



THE DEFENSE MONITOR

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MX: THE WEAPON NOBODY WANTS

Defense Monitor in Brief

- There is no satisfactory solution to the problem of preserving ICBMs for the indefinite future. ICBMs are becoming obsolete and should be phased out.
- The primary purpose of the highly accurate MX missile itself is to attack Soviet missiles in a first strike. It is a highly dangerous weapon which will damage U.S. national defense.
- The Department of Defense has examined the strengths and weaknesses of 30 different basing schemes for the MX. All have significant problems.
- President Reagan should appoint a Blue Ribbon Panel to examine *all* aspects of U.S. nuclear weapons. The Panel should review the many proposals concerning the MX, the new strategic bombers, additional weapons for Europe, the improved Trident and an ABM defense system in order to insure that the final decisions support a coherent military policy and avoid excessive costs.

THE MX SYSTEM: WILL IT IMPROVE OR WEAKEN NATIONAL DEFENSE?*

After years of study, the Department of Defense has not yet come forward with sound arguments which logically justify the need for the MX missile. Perhaps the clearest evidence of the lack of justification for the new system is that at least 30 different MX basing schemes have been proposed and not one is without serious liabilities.

In this *Monitor* we review the various proposals and report the strengths and weaknesses that DOD studies have identified. Careful consideration of these alternatives will certainly enable the reader to understand more clearly just how expensive, vulnerable, and unproductive an MX system would be.

Nevertheless, there is a risk in considering each of these basing proposals seriously. By their willingness to debate a nearly endless series of alternatives, advocates of the MX missile have seized the high ground in classic military fashion. The high ground is their assumption that the MX will actually strengthen national defense, if only the right basing scheme can be devised.

High ground, indeed! When their assumption is accepted, opponents are limited merely to debating details of what kind of an MX system we will have. Opponents need to attack the high ground in a real debate on whether the MX actually adds to or weakens our ability to defend the United States from nuclear attack.

To address this critical issue, let us consider some facts. First, the MX is intended to be a high yield, highly

accurate missile capable of destroying Soviet intercontinental ballistic missile (ICBM) launchers, 1,400 of them. To do this effectively the 2,000 MX weapons must destroy the launchers before the Soviet missiles are en route to targets in the U.S. Simple logic leads to the conclusion that the MX is a first strike weapon. There is no other logical mission for a system which is designed with the power and accuracy to destroy ICBM launchers.

Paradoxically, the multiple protective shelter (MPS) basing mode for the MX is designed to provide 4,600 hiding places which presumably would enable 200 MX missiles to ride out a Soviet first strike. Granting, for the moment, that most of the MX missiles would sur-

"A Barrel of Rotten Apples"

"This [MX basing options] is a question of what is the least rotten apple in a barrel of rotten apples."

Dr. Seymour Zeiberg

Deputy Under Secretary of Defense for Research and Engineering

March 18, 1981

"We see that all available modes of basing MX pose serious problems. . . .

"None of them is without serious risks, high cost, important uncertainties, or significant drawbacks."

Office of Technology Assessment

U.S. Congress

1981

*Authored by Rear Admiral Eugene J. Carroll, Jr. (U.S. Navy, Ret.), Associate Director of the Center for Defense Information. Retired in 1980 after 37 years in the Navy, Admiral Carroll was a nuclear weapon delivery pilot and engaged in U.S. military planning for conventional and nuclear war.

vive, at what would they be aimed? Empty Soviet ICBM silos? Many, if not most, of the Soviet ICBMs would be launched in their first strike leaving only empty holes in the ground for us to attack. How does the ability to ride out several thousand nuclear explosions in the United States and then retaliate against empty Soviet silos add to national defense? Clearly it does not.

Regardless of the rationale U.S. planners advance to support the MX system, Soviet leaders are going to reach their own conclusions about its significance and U.S. intentions. They will see the MX as a first strike threat and respond to it in ways that will almost certainly increase the total nuclear threat against the United States. Worse yet, the Soviet perception of an increased U.S. first strike threat will generate additional pressure on Soviet leaders to consider initiating a nuclear attack in any confrontation with the United States. It is unlikely that the Soviets will "blink" in 1992 as they did during the Cuban crisis of 1962. Given the powerful Soviet ICBM force, and their perception

The Cumbersome MX

"Our military weaponry appears to me to be similar in shape to that of the knight in shining armor in the Middle Ages whose armor grew progressively heavier, more cumbersome, until that knight, the greatest war machine of its time, could no longer fight, and was defeated at the Battle of Agincourt by some scrawny little foot soldiers with strings and wooden shafts We are building weapons now so cumbersome, so complicated, so expensive, that I do not think that they guarantee the security of this nation. I think they weaken the security of this nation

"The MX is such a system carried to its logical absurdity, full of initials like MPS and LUA and PLU. It reminds me again of the Middle Ages when monks sat around debating how many angels could sit on the head of a pin. We now debate how many bombs on the head of a missile. The monks may have also brought up initials like FBD for fire breathing dragon and BTM for burn to mouth ratio, much as we do today."

Congressman James Weaver
July 9, 1981.

that the MX will put it at risk, the fact is that the MX will increase the threat of nuclear attack on the United States.

