# THE MX BASING DEBATE: THE REAGAN PLAN AND ALTERNATIVES

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## ISSUE DEFINITION

On Oct. 2, 1981, President Reagan announced his plan for basing the MX missile, as part of a comprehensive proposal on U.S. strategic forces. The plan for MX is divided into near- and long-term elements. It would:

-- Deploy at least 100 MX missiles in modified Titan (and later Minuteman III) silos, hardened to withstand substantially more nuclear blast than current silos;

-- pursue research and development (R&D) on three long-term basing options for MX: continuous airborne patrol aircraft, ballistic missile defense of land-based MX, and basing deep underground or on the south side of mesas;

-- "expect to choose among one, or more likely several, of these options in 1984."

The Administration recognizes that silo basing is an interim measure to buy time until a more permanent solution is obtained, but contends that it is the most effective way to enhance MX survivability in the mid-1980s. The Administration further looks toward the three long-term options as promising ways of providing security later.

Critics are likely to challenge both elements, asking:

-- Can we forgo silo basing and proceed directly to a long-term basing mode?

-- Are the three long-term options under consideration the best from which to choose?

S. 815, the FY82 Defense authorization bill, as reported from conference, specifies that no funds may be obligated or spent for developing an operational MX basing mode before Nov. 18, 1981, and no funds may be spent for that purpose after Nov. 18 if, before then, both Houses agree to resolutions disapproving the President's basing mode for MX announced on Oct. 2. At issue is whether the Congress finds the President's approach for MX acceptable, and, if not, what alternatives it might recommend that the Administration should pursue.

## BACKGROUND AND POLICY ANALYSIS

There is a consensus that the Reagan MX basing plan and any alternatives must meet two broad criteria:

-- First, it must offer survivability; that is, it must give us confidence that some significant number of missiles can survive a Soviet attack as a militarily effective force.

-- Second, its costs, social and environmental

impacts, effects on our allies, arms control ramifications, etc., must be politically acceptable.

This issue brief analyzes the Reagan approach and other prominently mentioned alternatives against these criteria. Options covered are:

Reagan's Plan

(1) Combining alternatives: strategic force diversification.

(2) Superhard silos.
(3) Airmobile.
(4) Antiballistic missiles (ABMs).
(5) Deep underground basing.

Low Cost Alternatives

(6) Decide that ICBMs are invulnerable.
(7) Base MX in silos, and launch missiles on warning of attack.

(8) Forgo new land-based ICBMs.

MX Basing Alternatives

(9) Multiple protective structures (MPS).
(10) Scaled-down MPS.
(11) Small submarines.

New Missile

(12) Small ICBMs.

For more detailed information, see the following issue briefs: MX Intercontinental Ballistic Missile (IB77080), Trident (IB73001), Antiballistic Missiles (IB81003), Bomber Options for Replacing B-52s (IB81107), The Reagan Plan for U.S. Strategic Forces: Issues for Congress (MB81254), and Antisatellites (IB81123), available from CRS; and "MX Missile Basing," (Sept. 1981, 335 p.), available from the Office of Technology Assessment. See also "Assessing the Options for Preserving ICBM Survivability," Report 81-222F, available from CRS.

## REAGAN'S PLAN

### 1. Combining alternatives: strategic force diversification

While the rest of this Issue Brief treats various options separately, they are not mutually exclusive. They could be combined in a diversified force.

Diversification seeks to respond to Soviet threats by trying several ways at once to solve our strategic force problems, such as ICBM vulnerability. The Administration took this approach to strategic forces generally by recommending, in addition to both short- and long-term solutions for MX,

deployment of submarine-launched cruise missiles as well as Trident II, and ALCM, B-1, and a Stealth bomber.

The justification for strategic force diversification is the same as for the strategic triad: several systems better assure survivability, can be used for different missions, are harder to attack and defend against, contain strengths that offset the weaknesses of any one system, etc. Just as three strategic weapons compel the Soviets to spread their resources thinner, several ICBM basing modes have the same effect. Pursuing development of several hedge programs reduces the time from a deployment decision to initial deployment and gives us more understanding of the strengths and weaknesses of these systems. As a result, we could confidently select and rapidly deploy one or more systems that best respond to the Soviet threat.

