MODERNIZING U.S. STRATEGIC OFFENSIVE FORCES:

THE ADMINISTRATION'S PROGRAM AND ALTERNATIVES

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Congressional Budget Office

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NOTES

Unless otherwise indicated, all years referred to in this report are fiscal years. Likewise, unless otherwise noted, all dollar amounts are expressed in constant fiscal year 1984 budget authority dollars.

PREFACE

Over the next several months, the Congress will be debating the Administration's plan for upgrading U.S. strategic forces, particularly land-based missiles. At the request of the House Budget Committee, the Congressional Budget Office (CBO) has studied the Administration's strategic plan and alternatives to it. By many commonly used measures, the Administration's strategic plan will result in a substantial buildup of U.S. strategic forces. It also represents a decision to maintain a triad of forces each able to survive a Soviet first strike, thereby retaining the insurance inherent in such a combination of forces.

The scope and cost of the Administration's strategic buildup have prompted debate over alternative approaches. This study outlines three alternatives. One would forgo deployment of the 100 MX missiles in existing silos. Another would forgo deployment of the MX and development of a follow-on land-based missile; instead, it would expand the number of Trident submarines to replace the warheads lost by not deploying more land-based missiles. The study also discusses an alternative that would rely on upgrades of existing B-52 bombers and more air-launched cruise missiles instead of continued procurement of the B-1B bomber. In accordance with CBO's mandate to provide objective and impartial analysis, this study makes no recommendations.

A summary of this study was published separately. It is reproduced here with no changes.

Lawrence J. Cavaiola and Bonita J. Dombey of CBO's National Security and International Affairs Division prepared the study under the general supervision of Robert F. Hale and John J. Hamre. Bill Myers of CBO's Budget Analysis Division provided detailed cost analysis. Rich Davison, formerly of CBO, participated in earlier stages of the analysis. Valuable assistance was also provided by Julie Carr, Roberta Drews, T. Keith Glennan III, Stephanie Martin, and Greg Schulte. Thomas A. Brown of the Rand Corporation provided helpful comments. (The assistance of external reviewers implies no responsibility for the final product, which rests solely with CBO.) Robert L. Faherty and Francis Pierce edited the manuscript, assisted by Nancy H. Brooks.

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SUMMARY

In October 1981, the Administration announced its plan to modernize all parts of the U.S. strategic deterrent. Representing the most comprehensive and far-reaching such effort in the past 20 years, the plan would expand and upgrade the triad of strategic "offensive" forces: land-based and sea-based intercontinental ballistic missiles plus long-range bombers. It would also improve the triad's communications and control systems, and strengthen U.S. defenses against attack by Soviet bombers.

U.S. strategic forces are primarily intended to deter the Soviet Union from initiating a nuclear war. To do so, they must be able to survive a Soviet nuclear strike and retaliate in an appropriate and timely manner. In recent years, the Soviets have expanded and improved their strategic forces. The Administration apparently believes that in response the United States must increase not only the numbers of its forces and their chance of surviving a Soviet strike, but also their destructive capability, endurance, and responsiveness. The broad scope of the buildup--and the relative share of the nation's resources to be devoted to defense in general--has sparked debate, as has the high cost of individual weapons systems. Most recently, debate has centered on the Administration's proposal to deploy the MX missile.

This study assesses the scope and costs of the Administration's planned modernization, taking into consideration the effects that arms control agreements could have on it. The study also considers proposals to modify the Administration's program by (1) dropping the MX missile, (2) focusing modernization efforts on submarine-based missiles rather than land-based missiles, or (3) terminating the B-1B bomber program in favor of improving existing bomber capability.

THE ADMINISTRATION'S MODERNIZATION PLAN

Scope of the Effort

The Administration's plan would involve all three of the triad forces. While not all of the details are available on an unclassified basis, this study assumes that modernization would include the following programs:

- Deployment by 1988 of 100 MX intercontinental ballistic missiles (ICBMs) in silos formerly housing Minuteman missiles;

- Deployment in the early 1990s of a new, single-warhead, small ICBM (SICBM) in one or more basing modes;

- Deployment by the late 1980s of 100 B-1B bombers and in the early 1990s of 132 Advanced Technology--or "stealth"--bombers;

- Deployment by the early 1990s of about 3,200 air-launched cruise missiles, initially on refitted B-52 bombers and eventually on both B-52 and B-1B bombers;

- Continued procurement through 1993 of Trident submarines at the current rate of one per year to a total of 20, and deployment on most Trident submarines by 1996 of the new, larger Trident II (or D-5) missile currently being developed;

- Deployment by 1988 of about 400 nuclear-armed, sea-launched cruise missiles on some attack submarines and surface ships.

Costs of the Plan

The Congressional Budget Office (CBO) estimates that it would cost approximately $50 billion a year in budget authority--or a total of about $250 billion over fiscal years 1984-1988--to build, modify, and operate all of the strategic forces and their associated elements. The estimates include both direct costs and indirect costs, such as personnel support. (These approximations are based on estimates made last year, since details of direct and indirect costs beyond 1984 are not available for the Administration's latest five-year defense plan. The costs should, however, provide a rough guide to likely totals under the latest program.)

Within this total, investment costs of strategic offensive forces would reflect the timing and production of key systems: the MX missile and B-1B bomber in the mid-1980s; the Advanced Technology bomber, Trident II missile, and SICBM in later years. Operating costs would increase during the late 1980s and early 1990s as new forces were added and only a few older systems were retired. Later, when many currently deployed systems are retired, operating costs would decrease.

A Major Expansion

The Administration's modernization plan would represent a quantitative and qualitative buildup of U.S. strategic forces. It would mean not only an increase in the numbers of nuclear warheads that could be delivered in the event of a Soviet attack, but also a response to changes in

Soviet strategic forces and doctrines and a decision to maintain the U.S. strategic nuclear triad.