Next, let us consider whether the MX system will reduce the potential weight of nuclear retaliation against our nation. Right now we have 1,000 Minuteman II and III missiles capable of delivering up to 2,100 nuclear weapons against 1,400 Soviet ICBM launchers. Recent Congressional studies report that the

Minuteman force could be expected to destroy between 30 percent and 64 percent of the Soviet ICBMs if we launched the first strike. (The wide range of values reflects differing assumptions concerning missile mix, missile accuracy and target hardness.) Assuming a mid-range result, 50 percent of the Soviet ICBMs would survive to deliver up to 3,000 weapons against U.S.

MX Missile: Destabilizing

"A high-accuracy ICBM is a destabilizing weapon because it can be launched on short notice, because it has a short flight time and therefore gives little warning and because it can destroy even hardened targets like ICBM silos. ICBM's like Minuteman and MX are at the most destabilizing end of the weapon spectrum because they combine all of these characteristics. Thus building the MX, rather than stabilizing the strategic balance, would probably destabilize it further."

Admiral Stansfield Turner (U.S. Navy,
Ret.)

Former Director, Central Intelligence
Agency

March 29, 1981

targets. Of course, more than 900 Soviet Submarine-Launched Ballistic Missiles (SLBM) plus the surviving long-range bombers would also be available to deliver additional attacks. Thus, following a successful U.S. first strike today, we must expect the U.S.S.R. to emerge with the capability to deliver not less than 3,000 and possibly as many as 5,000 nuclear weapons against the United States even though we strike first.

What will we gain by adding the MX system? Because of the postulated improvement in accuracy (300 feet for the MX versus 600 feet for the Minuteman III) it has been calculated that a 200 missile MX force will have more than 5 times the destructive potential of our present Minuteman force. This ratio is then used to calculate that the planned MX system could destroy 92 percent of existing Soviet ICBMs. This startling calculation of projected damage is flawed because it measures the theoretical effectiveness of a future weapon system against an existing target system. It is unwise, even fatuous, to assume that the Soviets will allow us 8 to 10 years to develop and deploy an MX system without themselves responding to counter the new threat. Possible Soviet responses include resumption of work on the mobile SS-16 ICBM system, a multiple shelter program, additional silo hardening and an advanced ABM system. When we finally field the MX system we will be fortunate to find that we have even held our own in terms of the ability to destroy Soviet ICBMs. Following our lead, the Soviets' increasing use of MIRV warheads in their ICBMs and SLBMs suggests that even if we can "kill" the same number of Soviet missiles in 1990, the

number of Soviet surviving weapons will actually be greater. Clearly there is no way to calculate the precise number of Soviet weapons which would remain to attack the United States but it is reasonable to assume that the number would not be less than the same three to five thousand which would survive a Minuteman attack today.

What then is wrong with using the MX program as a means of maintaining a first strike capability to destroy perhaps 50 percent of the Soviet ICBM force? There are a number of reasons why it would be wrong, the most important of which is that no first strike by the U.S. or the Soviets can prevent the other side from mounting a massive retaliatory nuclear attack against the aggressor. The Soviets already have more than 7,000 nuclear weapons in their strategic long-range land, sea and air forces. On the average, each one of these weapons has about 60 times the power of the Hiroshima and Nagasaki bombs. It is estimated that they will have nearly 9,000 strategic weapons by 1985. As we have seen, even if we were to execute a completely successful preemptive attack we would still expect three to five thousand weapons to survive for delivery on targets in the United States. Repeated studies reveal that such an attack would result in more than 100 million casualties in the United States. This fact alone suggests that no President would authorize a first strike when such action would insure the destruction of this nation. Why build a first strike system if you are unwilling to commit national suicide?

Another good reason for not creating a mobile land-based first strike system is that the Soviets may not consider it invulnerable no matter what U.S. proponents claim! If they reach this conclusion, they may be expected to develop a counter system employing

The Unloved MX

"The Air Force wishes deep down the MX would go away, just as the Navy wishes Trident would. Babysitting a motionless tube in a hole in the ground or in the confines of a submerged submarine at sea for months at a time has little career appeal. It is a factor in the retention problem that both services have."

William H. Gregory

Editor-in-Chief

Aviation Week and Space Technology

July 27, 1981

thousands of weapons to blanket the target area. MX advocates argue that such a counter system is beyond Soviet capabilities, ignoring the fact that the Soviets have always met every U.S. nuclear challenge sooner and more effectively than we anticipated. In fact, the Soviets led the U.S. into the ICBM era and it is unwise to underestimate their future capabilities in the art.

Given the fact discussed above that an expanded U.S. first strike capability will greatly increase the risk of a Soviet preemptive first strike, plus the strong probability that the Soviets will match (or exceed) our nuclear expansion, it is clear that deployment of the MX will increase both the possibility of a nuclear attack on the

Air Mobile MX?

"The air-mobile plan has been carefully studied and virtually discarded by the House and Senate Armed Services Committees as too unreliable, too costly, and of questionable survivability."

Senator John Tower

Chairman, Senate Armed Services Committee

August 1, 1981

United States and the level of damage if it occurs. There can be little merit in any initiative which serves to raise both the threat of nuclear war and the level of destruction if war ensues.

Can We Afford MX?

