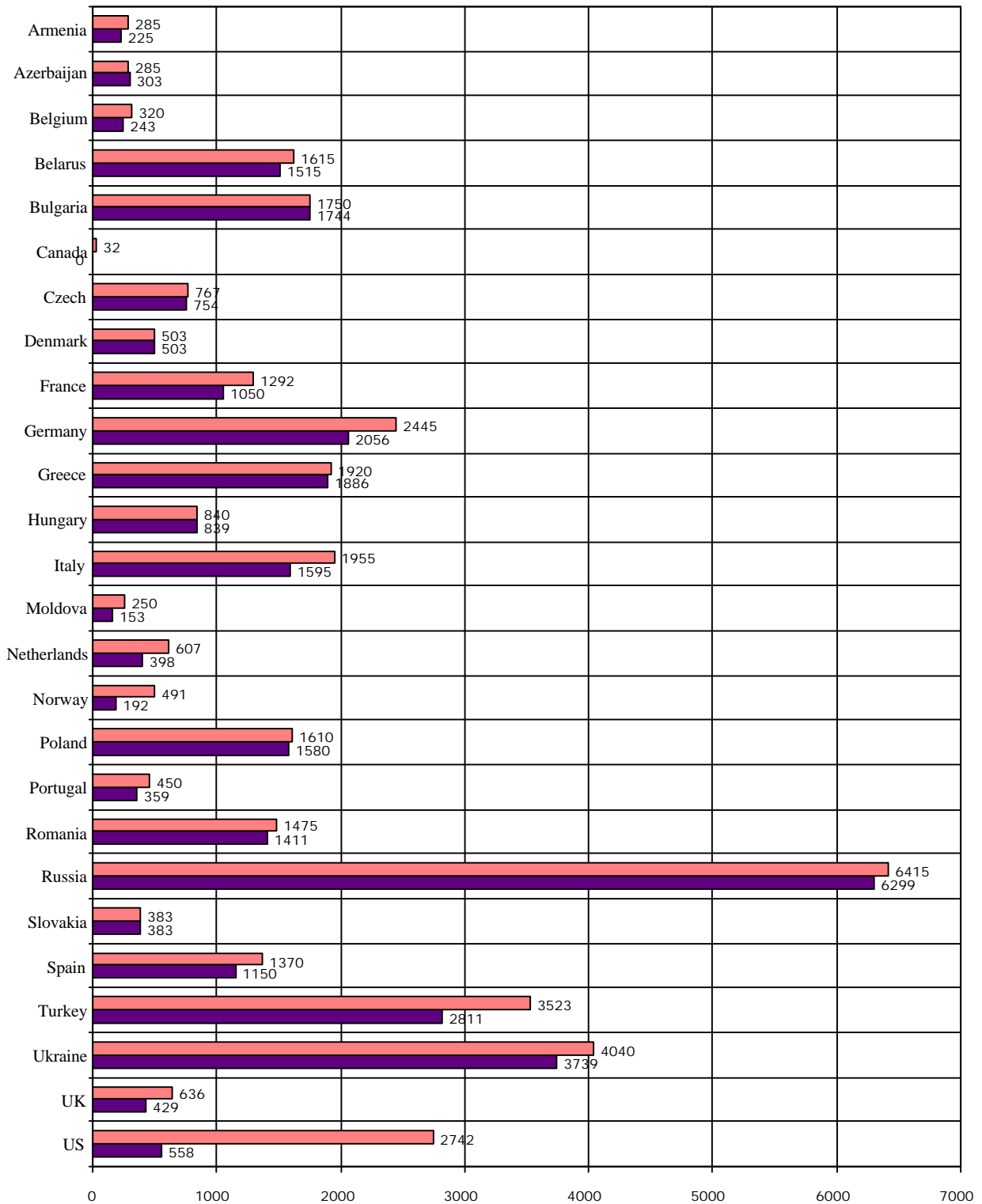
ACVs (AIFVs and APCs): Actual versus CFE Limit in 1999

(1,000s)



