

Chapter 12

ARMS CONTROL CONSIDERATIONS
AND MX BASING OPTIONS

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ARMS CONTROL CONSIDERATIONS AND MX BASING OPTIONS

OVERVIEW

This chapter discusses several ways in which arms control considerations bear on the choice of a basing mode for the MX missile. These include the impact of arms control agreements in force, the impact of agreements signed but not yet ratified, and the possible impact of various MX basing modes on future arms control negotiations. *

The 1972 ABM Limitation Treaty would prohibit the deployment of MX missiles in any mode defended by an antiballistic missile (ABM) system unless such deployments occurred within the Grand Forks, N. Dak., Minuteman field. The Treaty would also prohibit the deployment of ABM systems that were not of a type explicitly permitted by Article I II.

The Seabed Arms Control Treaty would prohibit deployment of MX missiles in fixed shelters on the seabed floor or on any seabed-mobile platform. The Outer Space Treaty presently in force and the proposed SALT II Treaty would prohibit deployment of MX missiles in any mode which launched nuclear weapons into Earth orbit. None of these basing modes appears attractive at this time.

Other arms control agreements either in force or still awaiting ratification would permit most MX basing modes. The proposed SALT II Treaty would prohibit deployment of surface ship mobile based MX as well as inland waterway variants of surface ships, submarines, or deployment on the bottom of lakes, rivers, canals, or other inland waterways. The SALT I

Treaty would not prohibit other basing modes assessed in this study if deployments could be made in a manner that would permit verification, through use of national technical means, of U.S. compliance with the terms of the Treaty were it in effect.

Minuteman III rebasing in a multiple protective shelter (MPS) mode could be undertaken if the SALT II Treaty limits were still in effect after 1985; however, the limits on the total number of MIRVed ballistic missiles would, if still in effect, prevent the United States from deploying an economical mix of missiles and shelters for Minuteman III/MPS to keep pace with plausible Soviet threats unless the number of U.S. submarine-launched ballistic missiles (SLBMS) armed with multiple independently targetable reentry vehicles (MIRV) deployed were decreased.

The 1963 Limited Test Ban Treaty that is presently in force, and the 1974 Threshold Nuclear Test Ban and the 1976 Peaceful Nuclear Explosions Treaties that are signed but still awaiting U.S. ratification, contain provisions that limit the ability of the United States and the Soviet Union to conduct nuclear weapons explosions useful in generating empirical data that would be helpful in designing both basing modes and attack strategies against them.

Most basing modes for the MX missile pose relatively few future arms control negotiating problems. MPS basing for MX and Minuteman III raises serious negotiating problems because a very high premium is placed on limiting the number of RVS the Soviets can deploy on intercontinental ballistic missiles (ICBMS). MPS also would compel arms control negotiators to specify procedures for verification at a level of detail not successfully negotiated in earlier arms control negotiations.

* This discussion is restricted to an assessment of the arms control implications of basing mode options only. For a detailed analysis of the arms control implications of the MX missile itself, see "ICBM Programs," in U S Congress, House Committee on Foreign Affairs and Senate Committee on Foreign Relations, *Fiscal Year 1982 Arms Control Impact Statements* (Washington, D C U S Government Printing Office, 1981), pp 26-71, passim

BASING MODES INCONSISTENT WITH ARMS CONTROL AGREEMENTS IN FORCE

Most basing modes considered for the MX missile are not prohibited by arms control agreements currently in force. However, three treaties contain specific provisions that would be contravened by some basing modes for the MX missile.

ABM Treaty

As noted in chapter 3 the 1972 ABM Limitation Treaty prohibits widespread ABM deployment to defend MX missiles in any basing mode. In addition, it also constrains deployment of a limited ABM system in numbers of radars, ABM launchers, and ABM interceptor missiles and restricts such deployment to the vicinity of the Grand Forks, N. Dak., Air Force Base.

Outer Space Treaty

Article IV of the 1967 Outer Space Treaty provides:

States Parties to the Treaty undertake not to place **in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space** in any manner.

This prohibition would be a legal barrier to any deployment of MX missiles that were used to launch nuclear weapons into Earth orbit under any circumstances. *

There are major technical obstacles to the deployment of militarily effective nuclear weapons aboard Earth-orbiting platforms. These obstacles include accurate delivery of a nuclear weapon to a fixed point on the Earth and maintenance of adequate command and control over an orbiting platform during a nu-

^{*}“Outer Space Treaty, ” in *U.S Arms Control and Disarmament Agency, Arms Control and Disarmament Agreements, 1980 Edition* (Washington, D C U S. Government Printing Office, 1980), p 52 Cited below as *Arms Control/ Agreements*.

^{*}A similar obligation is found in the proposed SALT II Treaty.

clear conflict. Launching nuclear weapons into orbit cannot now be regarded as a technically attractive basing mode for the MX missile.

Seabed Treaty

A third arms control treaty containing provisions that would rule out a basing mode that is technically feasible is the 1971 Seabed Arms Control Treaty. Article 1 provides:

1. The States Parties to this Treaty undertake not to emplace or emplace on the seabed and the ocean floor and **in the subsoil thereof beyond the outer limit of a seabed zone, as defined in Article 11, any nuclear weapons or any other types of weapons of mass destruction as well as structures, launching installations or any other facilities designed for storing, testing or using such weapons.**²

This provision would prohibit the deployment of MX missiles on various platforms that crawled along the seabed floor, in silos dug into the ocean floor, or in other fixed structures attached to the ocean floor.