It is common practice to argue that we must build a new weapon because it is technically feasible to do so and it will "strengthen our defense." There is much of this spirit about the MX system. We can now build this magnificent new missile which will drop one-third of a megaton in a peach basket so forget the cost! The fact is that our military budget is already \$80 Billion higher in 1982 than it was in 1980. The \$3 Billion for MX generates only a small part of the increase in 1982 but it is also only the tip of an iceberg which will grow — and grow — and grow. Sound national defense involves far more than powerful military forces. Measures to strengthen our economy, increase energy supplies and improve public education are examples of non-military programs which enhance financial, industrial and social elements of a sound national defense program. When we assess expensive proposals such as the MX we must be highly critical of the cost in terms of the loss of other programs which may actually contribute far more to our national strength and the well-being of our people.

There are additional reasons why the MX system should not be built and deployed in accordance with present plans. A number of these reasons are less significant individually than the critical conceptual objections already discussed. Collectively, though, they do add weight to the arguments against deploying the MX in multiple protective shelters in Nevada and Utah.

The foremost objection to any widely dispersed MX deployment in our western desert is that if the Soviets elect to attack on the massive scale necessary to inflict significant damage on the MX system, the inevitable

radioactive fallout will wreak havoc across the United States east of the missile sites. Depending on the exact size of the attack and the existing wind pattern during the post-attack period, it is probable that casualties in the first week would be in the 25 to 50 million range. Ultimately, as many as 100 million people could require medical attention and many millions would require relocation from highly radioactive areas. Large food growing areas would be contaminated for years. Energy producing regions (coal and oil) would be particularly hard hit, perhaps even totally abandoned. It is not inconceivable that social order and the economic process might collapse entirely from Nevada to the Mississippi River with unpredictable consequences throughout the rest of the United States.

In short, by making a major nuclear target out of the western United States we will create a situation in which even a purely anti-ICBM strike will directly threaten the lives of half of our population and jeopardize social and economic order throughout the nation. Placing the prime target for Soviet attack where the consequences of an attack must be borne by the entire nation cannot reflect sound military judgment or even good common sense.

Why Air-Mobile MX Won't Work

"We looked also at air mobile systems, putting the missiles in airplanes and launching them from the airplanes That turns out to be a very expensive approach. It also turns out to have a peculiar vulnerability That is, without knowing the location of the airplanes, the Soviets, with several thousand re-entry vehicles which is what we are considering as the threat could, in effect, barrage-attack the air space over the central U.S. With a few thousand warheads they could, in effect, destroy every airplane in about half a million square miles. That reason alone renders the air mobile systems highly vulnerable."

William J. Perry
Then-Under Secretary of Defense for
Research and Engineering
March 25, 1980

Another factor which has not been addressed previously is the manpower intensive nature of a multiple protective shelter deployment of the MX missiles. Present Air Force estimates call for 13,000 military and civilian employees on site to operate, maintain and protect the MX system at a cost of \$250 million a year. This equates to 65 people per missile, more than 8 times the number of people required to operate, maintain and protect each missile in a submarine. Adding base support figures and allowing for the U.S. Navy's Blue and Gold crew factor, it is still apparent that the multiple

protective shelter system will require 2 to 3 times the manpower of a comparable sea-based system. Even the 13,000 figure is probably optimistic because it reflects an Air Force security plan based on a massive sensor system supplemented by mobile patrols and helicopter borne quick reaction teams. While this approach will require several thousand guards plus millions of dollars to install, operate and maintain the sensor system, the level of security which can be achieved with this approach is questionable. The same basic approach was not notably successful in Vietnam. Rigorous testing by Special Forces teams will undoubtedly reveal that additional personnel would be required to prevent penetration of the widespread MX shelter area by trained terrorists or saboteurs.

Dangerous Nuclear War Fighting Ideas

"MX is the weapon system of a country which . . . has decided to prepare intelligently for actual combat."

Colin Gray
Hudson Institute
Defense Department Consultant
1980

"An important characteristic to have is to be able to hit a hard target [such as a Soviet missile silo] and do it with a degree of accuracy If you have developed the ability to take out their missiles, you have achieved a degree of deterrence."

Caspar Weinberger
Secretary of Defense
July 28, 1981

Even if MX security requirements are affordable in dollars, will the people be available in an all volunteer force? Given growing manpower requirements throughout all of the armed services because of expanding military programs, thousands more for the MX is not an insignificant number and it is only part of the problem. Obviously, training, command, control, and communications support and headquarters staffs will also generate additional MX manpower requirements. Has adequate consideration been given to the nation's ability to meet these needs?

In summary, there is no convincing argument that national defense will be enhanced by the proposed MX missile system. To the contrary, there are credible arguments that adding these 2,000 nuclear weapons to our strategic forces may actually increase the risk of nuclear war and certainly will increase the level of damage on both sides if war ensues. The proposed MX system is dangerous, costly and manpower intensive. We don't need it, we may not be able to afford it, and we should not build it.