Critics raise several objections. Without rigorous control -- carefully balancing the division of expenditures between deployed weapons and R&D hedges, procuring only a few of the systems being developed as hedges, keeping most of these hedges at modest funding levels -- the cost of the entire program (weapons and R&D) would become excessive. In that case, hedges designed to generate and advance options would consume so much money as to preclude deploying weapons. Political drawbacks pertaining to a specific basing mode by itself would also pertain to it as part of a diversified force. However, if a specific system were scaled down in size as part of a diversification scheme, it might become more politically acceptable than if it were being pursued as a single option. Diversification would also be harmful if the United States viewed hedge programs in R&D as substitutes for deployed forces.

2. Superhard silos

The Administration proposes to deploy 100 MX missiles in Titan or Minuteman III silos reconstructed to withstand 5,000 pounds per square inch (psi) overpressure from a nuclear explosion, vs. 2,000 psi for current silos. It sees this as the only way to deploy MX when it is ready, in 1986.

Survivability: Many doubt that superhard silos can do much to improve survivability. Slight improvements in accuracy can offset the extra hardening, the Soviets have been rapidly improving ICBM accuracy, and MX provides a tremendous incentive for further improvement. Former Defense Secretary Harold Brown has said that hardening will not prevent silos from being destroyed because the Soviets could place warheads so close that the silos would be in the crater of their nuclear explosions. It is also uncertain if silos can be hardened to 5,000 psi. The Reagan Administration concedes that superhard silos have limited effectiveness, but that they do create additional uncertainty in the minds of Soviet planners.

Political acceptability: Superhard silos pose only minor social and environmental impacts, and are consistent with existing arms control agreements. Some believe that MX missiles deployed in vulnerable silos reduce the stability of the strategic balance because the United States might be forced to launch them on warning of Soviet attack. They also argue that the Soviets might believe they could successfully attack silo-based MX missiles. Either problem would increase the risk of war. Cost is another concern. A preliminary Air Force estimate as of Oct. 30, 1981, finds that R&D and procurement of 226 MX missiles (for deployment, test, and spares) will cost $13.8 billion exclusive of nuclear weapon material; and that 18 Titan silos superhardened and modified for MX plus infrastructure costs

(e.g., facilities associated with test launches and maintenance equipment) will cost $6.2 billion, 36 modified Titan silos plus infrastructure will cost $7.8 billion, and 40 modified Minuteman III silos plus infrastructure will cost $5.6 billion (all in FY82 dollars).

Status: This is the option selected by the Administration for first deployment of MX.

3. Airmobile

Aircraft carrying ICBMs can patrol vast areas and move rapidly; once aloft and dispersed, it is essentially impossible to destroy most of them with random barrage. It is difficult to destroy a fleet of these aircraft with a direct attack on them by other aircraft or by ICBM barrage of an area just after an aircraft had been located there by satellite. Existing aircraft, however, would be vulnerable if attacked at their bases by submarine-launched ballistic missiles (SLBMs) on depressed (fast) trajectories launched from submarines at the coasts.

There are two primary operating modes: Ground loiter, with aircraft ready for immediate takeoff at the end of runways; and air loiter or continuous airborne patrol, with a substantial part of the fleet always in the air.

Survivability: Ground loiter sacrifices survivability to gain political acceptability (lower cost). Survivability would depend on receiving warning of SLBM attack and taking off immediately. Slight delay in takeoff would drastically reduce survivability for most aircraft. Moreover, a Soviet attack that could destroy bombers on the ground could probably destroy ground-loiter ICBM carriers as well. Continuous airborne patrol is apparently much less vulnerable. Some believe it would be vulnerable to Soviet weapons in being and, of greater concern, to those that could be developed later, while others believe that countermeasures could reduce the effectiveness of an attack on these aircraft.

Political acceptability: Continuous airborne patrol sacrifices political acceptability to gain survivability. Fuel and maintenance make this method very costly for most aircraft. Ground loiter is much cheaper. Many believe that the exclusive adoption of either mode for basing ICBMs would end the triad of strategic weapons as we know it today.