Mobile platforms that crawled along the seabed floor would be detectable with various underwater remote-sensing equipment. Like other large land-mobile systems, seabed crawling platforms would not be fast enough to escape a determined effort to barrage attack their last known positions. While the ocean would provide some degree of protection from some nuclear weapon effects, seabed crawlers carrying MX missiles would nevertheless be vulnerable to nuclear weapons attack. Fixed shelters or silos dug into the seabed floor would have similar vulnerabilities.

Moreover, there would be many complicated, expensive, and technically challenging operational problems to be met before such a system could be deemed a technically feasible

²“Seabed Arms Control Treaty, ” In *Arms Control/ A-reemprnt*, p 102

basing mode for the MX missile. Hence, it does not appear that the Seabed Arms Control

Treaty prohibits the deployment of the MX missile in any attractive basing mode.

OTHER ARMS CONTROL AGREEMENTS IN FORCE AFFECTING MX BASING DECISIONS

Limited Nuclear Test Ban Treaty

The 1962 Limited Nuclear Test Ban Treaty prohibits the detonation of nuclear explosive devices in the atmosphere, under water, and in outer space.³ These limitations on nuclear weapons testing prevent the United States or the Soviet Union from conducting nuclear explosions that could generate empirical data about nuclear weapons effects that might be needed to resolve major technical uncertainties in areas such as the following: the hardness of vertical and horizontal protective shelters; nuclear weapon effects on aircraft, surface ships, and submarines, or other vehicles used to carry MX missiles; the effects of nearby nuclear detonations on ABM systems and components; nuclear weapons effects on communications during and immediately after an attack; the effects of multiple nuclear weapon detonations in close proximity to a small number of protective shelters; and the development of strategies and tactics to attack or to defeat an attack on **MX/MPS deployments. However, the amount of technical risk for each basing mode introduced by the lack of atmospheric nuclear weapons test data is relatively minor** in comparison with technical risk created by other factors.

SALT I Agreements

The SALT I Agreements of 1972 contain several provisions that might affect MX basing decisions. The SALT I Agreements consist of two separate agreements: The 1972 ABM Limitation Treaty previously discussed, and the Interim Agreement on Strategic Offensive Forces.⁴ The Interim Agreement on Strategic

Offensive Forces, however, was an Executive Agreement and was affirmatively endorsed by the House of Representatives and the Senate pursuant to section 33 of the Arms Control and Disarmament Act of **1961. It set limits on the numbers of ICBM and SLBM launchers that the United States and the Soviet Union could deploy for the period May 1972 through October 1977.** When it expired, both the U.S. and the Soviet Governments indicated that pending the completion of negotiations for a SALT II Treaty, they would continue to abide by the terms of the Interim Agreement unless or until the other party to that agreement undertook an action that was inconsistent with the terms of that agreement.^{5b}

Article I of the Interim Agreement prohibits the construction of additional fixed land-based ICBM launchers after July 1, 1972.⁷ Hence if the Interim Agreement were still de facto in effect when the MX was to be deployed, MX basing in silos would be limited to modified Minuteman silos rather than new ones.

³“Statement by Secretary of State Vance United States Intent Regarding the SALT I Interim Agreement, September 23, 1977,” in *U S Arms Control and Disarmament Agency, Documents on Disarmament, 1977* (Washington, D C U S Government Printing Office, 1979), pp 577-578

Secretary of State Vance issued the following statement

In order to maintain the status quo while SALT I negotiations are being completed, the United States declares its intention not to take any action inconsistent with the provisions of the Interim Agreement on certain measures with respect to the limitation of strategic offensive arms which expires October 3, 1977, and with the goals of these ongoing negotiations, provided the Soviet Union exercises similar restraint

⁴“Statement by the Soviet Union Intent Regarding the SALT I Interim Agreement, Sept 24, 1977,” *Ibid*, p 578

In accordance with the readiness expressed by both sides to complete a new agreement limiting strategic offensive arms and in the interests of maintaining the status quo while the talks on the new agreement are being concluded, the Soviet Union expresses its intention to keep from any actions [compatible with the provisions of the Interim agreement on some measures pertaining to the limitation of strategic offensive arms which expires on October 3, 1977, and with the goals of the talks that are being conducted, provided that the United States of America shows the same restraint

⁷Interim Agreement, ” in *Arms Control Agreements*, p 150

³“Limited Test Ban Treaty,” art I in *Ibid*, p 42

⁴Interim Agreement on Strategic Offensive Arms, ” in *Ibid*, pp 150-157

Modernization of SLBM platforms is specifically permitted under article IV of the Interim Agreement, so deployment of both the Trident submarine and small submarines armed with MX missiles would be allowed were the terms of the Interim Agreement still being observed at the time MX deployment was made.⁸

During the final hours of the SALT I negotiations, Department of Defense (DOD) Representative Paul Nitze spoke for the U.S. Government on the question of land-mobile ICBMS. Nitze said:

In connection with the important subject of land-mobile ICBM launchers, in the interest of concluding the Interim Agreement the U.S. Delegation now withdraws its proposal that Article I or an agreed statement explicitly prohibit the deployment of mobile land-based ICBM launchers. I have been instructed to inform you that while agreeing to defer the question of limitation of operational land-mobile ICBM launchers to the subsequent negotiations on more complete I imitations on strategic offensive arms, the U.S. would consider the deployment of operational land mobile ICBM launchers during the period of the Interim Agreement as inconsistent with the objectives of that Agreement.⁹

The purpose of this statement was to warn the Soviet union that the united States would consider the deployment of the SS-16 in its mobile mode to be legitimate grounds for terminating the Interim Agreement. It was not intended to preclude U.S. deployment of a mobile ICBM at some future point in time if agreement on measures to ensure adequate verification of a SALT treaty limiting offensive forces could be negotiated.

The Protocol to the Interim Agreement limits to 710 the number of SLBM launchers permitted for the United States. The Protocol further provided that both the United States and the Soviet Union could exchange retiring

ICBMS deployed prior to 1964 for new SLBMs. 'O However, President Nixon informed the Soviet Government that the United States would not exercise its right under the provisions of Article 11 I of the Protocol to convert older ICBMs into newer SLBM launchers.

The number of SLBM launchers deployed by the United States would exceed 710 if deployment of MX missiles on small submarines were to take place, the 31 SSBNS built in the 1960's armed with Poseidon and Trident missiles were retained in the fleet, and more than nine Trident submarines were to be deployed simultaneously. A judgment on the strategic utility of continuing into the late 1980's and 1990's to adhere to the terms of the 1972 Interim Agreement on Strategic Offensive Forces would require considerable technical and political analysis as the number of deployed MX missiles on small submarines, *Trident* submarines, and remaining Poseidon submarines approached the limit of the Interim Agreement.

The second component of the SALT I Agreements relating to MX basing is the 1972 ABM Limitation Treaty discussed in chapter 3. The ABM Limitation Treaty prohibits the deployment of the LoADS ABM system or the present concept of an Overlay ABM to defend MX missiles deployed either in MPS or in silos. It also prohibits the deployment of Soviet defenses that in turn might substantially increase the need for larger numbers of U.S. strategic weapons carried aboard both ICBMS and SLBMS. The value of deploying MX in any mode protected by any ABM system must be weighed against the uncertainties in U.S. strategic planning and increases in strategic forces requirements that might be introduced with the deployment of a Soviet ABM system.

“” Protocol to the Interim Agreement,” in *ibid* , p. 154

‘ The evolution of the limits on the number of modern submarine launched ballistic missile launchers in the SALT I interim Agreement Protocol are discussed in great detail in Gerard C Smith’s book, *Doubletalk: The Story of SALT* (Garden City, N Y Doubleday, 1980) See especially pp 393-397 and p 428

⁸*ibid* , p 151

⁹“Unitateral Statement [B]: Land-Mobile ICBM Launchers, ” *ibid* , p 156

IMPACT OF SALT II ON MX BASING

The SALT II Treaty, signed June 18, 1979, in Vienna, Austria, would substantially affect MX basing options were the Treaty to be ratified and were its terms to remain in effect beyond December 31, 1985. The Treaty was intended to limit equally the total number of strategic nuclear weapons delivery vehicles in the arsenals of the United States and the Soviet Union, to place an upper limit on the total number of nuclear weapons carried by ICBMS, SLBMS, and long-range bombers equipped with cruise missiles, or air-to-surface ballistic missiles, and to inhibit the development of new types of ICBMS. It was also intended to build confidence in the ability of the two nations to coexist without fear of an unremitting strategic arms race by providing for an exchange of data on strategic nuclear weapons, establishing rules for the monitoring of each other's compliance with the terms of the treaty, exchanging information on certain activities that might be ambiguous, and continuing the negotiating process leading to one or more subsequent Strategic Arms Limitation Agreements.²

The Treaty was submitted to the Senate on June 22, 1979, where extensive hearings were held by both the Committee on Foreign Relations and the Committee on Armed Services. Before the Senate could take up the report of the Foreign Relations Committee on the proposed ratification of the Treaty, the Soviet Union invaded Afghanistan and President Carter formally requested the Senate on January 3, 1980, to defer further action on the Treaty. The President said in his letter to Senator Robert Byrd:

In light of the Soviet invasion of Afghanistan, I request that you delay consideration of the SALT II Treaty on the Senate floor.

The purpose of this request is not to withdraw the Treaty from consideration, but to de-

fer debate so that Congress and I as President can assess Soviet actions and intentions, and devote our primary attention to the legislative and other measures required to respond to this crisis.

The United States has signed the Treaty, as has the Soviet Union; however, the Soviet Union has not ratified the Treaty, and has stated that it will not do so until the United States indicates whether or not it will complete the ratification process as is required by the U.S. Constitution. The United States has not completed ratification of the Treaty, since two-thirds of the Senate has not given its advice and consent to do so.