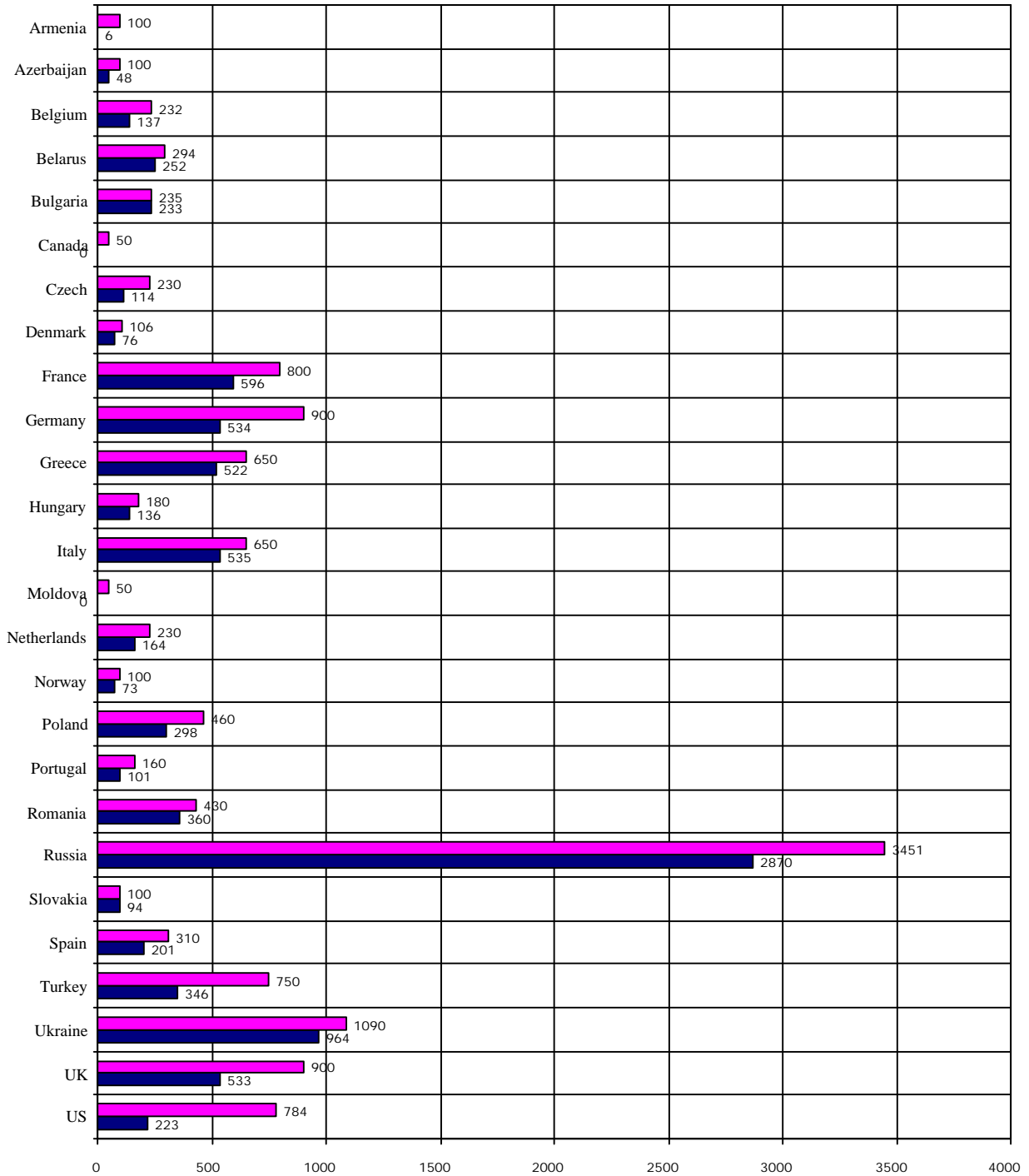
Source: Adapted by Anthony H. Cordesman from the IISS, Military Balance, 1999-2000

Artillery: Actual versus CFE Limit in 1999 (1,000s)