Status: Two designs have been set forth to remedy both survivability and political acceptability problems simultaneously. One, Big Bird, seeks to make air loiter less costly. It would be a very large, propeller-driven aircraft with glider-like wings that would reportedly use 10% or 20% of the fuel of a large jet cargo aircraft. Another aircraft seeks to make ground loiter more survivable. The Office of Technology Assessment finds that an aircraft hardened to withstand nuclear weapon effects would drastically reduce the effectiveness of even the worst SLBM attack, an attack using many reentry vehicles (RVs) from SLBMs on fast trajectories launched from submarines at the coasts. The Administration plans to conduct R&D on a continuous airborne patrol aircraft (without specifying if it would be Big Bird or another aircraft) as an option for long-term MX basing. Some House and Senate Armed Services Committee leaders are highly critical of airmobile basing, on the grounds of cost, vulnerability, and difficulty of operation, among other reasons. The conferees on S. 815, FY82 DOD authorization, agreed that no funds authorized by that bill could be used for R&D of an aircraft launching mode for MX.

4. Antiballistic missiles (ABMs)

This concept would use interceptor missiles to destroy Soviet RVs attacking U.S. ICBMs. Before the President's Oct. 2 announcement, two systems were under consideration. One, Low Altitude Defense (LoAD), would use missiles of very short range -- a few kilometers -- to defend MX missiles based in MPS. LoAD would be effective, by using the leverage offered by MPS, because it would need to intercept only those RVs headed for shelters containing MXs or LoAD units. For example, if the Soviets use 23 RVs to attack all 23 shelters in an MX cluster containing one MX and one LoAD missile, the defense, by using the LoAD missile to intercept the RV headed for the MX, defeats the attack. Still not knowing the location of the MX, the Soviets would need to use another 23 RVs, one per shelter, to destroy the shelter containing the missile. LoAD is the U.S. ABM that could be deployed most rapidly, in the mid-1980s. In defending U.S. silos, though, LoAD could be readily overwhelmed, according to OTA.

Another type of ABM could be used to defend silo-based ICBMs. This system, layered defense, would have two tiers. An "overlay" of long-range missiles, each with multiple nonnuclear warheads, would intercept RVs in space, above 300,000 ft. This overlay is in early experimental stages. The "underlay" is simply LoAD or a similar system. Layered defense would seek leverage by having the overlay weaken the attack so much that the underlay could cope with remaining RVs.

Survivability: The case was made that LoAD would defend MPS effectively, since its task was quite modest (force the Soviets to use an extra RV per shelter) and it did not have to work well to do that. Layered defense, though, is frontier technology. The overlay would have to work very well for layered defense to be effective, yet there are a great many questions about whether it could differentiate between RVs and decoys, and otherwise avoid being overwhelmed. It will take several years at least to resolve these questions.

Political acceptability: The most significant question in this category is that the ABM Treaty of 1972 forbids all but a very small and militarily effective system. The desirability of the treaty has aroused a sharp and complex debate on ABM stretching back to 1969 and earlier.

Status: Under the Administration plan, ABM would be one option for further R&D for long-term MX basing. The Administration noted, "Any ground-based scheme [for basing MX] ultimately would require a ballistic missile defense for survivability. But today, ballistic missile defense technology is not at the stage where it could provide an adequate defense against Soviet missiles." The Administration also raised four questions: How well ABM would work, how much it would cost, how Soviet ABMs would affect U.S. and allied offensive capabilities, and the political ramifications of altering the ABM Treaty. By ending MPS, the Administration has foreclosed any justification for a rapid deployment of LoAD. If the United States is to deploy any ABM to defend superhard silos, sandy silos, or hard tunnels, layered defense must be the ABM used. But layered defense is much further from deployment than LoAD. The Administration has thus in effect put off the possibility of ABM deployment for at least several years. Given this, it is difficult to see what would be gained before then by seeking to renegotiate the ABM Treaty or, failing that, abrogating it to defend MX.

5. Deep underground basing

This concept would place MX missiles so far underground that even direct hits by Soviet weapons could not destroy them. There are at least two variants. In one, "pencil pusher" or "sandy silo," silos would be dug several thousand feet deep. Each would have one or several capsules containing a missile. The top of the capsule would be shaped like a pencil point; a gas generator would push the capsule up with a force of 7,000 psi to penetrate through the crater left by a nuclear explosion. A second method, "hard tunnel," "citadel," or "underground missile complex," envisions excavating a cavern in the middle of a hard rock mountain. Tunnels would be dug out from the cavern to near the surface. The system would probably need people to operate it, though it might be possible to have it completely automated. After attack, excavation equipment stored inside the mountain would dig the tunnels out to the surface so the missiles could be launched.