ICBM BASING OPTIONS: Defense Department Survey†

LAUNCH UNDER ATTACK (LUA)

Positive Features:

- Low Cost
 - Near term
 - Public interface*
 - Environmental impact*
 - Cost*
- * = no change from present operations

Negative Features:

- Vulnerable to attacks on warning and C³ systems
- Requires warning
- No endurance
- Extremely short decision time
- Catastrophic false alarm problem



Description:

- Launch Minuteman force when early warning systems assess attack in progress



Description:

- New booster in Minuteman silos
- On warning, launch weapons into orbit
- On command, deorbit to attack or recover

ORBITAL BASED

Positive Features:

- Low cost

Negative Features:

- Vulnerable to attack in orbit
- Requires warning
- Accuracy insufficient for hard targets
- False alarm means loss of capability
- Orbital weapons violate space treaty

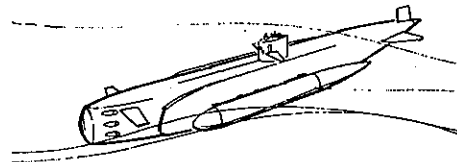
SHALLOW UNDERWATER MISSILE (SUM)

Positive Features:

- Minimal public interface
- Minimal environmental impact

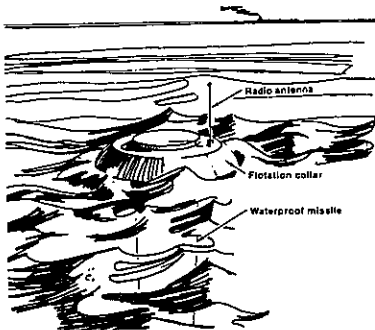
Negative Features:

- Same survivability mode as Trident but probably inferior
- Advanced technology subsystems
- Early 90's for earliest IOC (with new submarines)



Description:

- Fasten two or more M-X encapsulated missiles to submarines that patrol off U.S. coast



Description:

- Scatter missiles in the ocean on strategic warning from ships or submarines
- Water-proof missiles float unattended until commanded to launch, or recovered

Positive Features:

- Minimal environmental impact

Negative Features:

- Localization/destruction of missiles by trailing ships or airplanes
- Strategic warning required
- Capture of unmanned missiles
- False alarms, recovery, operating environment problems

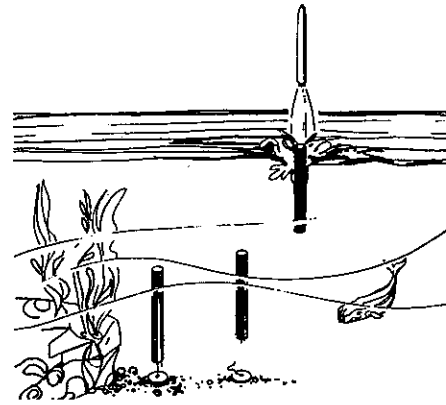
HYDRA

†From Defense Department document. CDI does not necessarily endorse claimed positive and negative features.

ORCA

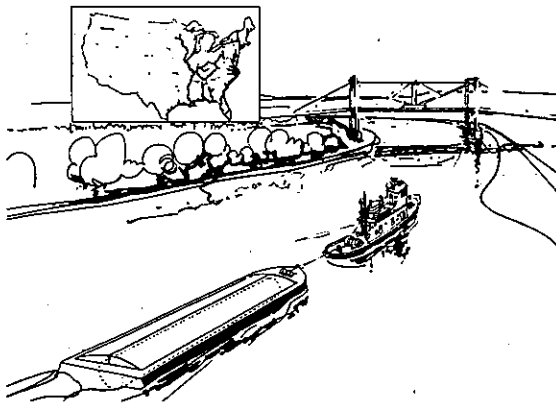
- Positive Features:*
- Long endurance
 - Minimal public interface
 - Minimal environmental impact
 - Low cost

- Negative Features:*
- Can't check status without revealing location
 - Violates seabed treaties



Description:

- Anchor encapsulated missiles to offshore sea bed



SHIP—INLAND

Description:

- Carry canisterized missiles on barges that move continuously along inland and coastal waterways

- Positive Features:*
- Low environmental impact

- Negative Features:*
- Available waterway length insufficient to withstand expanded attack
 - Interference with commercial traffic

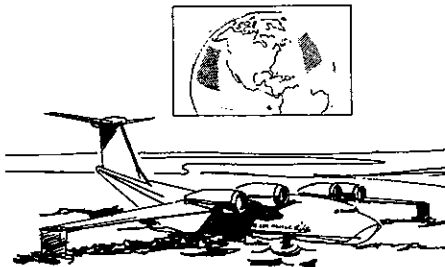
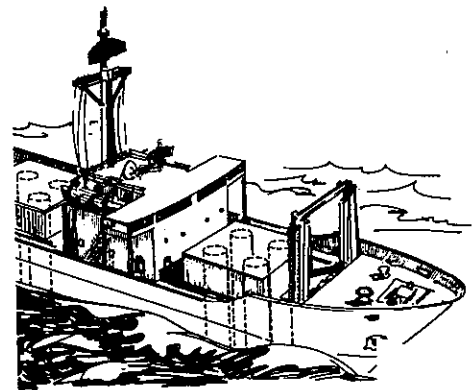
SHIP—OCEAN

Description:

- Carry missiles on special vessels moving randomly on oceans

- Positive Features:*
- Minimal public interface
 - Minimal environmental impact

- Negative Features:*
- Trailing ships or aircraft can localize and destroy
 - Accuracy insufficient for hard targets



Description:

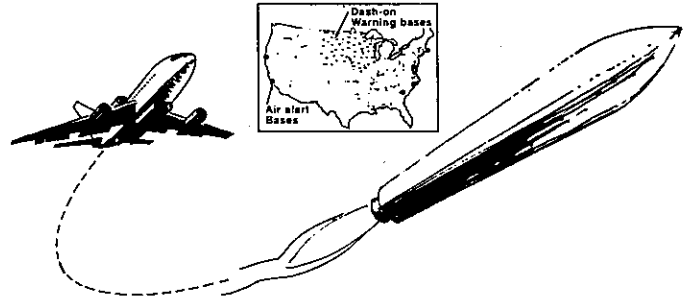
- Large amphibian aircraft carries ICBMs
- Plane flies over ocean, landing randomly for extended periods of time

SEA SITTER

- Positive Features:*
- Minimal public interface
 - Minimal environmental impact

- Negative Features:*
- Trailing of airplanes, followed by attack while sitting
 - Low endurance
 - Weather problems, particularly with high seas
 - High cost
 - Accuracy poor

WIDE BODY JET (W.B.J.)

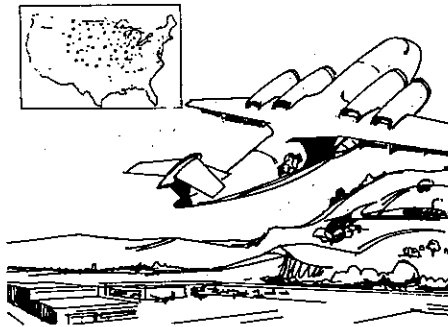


Positive Features: • None

Negative Features: • Requires warning
• Endurance limited to hours
• High cost, particularly for airborne alert

Description:

- Launch missiles from C-5 or 747 class aircraft
- Aircraft operate on ground alert like bombers
- Option for continuous airborne operations



Description:

- Launch missiles from STOL type aircraft
- Can access numerous landing sites with STOL capability
- Aircraft operate on ground alert like bombers

Positive Features: • None

Negative Features: • Requires warning
• Attack on secondary dispersal sites limits endurance
• High cost, particularly for airborne alert

SHORT TAKEOFF AND LANDING (STOL)

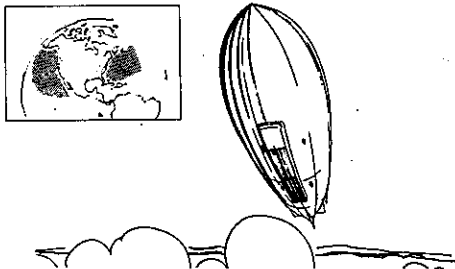
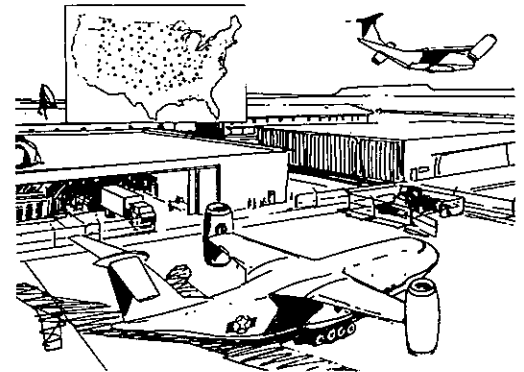
VERTICAL TAKEOFF AND LANDING (VTOL)

Description:

- Launch small missile (single R/V) from VTOL aircraft
- Aircraft operate on ground alert from numerous sites and have a "land anywhere" capability

Positive Features: • None

Negative Features: • Requires warning
• Very high cost
• 90's for earliest IOC
• Violates interim SALT II



DIRIGIBLE

Positive Features: • Minimal environmental impact

Negative Features: • Easy to track and attack
• Nuclear safety precludes operations over CONUS
• Weather limits operations

Description:

- Carry ICBMs on fleet of dirigibles operating in a continuous airborne mode over oceans
- Launch missile from dirigible

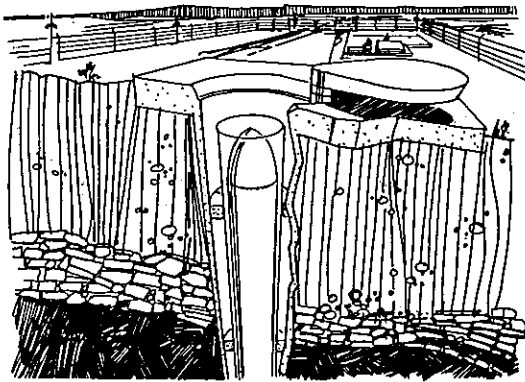
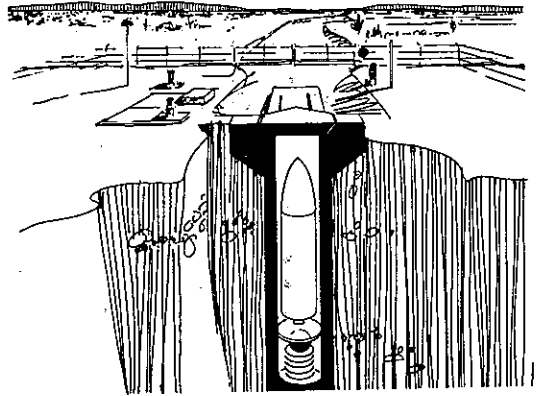
MIDGETMAN

Description:

- Build several thousand small, hardened silos and fill each with a small ICBM

- Positive Features:*
- Maintains essential features of ICBMs
 - Long endurance

- Negative Features:*
- Excessively costly
 - Violates interim SALT II



HARD ROCK SILO

Description:

- Build silos in granite outcroppings in western U.S.
- Design goal is to achieve highest possible hardness with surface-flush silo launchers

- Positive Features:*
- Distinct survivability mode
 - Long endurance

- Negative Features:*
- Defeated by evolutionary accuracy improvements

HARD TUNNEL

Description:

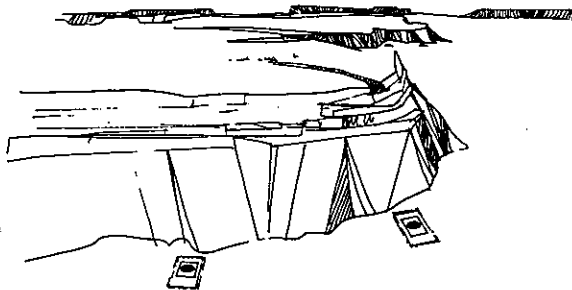
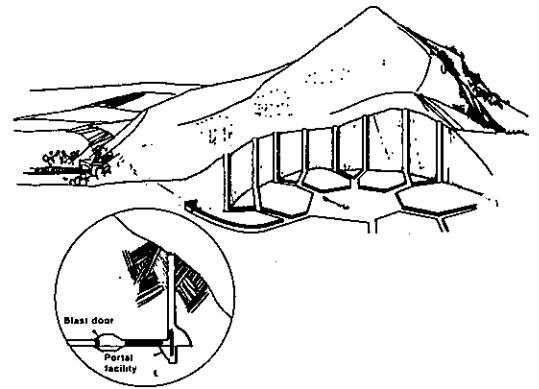
- Store missiles in very deep, superhard tunnels which can withstand direct hits
- Automatic digout and launch on command

Positive Features:

- Distinct survivability mode
- Long endurance
- Minimal public interface
- Good security
- Minimal environmental impact

Negative Features:

- Slow reaction after attack
- Technical risk of self-contained digout machines
- Hardness verification impossible



SOUTH SIDE BASING

- Positive Features:*
- Distinct survivability mode
 - Long endurance
 - Low cost

- Negative Features:*
- Vulnerable to responsive threats (low β R/Vs, SLBMs, MaRVs)
 - Limited suitable deployment area
 - Environmental impact, since sites in national parks

Description:

- Base missiles in horizontal shelters or vertical silos at the foot of south-facing mesa or mountain cliff
- Mountain/mesa shields missile from Soviet ICBM attack arriving from north

SANDY SILO

Description:

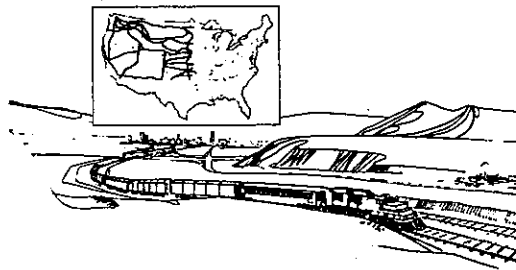
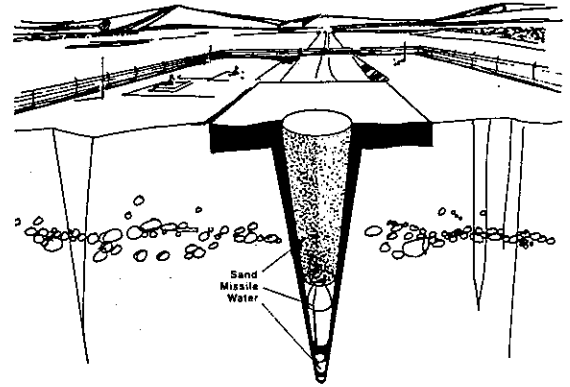
- Bury encapsulated missile in ~2000-foot-deep hole and cover with sand
- Designed to survive direct hit
- On command, pressurized water fluidizes sand and capsule floats to surface for launch

Positive Features:

- Distinct survivability mode
- Long endurance
- Minimal public interface
- Excellent security
- Low cost

Negative Features:

- Missile difficult to retrieve for maintenance
- Feasibility of egress after a nuclear attack (untestable)



Description:

- Special trains move ICBMs over existing commercial railroads
- Trains move randomly and park to launch

COMMERCIAL RAIL

Positive Features:

- Independent survivability mode
- Long endurance possible

Negative Features:

- Enemy might trail trains
- Public interface problems of nuclear weapons on commercial railroads
- Poor security

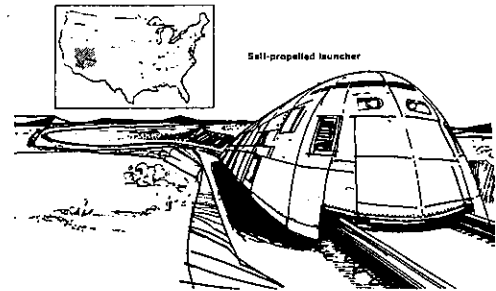
DEDICATED RAIL

Positive Features:

- Independent survivability mode
- Long endurance possible

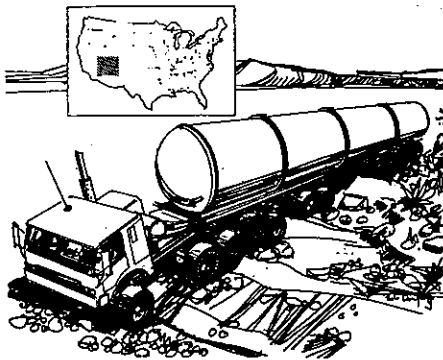
Negative Features:

- Trains could be trailed by remote sensors
- Large public exclusion area (~90,000 square miles)
- High cost



Description:

- Build new automated railway for nuclear hardened trains carrying missiles
- Trains move randomly and launch on command



Description:

- Scatter fleet of off-road mobile transporter/launchers over large uninhabited areas of southwest U.S.

Positive Features:

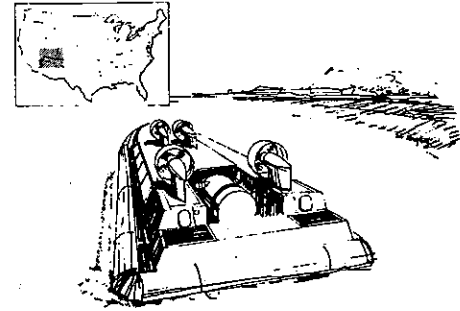
- Independent survivability mode
- Long endurance possible

Negative Features:

- Track and attack transporter locations
- Large public exclusion area
- Severe defacing of terrain

OFF-ROAD MOBILE

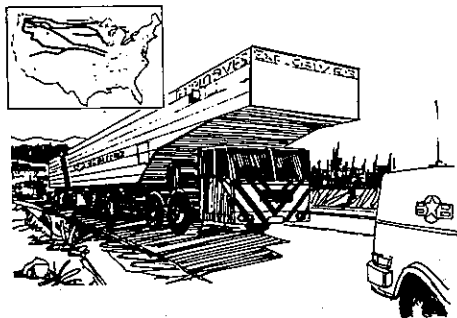
GROUND EFFECT MACHINE (GEM)



- Positive Features:*
- Long endurance possible
- Negative Features:*
- Track and attack transporter locations
 - Requires warning
 - Operational feasibility (gullies and other obstacles)
 - Severe dust erosion

Description:

- Scatter fleet of GEM transporter/launchers over large uninhabited areas of southwest U.S.



ROAD MOBILE (MINUTEMAN)

- Positive Features:*
- Long endurance possible
 - Low cost
 - Near term capability
- Negative Features:*
- Track and attack transporter locations
 - Takes too long to move vehicles on warning (hours)
 - Requires warning
 - Questionable feasibility due to jammed roads

Description:

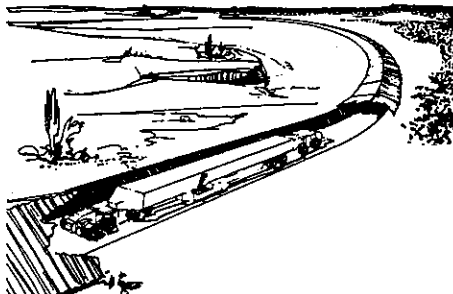
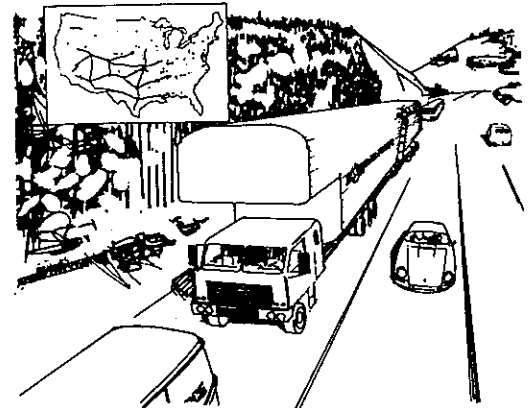
- Use existing Minuteman on road mobile transporter/launchers
- Base at existing Minuteman bases

ROAD MOBILE (NEW MISSILE)

Description:

- Parked on military bases, new ICBMs on transporter/launchers wait for attack warning
- On command, transporter convoys move out over interstate highways and secondary roads

- Positive Features:*
- Long endurance possible
- Negative Features:*
- Track and attack transporter locations
 - Low survivability without hours of warning time
 - Requires warning
 - Questionable feasibility due to jammed roads



COVERED TRENCH

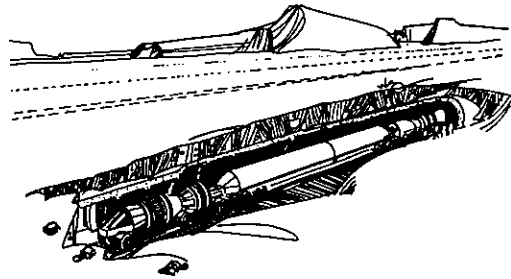
- Positive Features:*
- Independent survivability mode
 - Long endurance
 - Automated operation
- Negative Features:*
- Removal of cover plus vehicle immobilization by light precursor attack
 - Implanted sensors could localize missiles (decoys not feasible)
 - Large public exclusion area

Description:

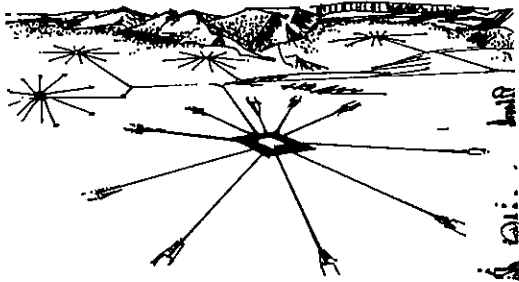
- Unmanned transporter/launcher travels randomly in a trench that is covered with a concealing fabric

HYBRID TRENCH

- Positive Features:*
- Independent survivability mode
 - Excellent security
 - Automated operation
- Negative Features:*
- Implanted sensors could localize missiles (decoys not feasible)
 - Large public exclusion area



- Description:*
- Shallow buried tunnels with M-X missile on unmanned transporter
 - Transporter randomly moves to locations in tunnel that have been selectively hardened



- Description:*
- Missiles on transporters at center of radial road or rail network
 - Dash to hardened horizontal shelters on warning

DASH TO SHELTER

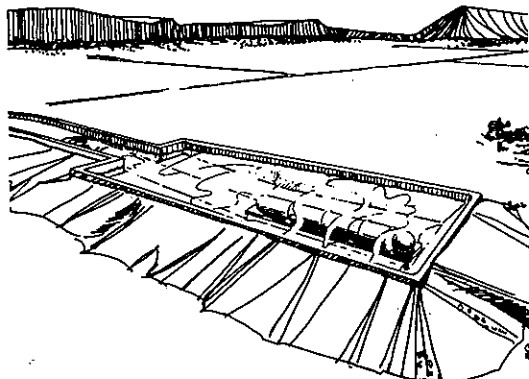
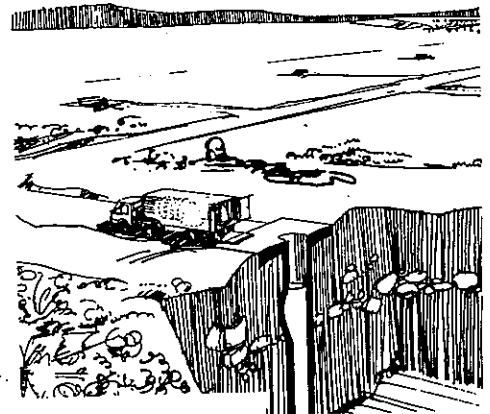
- Positive Features:*
- Long endurance
- Negative Features:*
- Observation of transporter during transit
 - Requires warning
 - High speed movement of heavy transporter

MOBILE FRONT END

- Description:*
- Build thousands of silos with a missile booster in each
 - Randomly mate a lesser number of expensive front ends (reentry vehicles, guidance system) to missiles
 - Conceal location of complete missile

- Positive Features:*
- Independent survivability mode
 - Long endurance

- Negative Features:*
- Cost much higher than comparable M-X/MPS
 - Probably inconsistent with interim SALT II



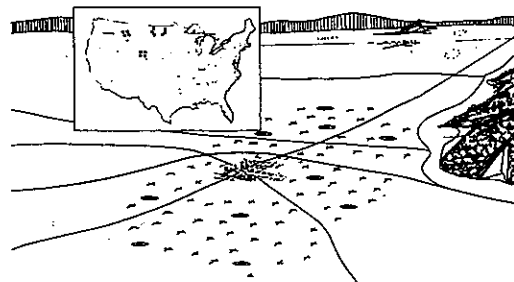
POOL

- Description:*
- Shelters are pools of opaque water
 - Transporter deposits water-tight encapsulated missile in pools
 - Operational concept similar to M-X/MPS

- Positive Features:*
- Independent survivability mode
 - Long endurance

- Negative Features:*
- Environmental impact (large water usage)

MINUTEMAN/MPS

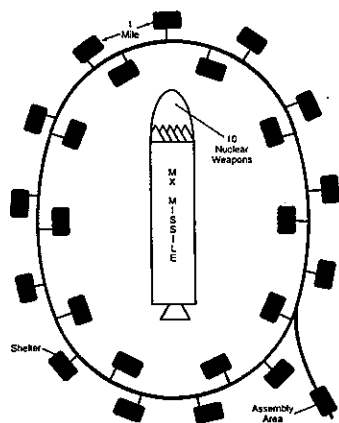


- Positive Features:**
- Independent survivability mode
 - Long endurance

- Negative Features:**
- None

Description:

- Construct additional vertical silos in existing Minuteman silo fields
- Use Minuteman or new missile that is randomly shuffled between silos



- MX Data:**
- 200 MX missiles (one per site)
 - 2000 separate nuclear weapons
 - 4600 missile shelters (23 per site)
 - 192,000 lbs. each missile
 - 1,600,000 lbs. transporter, launcher, missile
 - 200 sites proposed in Utah and Nevada

- Minuteman Data:**
- 1000 Minuteman missiles in 1000 silos
 - 2100 separate nuclear weapons
 - 78,000 lbs. each missile

- Alternatives under consideration:**
- 100 MX missiles in 1000 shelters in Nevada
 - Anti-ballistic missile system
 - Common missile, similar to Trident II

**NO. 30 —
MX
OPTION
RECOMMENDED
BY
AIR
FORCE**

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