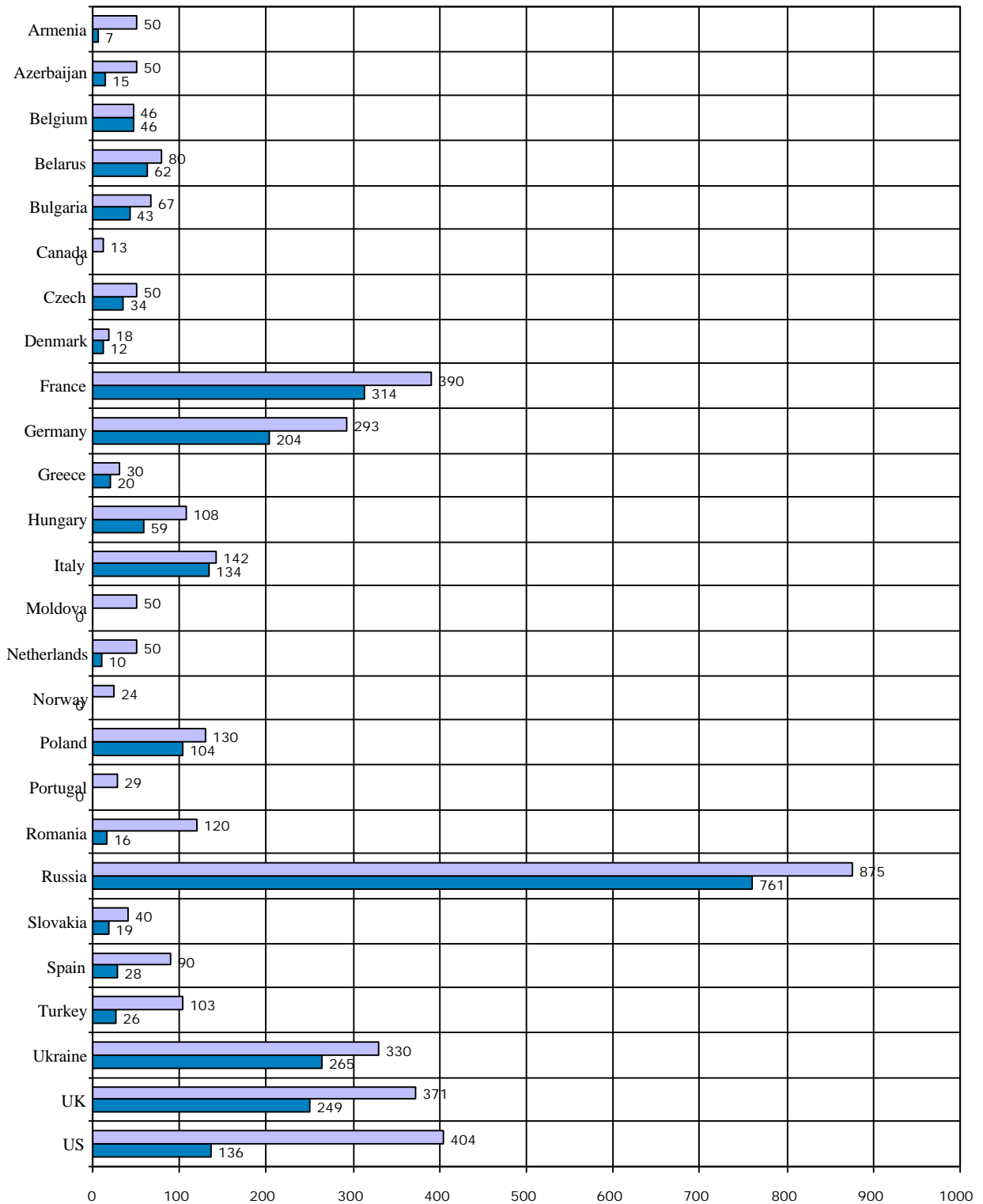
Source: Adapted by Anthony H. Cordesman from the IISS, Military Balance, 1999-2000

Fixed Wing Combat Aircraft: Actual versus CFE Limit in 1999 (1,000s)



Source: Adapted by Anthony H. Cordesman from the IISS, Military Balance, 1999-2000

Attack Helicopters: Actual versus CFE Limit in 1999 (1,000s)



Source: Adapted by Anthony H. Cordesman from the IISS, Military Balance, 1999-2000

Other Regimes

- **OSCE: Along with PfP now plays major political role in ensuring political dialog. Confidence building measures somewhat moot but:**
 - **Charter for European Security signed by 54 members at OSCE meeting in Istanbul in November 1999.**
 - **Strengthen role of OSCE in human rights, conflict prevention, and mediation.**
 - **Conflicts with regional conflicts can longer be regarded as affair of one country.**
 - **Rapid Expert Assistance and Cooperation Teams (REACT) to provide civilian expertise in emergencies**
- **Technology Transfer:**
 - **Still have COCOM-like controls: Wassenaar Agreement**
 - **Dual use technology has sharply undermined effectiveness.**
 - **Bilateral dialogue has become key to enforcement.**
- **Russian nuclear material security and weapons disposal.**
 - **Goes on in spite of US and Russian friction.**
 - **Congress described as success in 1999 defense debate. Increased funds for FY2000.**
- **UN Register of Arms Transfers:**
 - **Some value in providing transparency in sales and purchases.**
 - **Massive gaps in content.**
 - **Does not address issue of arms quality, proliferation, RMA, most C4I/BM systems.**
 - **Does not have enforcement regime.**

Wassenaar Agreement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies

- **33 states approve in July 1996.**
- **Replaced Coordinating Committee for Multilateral Export Controls (Cocom) formed in 1949.**
 - **More members.**
 - **Less scope.**
- **Complements UN Arms Register, BWC, and CWC.**
- **Small secretariat.**
- **Promotes “transparency and greater responsibility.**
- **Participating states control exports of items on common munitions list and List of Dual-Use Goods and Technologies, but all decisions left to individual states.**
- **Participating States will seek through their national policies to ensure that transfers of these items do not contribute to the development or enhancement of military capabilities which undermine these goals and are not diverted to support such capabilities.**