Survivability: These types of basing will probably protect the missiles in an attack. It is unclear, though, if the missiles can survive as an operational, launchable force. They could not be launched rapidly; until more research is done, no one can know if launch from hard tunnels would take hours or months, a DOD study finds. The ability to maintain communication with the missiles is uncertain. Atmospheric nuclear tests are barred by the Nuclear Test Ban Treaty of 1963. Without such tests, it may prove impossible to assess with confidence the hardness of the hard tunnel system or to know if missiles could push through the debris of bomb craters.

Political acceptability: Once completed, this system would have very little public interface. The cost is uncertain; it could be low for sandy silos but high for tunnels drilled in hard rock, though use of preexisting mining tunnels might reduce costs. Verifiability for arms control is uncertain.

Status: This is one option for further R&D under the Administration plan. The key question is, Will R&D resolve the great technical uncertainties of these systems?

LOW COST ALTERNATIVES

6. Decide that ICBMs are invulnerable

If ICBMs are not as vulnerable to Soviet attack as popularly believed, then modernizing our ICBM force may be unnecessary. The fundamental question of whether or not ICBMs are vulnerable divides in two:

a. Can one RV destroy one ICBM silo ("single-RV issues")? One position says no, because many error sources degrade ICBM (and SLBM) accuracy below that needed to destroy a silo. Each missile trajectory encounters unique magnetic and gravity anomalies. They would affect an operational trajectory and accuracy to an unknown extent unless we correct for them by flying a missile over that trajectory toward the U.S.S.R., which we cannot do. Weather would affect accuracy. The Air Force counters that such problems have been examined closely for 20 years. Satellites and on-site surveys detect gravity and magnetic anomalies for operational trajectories. Firing ballistic missiles over many paths has indicated "no significant trajectory

dependent error sources." Weather data for a target can be fed into Minuteman IIs before launch. This capability is useful for refining accuracy because RVs from these missiles are more sensitive to atmospheric influences than are Minutemen III RVs. Former Defense Secretary Brown said in Sept. 1981, "By the late 1980's, you'll be able to have a warhead come down right in the middle of the silo cover."

b. Can one ICBM force destroy another ("ICBM-force issues")? Conclusions one draws about a single RV attacking a single ICBM do not automatically apply to one ICBM force's attacking another. For example, the explosion of one RV can destroy, disable, or knock off course following RVs. To avoid this "fratricide," RVs must be swept from one side of a missile field to another with split-second timing, or all RVs must explode over a missile field at the same instant. Two RVs should be used per shelter to compensate for imperfect reliability; they should come from different ICBMs so one missile's failure does not leave a silo unattacked. Thus hundreds of missiles must be launched on precise schedules and put their RVs on precise trajectories. This task cannot be practiced, reducing a nation's confidence that it can destroy the opposing ICBM force. The reliability of a type of ICBM, as calculated from previous tests, may not be the reliability for an actual attack. Even if the attack goes as planned, the United States could launch its ICBMs while Soviet ICBMs were enroute.

The rebuttal to this argument is that we should not rest ICBM survivability on Soviet difficulties in destroying U.S. ICBMs; Soviet, not U.S., calculations on this point affect Soviet actions. The issue is not if ICBM-force issues will deter a Soviet bolt from the blue; that course poses overwhelming hazards. Rather, how would the Soviets calculate the advantages of attacking U.S. ICBMs in a deep crisis, where a limited attack might appear the least bad option? Relying on our calculations of Soviet calculations under terrible pressure is too risky.

The debate so far has not differentiated between single-RV and ICBM-force issues. Yet the former are critical in deciding how to base MX. If Congress finds that single-RV issues guarantee ICBM survivability, then the MX basing debate could end at that point. If Congress finds this is not the case, however, it would have to rest the full burden of ICBM survivability on ICBM-force issues, e.g., difficulties the Soviets may have in coordinating an attack.