During this period between signature of the Treaty and either its ratification or rejection, common understanding of international law requires the United States to take no action intended to defeat the purposes for which the SALT II Treaty was negotiated.¹⁴ The Reagan administration has publicly taken the position that it does not believe itself bound by the limits of the agreement pending completion of a careful review of the Treaty.¹⁵ Nevertheless, the United States has observed those provisions of the Treaty imposing quantitative and qualitative limitations on American strategic nuclear forces.

¹⁴"Strategic Arms Limitation Treaty," in *Weekly Compilation of Presidential Documents*, vol. 16, No. 1 (Jan. 7, 1980), p. 12.

¹⁵"Statement by William J. Perry," in U.S. Congress, Senate Committee on Armed Services, *Department of Defense Authorization for Appropriations for Fiscal Year 1981* (Washington, D.C.: U.S. Government Printing Office, 1980), p. 626.

Under international law a state is obligated to refrain from taking actions which would defeat the object and purpose of a Treaty it has signed subject to ratification until it shall have made its intention clear not to become a party to the Treaty. We, therefore, expect that both the United States and the Soviet Union will refrain from acts which would defeat the object and purpose of the SALT II Treaty before it is ratified and enters into force, and indications are that both sides are doing this.

This obligation however, is not of indefinite duration.

¹⁵Bernard Gwertzman, "U.S. Says It Is Not Bound by 2 Arms Pacts With Soviet," *New York Times*, May 20, 1981, reported:

The Reagan Administration affirmed today that it was not legally bound by either of two treaties with the Soviet Union on the limitation of strategic nuclear weapons.

A statement, issued by the State Department . . . said, however, that, pending a policy review, nothing would be done to undercut the accords as long as the Russians also did not undercut them.

¹⁴See "Letter of Transmittal of the SALT Two Treaty From Secretary of State Vance to President Carter," in U.S. Congress, Senate Committee on Foreign Relations, *SALT Two Treaty, Hearings, Volume 1* (Washington, D.C.: U.S. Government Printing Office, 1979), pp. 4-44.

There are several provisions of the proposed SALT II Treaty that would affect the deployment of the MX were the terms of the Treaty in force in 1986 or beyond. Some of the Treaty provisions affect basing modes directly; other provisions of the Treaty might affect the testing, operation, or cost of MX deployment, or might require design changes in various basing modes to facilitate monitoring the deployment of mobile ICBMS for compliance with the terms of the Treaty.

Four basing modes would be explicitly prohibited under terms of the SALT II Treaty were the Treaty in force when the MX would be deployed:

1. Deployment of MX missiles in new, fixed ICBM silos would be prohibited under provisions of article IV.
2. Surface ship mobile deployment of MX missiles would be prohibited under provisions of article IX.⁷
3. Deployment of MX missiles on inland waterways, lakes, or the bottoms thereof would be prohibited under provisions of article IX.
4. Deployment of MX missiles in any basing mode to launch nuclear weapons into Earth orbit would be prohibited under provisions of article IX.

Article II of the Treaty defines ICBM launchers countable under the Treaty. MX research, development, and test launchers must be unique to the MX missiles unless the United States would be willing to have less capable missiles and their launchers counted under the SALT II limits.⁸ For example, mobile intermediate range ballistic missiles would be countable under the SALT II Treaty limits if they were tested from MX development facilities or MX deployment sites.

Deployment of MX missiles by backfitting them into existing Minuteman silos would be permitted under terms of the SALT II Treaty,

⁷"SALT II Treaty," art IV, in *Arms Control Agreements*, p 215.

⁸Art IX, clause I(a), *ibid*, p 225

⁹Art IX, clause I(b), *ibid*

¹⁰Art IX, clause I(c), *ibid*

¹¹Art II, *ibid*, pp 208-214

even if existing Minuteman silos required modification to support the larger MX missile.² Deployment of MX missiles to Minuteman II silos would, however, by definition increase the number of MI RV-countable launchers, thereby bringing the United States closer to or even exceeding the allowed number of MIRVed ballistic missiles under provisions of the Treaty.²²

While the SALT II Treaty permits modernization and improvements of ICBMS and their launchers, there is disagreement between the United States and the Soviet Union as to whether or not multiple protective shelters constitute fixed ICBM launchers within the context of article IV.

The Soviet position is that multiple protective shelters are but one form of fixed ICBM launchers. "

The U.S. position is that so long as the multiple protective shelter cannot launch an MX missile without the aid of an associated launcher that contains launch support equipment including power supplies, environmental control equipment, communications equipment, and other missile support equipment, the shelters would not meet the definition of a fixed ICBM launcher found in article 11 of the Treaty. MPS basing for MX would therefore be permitted were the SALT II Treaty in force when the MX was deployed.²⁴

Article XV of the Treaty requires that any deployment of the MX missile be made in a manner that would permit the unimpeded use of technical means of verification to monitor U.S. compliance with the provisions of the

²¹Art IV, *ibid*, pp 214-215

²²Art V, *ibid*, pp 220-221

²³The Soviet position on MPS deployment for the MX or Minuteman missiles is described by Strobe Talbott, in "Keeping the Options Open," *Endgame: The Inside Story of SALT II* (New York: Harper & Row, 1979, 1980), p 162-173, on the basis of interviews with senior U.S. officials. Authoritative unclassified discussion of the Soviet position on this issue is presented in, U.S. Congress Senate Committee on Foreign Relations, *SALT II Treaty* (Washington, D.C.: U.S. Government Printing Office, 1979), Part 4, pp 433-437 and Part 5, pp 278-280, 291, 301-302

²⁴*Ibid*, see also, "Statement of Ambassador Ralph Earle," in U.S. Congress, Senate Foreign Relations Committee, *ibid*, pt 4, pp 436

SALT II Treaty were the treaty in force at the time the MX was deployed.