Survivability: If one believes that our ICBMs are not vulnerable to an attack by Soviet strategic nuclear forces, then survivability is not a problem.

Political acceptability: If this approach works, its absence of social and environmental impact, dollar cost, and adverse consequences for SALT make it highly acceptable.

Status: The majority opinion in the public debate is that there is a reasonable expectation that our ICBMs as currently based are or soon will be vulnerable to Soviet attack. Arguments critical of this opinion are still being raised.

7. Base MX in silos, and launch it on warning of attack

Description: Heat-sensing satellites can detect ICBM launches, and radar can track RVs. Observable signs associated with an attack could thus let us

launch ICBMs on warning of attack. This course is available now, DOD notes. It is the fastest way to close the window of vulnerability. Enhancing our command, control, and communication (C3) ability for our ICBM force would make launch on warning (LOW) more credible whether or not we declare it to be our policy.

Supporters of LOW argue that no basing mode assuredly lets land-based ICBMs survive attack. Further, it avoids the costs and problems of a complex system like MPS, airmobile MX, or ABM. With LOW, we can salvage the maximum military value from our ICBMs. We can have very high confidence that LOW would work. With LOW, of course, MX would not remain operational for weeks after an attack, but we do not need that capability because SLBMs can endure. Supporters also note the alternative to LOW, having ICBMs vulnerable during the 1980s, is not risk-free.

Critics charge that LOW entails huge risks that can never be eliminated. Launching when there was no attack would cause Armageddon by computer. If the Soviets believed we would LOW, they would realize that false warning could lead to a U.S. bolt-from-the-blue attack, destroying most of their ICBMs. They could respond by adopting their own LOW policy. U.S. security would then depend on Soviet computers not erring. If we fail to LOW in a real attack, the Soviets could destroy almost all of our ICBMs. They could exploit the weaknesses of LOW. If we depend on LOW, DOD argues, "the Soviets would surely devise ways to blind our warning system in a precursor attack." Would the President find absence of warning data adequate basis for launching ICBMs? We should not require the President to make that choice, but should buy survivable forces instead.

Survivability: LOW would provide survivability. OTA finds that "sensors and communications could... make at least the technical elements of the [launch under attack] capability exceedingly difficult... to disrupt."

Political acceptability: The costs of LOW are modest, and social, environmental, and SALT impacts are negligible. Serious questions about its effect on increasing the risk of nuclear war, however, have made LOW difficult to accept.

Status: The United States has neither declared LOW to be our policy nor acquired the equipment and procedures needed to have high confidence in a LOW policy. Secretary Brown said in the FY82 DOD annual report that "while the Soviets cannot ignore our capability to launch our retaliatory forces before an attack reaches its targets, we cannot afford to rely on 'launch on warning' as the long-term solution to ICBM vulnerability." [emphasis in original] The Reagan plan calls for enhanced C3, which will probably reduce Soviet confidence that we would not LOW. This might enhance deterrence while increasing the risk of accidental war. Some Members of Congress have proposed LOW as at least an interim solution to ICBM vulnerability.

## 8. Forego new land-based ICBMs

This option would concede that land-based ICBMs cannot be made survivable. It would not deploy MX at all, would probably leave existing Minutemen in place, and would strengthen the bomber and submarine forces. Bomber forces would be diversified by proceeding with air-launched cruise missiles, B-1, and later an advanced technology ("Stealth") bomber. Submarine forces would be upgraded by deploying the D-5 variant of the Trident II missile, the largest missile that could fit into Trident submarine launch tubes. The

Trident submarine/Trident II system could be designed to provide prompt counterforce capability if the decision were made to do so. Submarine-launched cruise missiles might also be deployed on attack submarines. Since this method would emphasize submarines, the United States would hedge against a Soviet breakthrough in antisubmarine warfare by conducting R&D on antisubmarine warfare countermeasures. In addition, the United States might bring to the point of deployment several systems, such as ABM defense of ICBMs, aircraft and small submarines able to carry ICBMs, and small ICBMs, and deploy them if the Soviet threat to our submarines warranted.

Survivability: The Office of Technology Assessment, in its study of MX missile basing, "could find no existing technology, and no technology is believed to be on the horizon, which offers any promise for permitting an effective Soviet attack on a fleet of small MX-carrying submarines." Poseidon and Trident submarines are generally thought to be more survivable than small submarines.

Political acceptability: The major objection to this plan is that it would end the strategic triad as we know it, which consists of bombers, submarines, and ICBMs. This triad has a number of benefits, as noted above, and U.S. policymakers are comfortable with it. In addition, moving to a dyad would alter the current division of roles and missions within the services in a way that the Air Force would strongly oppose.

Status: There is little interest in this approach in the Congress or the Administration.

## MX BASING ALTERNATIVES

### 9. Multiple protective structures (MPS)

In Sept. 1979, President Carter recommended basing 200 MX in 4,600 MPS. This is also the system the Air Force prefers.

Generically, MPS is a giant shell game in which few missiles are moved among many shelters. The shelters may be horizontal or vertical and may be connected by roads, railroads, or tunnels. The theory underlying MPS is that the Soviets would not know which shelters contain missiles, so they would have to attack all the shelters in a first strike. Yet the United States would build so many shelters that they couldn't attack them all. As a result, some shelters and missiles would survive. The Soviets, knowing this, would be deterred.

MPS works if we can meet two conditions. We must keep the Soviets from knowing which shelters contain missiles; otherwise, the leverage sought by proliferating shelters disappears because they could attack 200 instead of 4,600 shelters and overwhelm the system. Second, since MPS provides survivability only if the Soviets cannot destroy most of the shelters, the United States must build more shelters than they can attack, defend shelters with ABMs, or both.

MPS advocates argue that we could probably prevent the Soviets from knowing which shelters contain missiles. We would build decoys so each shelter would appear to hold a missile. We would have a team of experts,

with access to more information than we expect the Soviets could obtain, trying to discover which shelters hold missiles. We would adjust the system to correct the problems they discover. Even if the Soviets believed they had located the missiles, they would still be deterred from attacking only those shelters with missiles because of the consequences if they were wrong.

Critics note that there are a dozen or more observable features of missiles in shelters, such as mass and heat. If the Soviets could differentiate on even one, they could learn which shelters hold missiles. Since the U.S. is an open society, they could complement satellite data with information obtained from agents on the ground.

The issue of building enough shelters to offset Soviet RVs at a specified future time depends on our intelligence estimates of the number of RVs they will have available to attack MPS at that time and on our willingness to build the required number of shelters and/or defend them with ABM. OTA estimates that, if the Soviets choose, they could target 7,000 RVs on MPS in 1990 and 12,000 in 1995. To enable 100 MX missiles to survive, we would need 8,250 MPS in 1990 and 12,500 in 1995. On the other hand, MX might force them to spend more resources on protecting their ICBMs and less on increasing the threat to MX. MPS advocates argue that we could add shelters and/or defend them with ABM; critics point to the political resistance that the 4,600-MPS system met and doubt that we could build still more shelters.

Survivability: If the Soviets do not know which shelters contain missiles and if they do not have enough RVs to destroy most shelters, MPS would provide survivability.

Political acceptability: The more shelters we build, the higher the dollar cost and societal/environmental impact. The commitment to add shelters to offset Soviet RVs raises the prospect of unending impacts if the Soviets continue to add RVs. An ABM defense can avoid the need to add shelters and the associated impacts, but would require additional costs and force the United States to renegotiate or withdraw from the ABM Treaty. So doing would raise questions about the future of arms control and U.S. strategic policy.

Status: Given the diverse opposition MPS had already encountered, the Administration's rejection of MPS appears to end prospects for this basing mode.

10. Scaled-down MPS

Press reports indicate the Administration considered basing 100 MX in 1,000 MPS. This system by itself would reduce the cost, societal and environmental impact, and survivability below those of 200-MX/4,600-MPS. If it were the first installment on a larger system, it could provide increased survivability along with increased cost and impact, though if we delay a decision on system size and if the Soviets add many silo-killer RVs, it is uncertain if we could later build enough shelters fast enough to attain MX survivability by 1990, for example.

Survivability: This system, by itself, fails. The Soviets could readily target two RVs on each shelter. If each RV has an 85% chance of destroying its target, as OTA estimates, then only 15% of 15% of the missiles -- 2.25 missiles -- would survive.