Each basing mode for the MX can in principle be designed to meet the requirements of article XV for verification; however, the U.S. deployment of a mobile ICBM will set a standard by which future mobile ICBM deployments by the Soviet Union will be judged. It is therefore important to note that for MPS basing, the key features supporting the monitoring of U.S. compliance with the quantitative limits in article V of the Treaty are (a) open hall construction of the missile and its associated launcher; (b) confinement of deployed missiles to a designated deployment area and (c) use of a dedicated transportation system.²⁵

There has been considerable speculation about the differences between horizontal and vertical shelters from the standpoint of SALT II Treaty verifiability. The proposed MX/MPS system has been carefully designed from both engineering and operational standpoints to permit monitoring of the number of MX missiles deployed by the United States without revealing their exact location consistent with the need to preserve location uncertainty—PLU. These design features and operations are described in detail in chapter 2.

On the basis of a review of unclassified discussion of verification problems associated with counting the number of MX missiles deployed by the United States, there appears to be little difference between vertical and horizontal shelters. Monitoring deployment of Soviet mobile ICBMs could be easier or could be carried out more confidently if their mobile ICBMs were deployed in horizontal shelters with removable observation ports. Thus, the requirement that the MX be deployed in a manner that would permit the United States to monitor a similar if not identical Soviet de-

ployment sometime in the future *may* make the distinction between horizontal and vertical shelters significant.

Rebasing Minuteman III missiles in an MPS mode would be constrained were the terms of the SALT II Treaty in force in 1986 when such deployments could begin. The number of Minuteman III missiles that could be deployed would be limited under terms of article V such that the total number of ICBMS and SLBMS equipped with MIRVS could not exceed 1,200, and the total number of bombers equipped with air-launched cruise missiles, MIRVed ICBMS, and MIRVed SLBMS could not exceed 1,320.²⁶ DOD has proposed to deploy up to 172 B-52 aircraft equipped with air-launched cruise missiles,²⁷ and as many as **760** MIRVed SLBMS in the late 1980's,²⁸ leaving room for only 388 MIRVed ICBMS under the proposed ceiling on aggregate number of MIRVed strategic nuclear delivery vehicles in the SALT II Treaty.

Rebasing of Minuteman III missiles could therefore disrupt current plans to deploy a fleet of MIRVed Poseidon and Trident SLBMS, B-52 bombers equipped with air-launched cruise missiles, and retention of the present Minuteman III force. Furthermore, the small number of missiles that could be deployed within the SALT II Treaty limits were they in force beyond 1985 would constrain a Minuteman III/MPS system to a MX of Minuteman III missiles and shelters that would cost considerably more than the optimal mix.

Questions on status of vertical shelters noted above in connection with MX/MPS would also require resolution for rebasing of Minuteman III missiles. Verification issues arising in connection with MX/MPS would also arise in the case of rebasing of the Minuteman III missiles in an MPS mode.

Other basing modes for the MX not explicitly prohibited by the SALT II Treaty do not appear to be as stressful to the monitoring capabilities of either the United States or the

²⁵See statement of Dr. James Timbie to the Subcommittee on Public Lands, House Committee on the Interior, *Status of the MX Missile* (Washington, D.C.: U.S. Government Printing Office, 1980), pp. 400-401. See also, U.S. Congress, House Committee on Foreign Affairs and Senate Committee on Foreign Relations, *Arms Control Impact Statements for Fiscal Year 1982* (Washington, D.C.: U.S. Government Printing Office, 1981), pp. 62-67; *ibid.*, *Arms Control Impact Statements for Fiscal Year 1981* (Washington, D.C.: U.S. Government Printing Office, 1980), pp. 58-63.

²⁶Art. V, in *Arms Control Agreements*, pp. 220-221.

²⁷U.S. Congress, House Committee on Foreign Affairs and Senate Committee on Foreign Relations, *Arms Control Impact Statements for Fiscal Year 1982*, op. cit., p. 125.

²⁸*Ibid.*, p. 80.

Soviet Union as MX or Minuteman III deployed in an MPS mode. Silo basing, with or without defense, can be monitored readily by national technical means in the same manner that current deployments of MIRVed ICBMS are monitored. Air-mobile basing of MX could be monitored through national technical means just as present bomber deployments are monitored. In addition, air-mobile deployment of MX if undertaken within the terms of the SALT I I Treaty would require the use of aircraft with Functionally Related Observable Differences (FRODS). Such measures might include the use of specifically designed aircraft unique to the air-mobile MX mission or the structural modification of other aircraft of similar types to aid in their identification as MX missile launching platforms through use of national technical means of verification. These measures would facilitate counting the MX-carrying aircraft and missiles under the aggregate limits on strategic nuclear delivery vehicles and the MI RV-ed ICBM sublimits.