Political acceptability: Better than for 200 MX in 4,600 MPS.

Status: The Reagan plan's cancellation of MPS would appear to end future efforts toward even a scaled-down MPS.

11. Small submarines

This system would involve 50 or so World War II sized diesel electric submarines, each carrying two or four MX or other missiles horizontally in canisters outside the pressure hull. On command, canisters would separate from the submarine and float to the surface, where the missile would be ignited. The missiles could have very good accuracy by using navigation satellites, ground radio beacons, or star sights. Submarines would have a patrol range of 500-1500 nmi, but this could be extended. They would not operate above the continental shelf to avoid being destroyed by very large waves caused by underwater detonation of nuclear weapons just off the continental shelf.

Survivability: In its study on MX missile basing, the Office of Technology Assessment "could find no existing technology, and no technology is believed to be on the horizon, which offers any promise for permitting an effective Soviet attack on a fleet of small MX-carrying submarines." It could not exclude the possibility of an unforeseeable antisubmarine warfare (ASW) advance, but noted that even in that case the differences between Trident and small submarines could impede destroying both submarine forces simultaneously. Critics argue that concentrating submarines off the coasts increases vulnerability, but even so detection would be difficult, submarines could be defended, operating areas could be expanded, and other techniques (replacing diesel propulsion with fuel cells to avoid snorkeling, deploying noise generators under water to impede Soviet ASW, etc.) could further reduce vulnerability. Survivability against known or foreseeable threats and the probable ability to counter unforeseeable threats is about as much survivability as can be hoped for.

There is a dispute over the importance the United States should attach to unforeseen threats to small submarines. The United States has hedged against a Soviet ability to destroy its deterrent force by building three independent strategic forces. With fixed-site ICBMs becoming vulnerable, the United States could continue hedging by redressing the vulnerability of land-based ICBMs, the most vulnerable force, or by deploying small submarines to upgrade the survivability of strategic submarines, the least vulnerable force. (Both could be done, but at high cost.) The choice poses quite different risks -- for land-based ICBMs, that the Soviets will be able to overwhelm or otherwise defeat whatever basing mode we choose; and for small submarines, that the Soviets will make dramatic and unforeseen advances in ASW.

Political acceptability: The triad concept, which by now has become deeply embedded in U.S. thought, and the current division of roles and missions among the services would make it difficult for the United States to abandon land-based ICBMs in favor of small submarines.

Some view small submarine basing as posing arms control problems. If encapsulated ICBMs could be placed on small diesel submarines, they could be placed on most ships, making verification difficult if not impossible.

Critics believe the system would be more expensive than is generally realized because of "hidden costs," such as ships and planes to defend the

submarines. Advocates respond that small submarines should be less costly than MPS. While they do not consider hidden costs, they note that other systems have such costs as well.

Status: This is a system in search of a home. It marks too radical a break with existing systems and existing divisions of roles and missions for the services to accept. The Navy has never favored it, and the Air Force has strenuously opposed it. The concept has been modified over the past two years to increase survivability and cost-effectiveness, leading to a larger submarine with more patrol range. Small submarines have become more like Tridents, critics note; they question the advantages of proceeding with both. Small submarine basing was not an option chosen by the Administration for further R&D. It thus appears out of the running, at least in the eyes of the Administration.

NEW MISSILE

12. Small ICBMs

This plan would deploy ICBMs much smaller than MX in one or several basing modes in addition to or instead of MX. One proposed small ICBM would weigh 22,000 lb and would be 38 ft long, vs. 192,000 lb and 70.5 ft for MX. Another would be 50 ft long and weigh 20,000 to 30,000 lb. Both small ICBMs would carry a single warhead. The smaller of the two could be deployed on tractor-trailer trucks; both could be deployed on medium-sized cargo aircraft, barges, etc.

The rationale for small ICBMs is that MX is too large to be survivable on land, where it can be based only in silos or MPS. Yet given current and projected Soviet ICBM accuracy, any fixed target can be destroyed. Land basing, however, is desirable to balance the triad, to enable rapid response to launch commands, etc. Only a mobile missile would have any chance of avoiding detection, and a missile must be small to be mobile.