Small submarine basing for the MX missile could be verified relying on the techniques and technologies presently used to count deployed SLBMS.

The SALT II Treaty, were it ratified, would have some effect on the MX basing mode decision, ruling out new ICBM silo basing, surface ship mobile basing, inland waterway basing, and orbital bombardment systems on legal grounds. Other basing modes for the MX missile would be permitted, and with the exception of MPS basing for MX or Minuteman III appear to present few technical challenges to the capabilities of either the United States or the Soviet Union to adequately verify each other's compliance with terms of the proposed SALT I I Treaty were the Treaty still in force in the period 1986 through the 1990's and beyond.

OTHER PENDING ARMS CONTROL AGREEMENTS AFFECTING MX BASING

Like the 1962 Partial Test Ban Treaty, the 1976 Threshold Nuclear Test Ban Treaty and the 1978 Peaceful Nuclear Explosions Treaty do not directly limit any MX basing decision. These two treaties, still awaiting U.S. ratification, nevertheless impose limits on certain U.S. Government activities that in turn affect research and development activities related to **MX** basing issues.

The Threshold Nuclear Test Ban Treaty limits the yield of underground nuclear explosions to not more than 150 kilotons. 29 In so doing, it limits the ability of the United States to conduct research and development on the structural hardness and resistance to nuclear effects of MPS horizontal and vertical structures, command and control systems, command post structures, and vehicles. The Peace-

ful Nuclear Explosions Treaty limits nuclear explosions for peaceful purposes to a yield of 150 kilotons. It also imposes certain additional limitations on the instrumentation of such explosions intended to reduce the likelihood that a peaceful nuclear explosion might be used to hide either nuclear weapons development activities or tests for various nuclear weapon effects. 30 Hence, these two treaties, like the Partial Test Ban Treaty, limit to some degree the ability of the United States to test the hardness of various MX basing modes to the nuclear effects environment in which they might be required to operate.

It is important to note, however, that the underground nuclear testing program conducted by the U.S. Government in recent years, chemical explosion simulation tests, other dynamic stress tests, nondestructive

²⁹ "Threshold Test Ban Treaty," in *Arms Control/Agreements*, pp 167-170

³⁰ "Peaceful Nuclear Explosions Treaty," *Ibid*, pp 173-189

tests, and simulations have provided a wealth of data necessary to design the MX missile and various possible basing modes for it. As a result of "this vigorous test program related to

MX development, there is widespread confidence in the ability of the missile to be built and operated within the design specifications.

FUTURE ARMS CONTROL NEGOTIATIONS

It is very difficult to predict confidently the future course of international arms control negotiations. The recent history of the Strategic Arms Limitation Talks between the United States and the Soviet Union serves to illustrate the multiple technical and political problems confronting would-be arms control negotiators.¹

However, both the United States and the Soviet Union, despite obvious difficulties in bringing the SALT II Treaty into force, have stated their continuing hope for eventual resumption of arms control negotiations. During ceremonies welcoming Chancellor Helmut Schmidt of the Federal Republic of Germany, President Reagan reaffirmed the commitment of the United States to negotiations leading to the reduction of arms in Europe within the SALT framework. The President promised "meaningful negotiations as to limit those very weapons."

The Soviets too have expressed their continuing desire for a resumption of arms control negotiations. For example, Leonid Brezhnev, General Secretary of the Communist Party of

the Soviet Union, in speaking to the 26th Congress of the Party, said:

We once more issue an urgent appeal for restraint in the sphere of strategic armaments. The peoples of the world must not be allowed to live under the threat of a nuclear war being unleashed. The limitation of strategic arms and their reduction is an extraordinary problem. On our part, we are ready to continue without delay appropriate talks with the United States of America while preserving everything positive that has been achieved up to now in this sphere.

The interest of both the United States and the Soviet Union in continuing their bilateral dialog on arms control suggests a need to understand better the impact of the MX basing decision on some of the problems arms control negotiators may face in the future.

MX missiles deployed in silos, on small submarines, or in an air mobile mode present few new arms control negotiating problems. These basing modes are either extensions of existing basing modes for strategic nuclear weapons delivery vehicles (SNDVS) or have been previously considered during the Strategic Arms Limitation Talks.² As a result there appear to be few new or unique arms control negotiating or verification problems associated with these basing modes. Extension of past arms control negotiating and verification practices would enable both the United States and the Soviet Union to conclude an arms control agreement

¹"See for example, testimony of various public officials and private witnesses on the pros and cons of the ratification of the SALT II Treaty in U S Congress, Senate Committee on Foreign Relations, *SALT II Treaty, Volumes 1 Through 5* (Washington, DC: U S Government Printing Office, 1979), U S Congress, Senate Committee on Armed Services, *Military Implications of the SALT II Treaty, Volumes 1 Through 6* (Washington, DC: U S Government Printing Office, 1979) See also Strobe Talbott, op cit., Robert P La brie, *SALT Handbook: Key Documents and Issues, 1971- 1979* (Washington, DC: American Enterprise Institute, 1979) For an interesting account of Soviet views on the problems of negotiating SALT, see Samuel B Payne, Jr., *The Soviet Union and SALT* (Cambridge, Mass: MIT Press, 1980)

²"Visit of Chancellor Helmut Schmidt of the Federal Republic of Germany," *Weekly Compilation of Presidential Documents*, vol 17, No 21 (May 25, 1981), p 547 The commitment of the United States to renew arms control efforts was made by Secretary Haig to the NATO Foreign Ministers during his speech of May 4, 1981 See John M Goshko, "Haig Tells NATO of New Plan for Talks With Soviets," *Washington Post*, May 5, 1981

³"Proceedings of the 26th CPSU Congress, Volume 1 Brezhnev Report," in *Foreign Broadcast Publication Service, Daily Report: Soviet Union*, vol 111, No 36, Supplement 1, Feb 24, 1981, p 20

⁴"Air-to-surface ballistic missiles and the aircraft carrying them would be a permitted MX basing mode were SALT II in effect in the late 1980's provided the missiles were not tested before the expiration of the Protocol to the SALT II Treaty on Dec 31, 1981, and that the aircraft carrying the missiles were equipped with FRODS to facilitate verification

permitting deployment of the MX missile in one or more of these modes which would still be verifiable using national technical means.

Surface ship mobile deployment of the MX missile, as noted earlier, is prohibited by the terms of the SALT I I Treaty because no formula could be negotiated to permit adequate verification without reducing surface ship mobile ICBM survivability to an unacceptable level. The principal arms control negotiating problem is the development of a formula permitting deployment of surface ship mobile MX in a relatively survivable manner on the one hand, and adequate verification of the number of missiles so deployed on the other. U.S. deployment of a surface ship mobile MX would establish a precedent for Soviet deployment of a comparable system. However, the United States would want to be certain that the ability to count the number of Soviet surface ship mobile ICBMS would not be unduly hindered should the Soviets opt for a mobile ICBM deployed in that mode at some time in the future. The problem from a weapon system survivability perspective is that steps that might be taken to facilitate arms control agreement verification rapidly reduce the survivability of surface ship mobile based ICBMS (see **ch. 7 of this report**).

Deployment of MX missiles on surface ship platforms equipped with FRODS to aid verification of an arms control agreement would facilitate detection, identification, and maintenance of trail at sea, thereby reducing survivability to a very low rate. Limiting areas of surface ship mobile operation would facilitate counting the vessels, but would also permit the Soviets to concentrate their antisurface warfare-monitoring assets on the general areas of deployment, thereby reducing the long-term survivability of the surface ship platforms.

MX missiles deployed in an MPS mode with or without defense would radically alter the arms control negotiating environment.

The number of ICBMS deployed in fixed silos cannot be readily augmented without considerable testing of alternative means for

launching missiles. The time consumed and the highly visible activities involved in the construction of ICBM silos make it highly unlikely that such silos could be deployed in large numbers without being detected by national technical means of arms control agreement verification. Other techniques for launching ICBMS might be developed that would go unnoticed, but such techniques could be detected when and if extensive testing were to occur.

Uncertainty about the possibility of detecting a clandestine deployment of ICBMS makes it difficult for either the United States or the Soviet Union to justify the risks of clandestine ICBM deployment unless such a deployment could be large enough to make a significant difference in the strategic balance. While judgments as to the number of clandestinely deployed ICBMs or RVS will vary among analysts, the threshold for strategic significance diminishes quickly as the number of ICBMS and/or RVS permitted decreases.

MPS deployment by the Soviets for a future land-mobile ICBM might create a situation in which they would find it relatively easy to either openly abrogate or clandestinely violate on arms control treaty limiting the number of land-mobile ICBMS deployed. An MPS system would deploy an entire infrastructure of **missile shelters, command and control systems, transportation systems maintenance facilities, personnel, and other resources needed** to support any mobile ICBM. Rapid, overt deployment of stockpiled missiles ("breakout") in excess of future treaty limitations in a sudden, open act of treaty abrogation might therefore be an attractive, relatively low cost option for increasing Soviet strategic forces.

The existence of the MPS infrastructure might also encourage clandestine attempts to deploy excess land-mobile ICBMS. Such deployments could be especially difficult to detect after they had occurred, and MPS deployment of land mobile ICBMS might lead to a situation in which it would not be possible to adequately verify violation of an arms control agreement.

MX/MPS creates an unprecedented need for future arms control agreements to specify cooperative measures for verifying the number of mobile ICBMS deployed by either side. This subject raises serious negotiating problems, as each procedure related to the verification of the number of MX missiles deployed by the United States must be designed with a hypothetical Soviet mobile ICBM in mind as well. Furthermore, a series of procedures, useful for verification purposes but perhaps not essential, would have to be included in order to ensure that those procedures essential for purposes of counting the number of large, land mobile ICBMs deployed by either side emerge from the negotiating process.

MX deployed in an MPS mode would further complicate the process of strategic arms control negotiation limitation by placing a very high value on Soviet agreement to an RV limitation. Previous SALT negotiations have attempted to balance specific United States and Soviet advantages in various areas of strategic weapons and Strategic nuclear weapon delivery systems in order to conclude an agreement that was balanced. While views differ on the degree of success U.S. and Soviet negotiators have had in attempting to reach a balanced agreement, MX/MPS would further complicate the negotiating process. The great sensitivity of the MX/MPS survivability to the numbers of Soviet RVS and the potential growth in the Soviet RV inventory coupled with the great cost of the United States MPS system would put Soviet arms control negotiators in a very strong negotiating position. An agreement limiting the number of Soviet RVS now or in the future would enable the United States to plan and budget for MX/MPS; the Soviets could therefore use their willingness to agree to RV limitations as a "bargaining chip" to persuade the United States to agree to other limitations on strategic weapons of keen interest to the Soviets.