Survivability: Small ICBMs appear survivable. In 1979, there were 1,339,000 tractor-trailer units in service in the United States. It would be difficult for the Soviets to barrage all the interstate highways; when other roads are added, the task becomes formidable indeed. Thus, if trucks carrying small ICBMs could be made to appear like other tractor-trailers, the Soviets would face an extremely difficult targeting problem.

Political acceptability: The major concerns are public interface, SALT, and cost. The public would probably oppose deploying nuclear missiles on highways. Questions would also arise about making any area of the nation a potential strategic target, safety in the event of an accident, and security from terrorist attacks.

A decision to deploy both MX and small ICBMs would violate the SALT II provision permitting each side one new type of ICBM. Further, SALT II imposes limits on missiles and launchers but not on warheads. These limits place small ICBMs at a tremendous disadvantage. While MX carries 10-12 RVs, a small ICBM would carry only one. Yet launchers of each would count equally toward the aggregate ceiling of 2,250 heavy bombers, air-to-surface ballistic missiles, and launchers of ICBMs and SLBMs (Article III, paragraphs 1 and 2). Given this provision, deploying small ICBMs would thus reduce the number of

RVs the United States could deploy.

The cost would depend on the basing mode; deploying 3,000 small ICBMs in hard silos would be costly (and would entail many of the social and environmental impacts of MPS), but deploying a few hundred small ICBMs on trucks would be much less expensive.

Small ICBMs would also raise a dispute over verifiability. Road-mobile small ICBMs could rely for survival on indistinguishability from a large number of civilian vehicles, although the same characteristic would impede verification for arms control purposes. SALT supporters argue that verifiability is critical to arms control agreements, and that these agreements are essential to limiting Soviet strategic forces.

SALT critics, many of whom would support small ICBMs, respond that SALT has limited launchers because they are readily verifiable, and that it is limiting the wrong things. Instead, they argue, the United States should try to negotiate limits on other measures of military capability -- missiles, throw weight of missiles, and number of warheads per missile, for example -- even though those items are harder to verify. If the Soviet Union will not agree to these limits, they would urge that the United States abandon SALT and move to a new "arms control" regime. In it, weapons would be limited not by formal agreements but by deploying weapons such as small ICBMs that give the Soviets no incentive to add to their ICBM force and give us no concern if they do; their missiles would be of no use in attacking small ICBMs they couldn't locate.

Status: These missiles are in conceptual design stages only. This option has attracted only modest public and Congressional attention. The Air Force Ballistic Missile Office has reportedly solicited sources for an advanced development program to examine small ICBMs.

## HEARINGS

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At head of title: Committee print no. 2.
"Doubts about the proposed MX/MPS basing mode are so well-founded and the deficiencies are so fundamental that it should be rejected."

CHRONOLOGY OF EVENTS

11/03/81 -- Conferees filed the conference report (H.Rept. 97-311) on S. 815, the FY82 DOD Authorization Act. The conference bill provides, inter alia, that no funds may be obligated or expended on developing an operational MX basing mode on or after Nov. 18, 1981, if before that date both Houses agree to a resolution disapproving the President's decision of Oct. 2, 1981, on MX basing. Conferees also agreed that no funds in this Act could be used for R&D of an aircraft launching mode for MX.

10/28/81 -- The House Appropriations Committee's Defense Appropriations Subcommittee voted 7 to 5 not to approve any funds for MX for FY82.

10/16/81 -- The House Armed Services Committee held a hearing on the President's strategic program.

10/05/81 -- The Senate Armed Services Committee and the House Appropriations Committee's Defense Appropriations

Subcommittee held hearings on the President's strategic program.

10/02/81 -- President Reagan announced his strategic program.

03/15/81 -- Secretary Weinberger named a panel of 15 non-governmental experts (the Townes Committee) to study how to base the MX.

09/07/79 -- President Carter announced his plan to deploy MX in the so-called "racetrack" system of shell-game multiple protective shelters.

01/17/77 -- Donald Rumsfeld, Secretary of Defense under the Ford administration, stated in his FY78 DOD Annual Report that "the primary basing concepts, at this time, consist of concealing mobile (MX) missiles in either underground trenches or hardened shelters" -- i.e., some form of multiple protective structures.

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