MX/MPS also complicates arms control negotiations by making it much more difficult to accept any agreement that would freeze strategic force modernization efforts unless such a freeze were absolute. The sensitivity of MX/MPS survivability to the number of RVS de-

ployed by the Soviets would require the United States to take a position that in essence required the Soviets to stop all construction and deployment of systems not operational as of a certain date even though MPS construction would have to continue until the number of shelters built exceeded the number of threatening Soviet RVS. Failure to obtain this kind of cutoff of new deployments would jeopardize the survivability of MX missiles deployed in an MPS mode.

Minuteman III rebased in an MPS mode would similarly complicate future arms control negotiations. Rebased Minuteman III would be as sensitive to the number of Soviet RVS deployed as would be MX/MPS deployment; the relative bargaining leverage gained by the Soviets for MX/MPS would also be gained with Minuteman III/MPS. Cooperative measures for verifying U.S. compliance with a limitation on the number of mobile, relatively small ICBMS would also have to be negotiated, again on the premise that U.S. deployment of a mobile ICBM would at some point be matched by a similar but not necessarily identical Soviet mobile ICBM deployment.

As a result, MX/MPS and Minuteman III/MPS would create a need for arms control negotiations to become ever more deeply and intimately involved in the specification of detailed procedures of weapon system deployment and peacetime operation.

Defended MX/MPS would add the great uncertainties associated with the reopening of discussions on ABM system limitations to the other negotiating problems noted above. While the present ABM Treaty seriously inhibits development, testing, and deployment of the LoADS ABM system, it equally inhibits development and deployment of Soviet ABM systems. Were the Soviets to be relieved of this legal inhibition, they might well deploy an ABM system that would affect the ability of U.S. ICBM and SLBM RVS to successfully attack Soviet targets, generating requirements for significantly larger numbers of U.S. strategic forces. The great uncertainties introduced in calculating the strategic balance, developing requirements for U.S. strategic

forces, and procuring the necessary forces would have to be weighed against the addi-

tional increment of survivability that a LoADS ABM might provide the MX.

ARMS CONTROL AND STABILITY

Arms control seeks as a general goal to reduce the likelihood of war. Efforts to maintain international stability and control the escalation of severe international crises are therefore often considered an integral component of arms control. The procurement and deployment of strategic forces in a manner that reduces the incentives to continue modernization or procure additional numbers of forces are also thought to be consistent with arms control efforts. The selection of a basing mode for the MX missile may therefore have broader implications for arms control beyond the negotiation of new international agreements.

The deployment of the MX missile in a survivable basing mode is generally thought to be an important adjunct to the management of severe international crises. High confidence by American and Soviet decisionmakers in the survivability of the MX force would minimize incentives for either side to strike first. Survivable basing would allow American decisionmakers to wait out a crisis without resorting to the use of force out of concern that if the MX missiles were not used, they might be preempted and unavailable later during a crisis. Survivable basing for the MX missile would reduce incentives of the Soviet leadership to attempt preemption because they could not be confident of destroying a sufficiently large fraction of the force to effectively limit the ability of the United States to retaliate. Survivable basing would also reduce Soviet incentives to initiate an attack out of fear that the United States would strike first to forestall Soviet preemption.

As noted throughout the earlier chapters of this study, most basing modes for the MX missile would provide survivability when fully deployed; several including small submarine or air mobile MX basing would provide sub-

stantial survivability concurrent with or shortly after initial operating capability. However, in some operational concepts, air mobile basing might create a situation during a crisis in which the Soviets might mistake a widespread, simultaneous launch of MX-carrying aircraft undertaken to enhance survivability as strategic warning of an impending American attack. Such a perception would add instability to a crisis. While there are many other operational concepts for an air mobile force which might overcome this concern, the possibility that the Soviets might perceive the airborne operation of a large fraction of the air mobile MX force as a provocative action during a severe crisis cannot be completely discounted.

As noted above, the selection of a basing mode for the MX missile that added incentives to increase the size of strategic nuclear forces would be inconsistent with the general goals of arms control. Most basing modes for the MX missile assessed in this study satisfy this criterion; MPS with or without the LoADS defense, however, would provide a strong incentive for the Soviets to add to their inventory of RVS. Finally, MX/MPS would make terminating a buildup of U.S. and Soviet strategic forces more difficult than other MX basing modes because the United States could not stop constructing MPS until the number of shelters exceeded the number of RVS in the Soviet inventory that might pose a threat to MX/MPS survivability. The Soviets, on the other hand, might find it difficult to stop adding RVS to their inventory unless they had clear evidence that the United States had halted its MPS construction program. Thus, MPS with or without the LoADS ABM defense would pose the most severe challenges to the long-term ability of the United States to achieve some of its stated arms control objectives.