The Buildup in Quantitative Terms. The quantitative effects of the Administration's proposed buildup on capabilities can be assessed using two measures common to strategic analysis:

- Total number of warheads, a measure that serves as a rough guide to the number of targets that can be attacked; and
- Number of "hard-target" warheads that can destroy targets hardened against nuclear effects, such as missile silos and command bunkers.

The Administration's plan would result in a substantial increase in U.S. strategic capabilities, relative to current levels. The size of the increase depends on the scenario assumed for a nuclear war. In one plausible scenario, the Soviets mount a major nuclear attack on U.S. weapons, but the attack comes after a period of warning long enough so that almost all U.S. forces are poised to retaliate. In these circumstances, the Administration's plan would increase the numbers of surviving U.S. warheads available for retaliation by 65 percent, from 6,000 in 1983 to 9,900 in 1990 (see Summary Figure 1). By 1996, the number of available surviving warheads would fall back to 9,300 as some older submarines and bombers were retired. (These results assume that the follow-on SICBM land-based missile supplied 600 surviving warheads--approximately the midpoint of survivability estimates attributed last fall to the Air Force for MX missiles deployed in the closely spaced basing mode.)

The increase in capabilities would be more dramatic if measured by the numbers of available surviving warheads that could destroy hardened targets. That number would rise from 1,400 in 1983 to 3,900 by 1990 (an increase of more than 175 percent) and to 6,700 by 1996 (an increase of more than 375 percent).

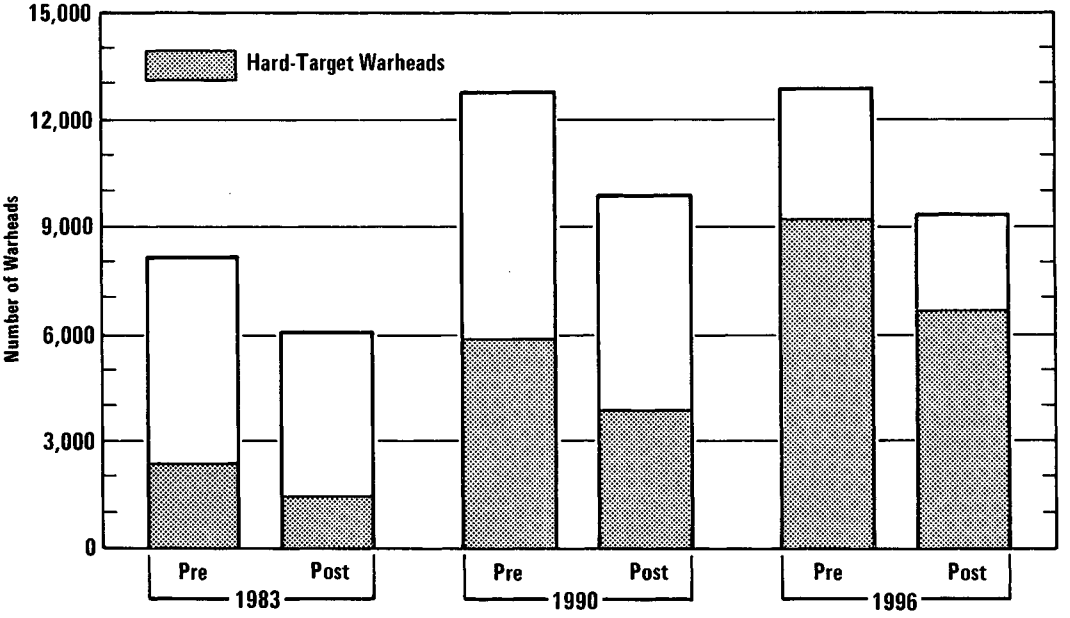
The subset of these surviving hard-target warheads that are considered "prompt" would grow even more substantially. Prompt warheads are those that can be launched and delivered to a target in a relatively short period of time, possibly destroying Soviet military forces before they launch another strike.

If the Soviets were to attack with no warning at all, the Administration's plan would still result in a buildup over today's levels. The measures of effectiveness would, however, be roughly 60 percent of those in an attack with warning, because fewer forces would be poised to escape

Summary Figure 1.

Administration's Strategic Force Buildup, 1983-1996

(Pre- and Post-Attack, With Warning)



SOURCE: Congressional Budget Office.

the Soviet attack. Although such a scenario must be considered in planning, many believe that a "bolt-out-of-the-blue" attack is less plausible than one occurring after a period of tension, nonnuclear war, or other warning.

Finally, the Administration's plan would increase the total counts of warheads available before any attack from 8,800 today to about 14,000 in 1990 and 1996. These simple counts of pre-attack warheads are not the best measure of strategic capability, though they are useful for comparative purposes.

The Buildup in Perspective. The scope of the Administration buildup must be judged in the perspective of changing Soviet forces and in terms of what might be needed to deter the Soviets from initiating a nuclear war. Since the early 1960s, the Soviets have been engaged in a consistent expansion of their strategic offensive and defensive forces. Land-based ICBMs have been the centerpiece of this modernization, but the Soviets have also deployed a substantial sea-based force and are modernizing their

strategic bomber force. Within the past ten years or so, they have more than quadrupled the number of nuclear warheads in their strategic offensive forces, to a present level of about 9,000 strategic warheads. By the mid-1990s, in the absence of arms control limits, regular replacements and additional force expansion could result in another doubling of this inventory.

Over the same period, U.S. defense planners have modified their view of the forces and strategies needed to deter the Soviets. In the early 1950s, plans called for striking urban areas. Under the mutual assured destruction (MAD) philosophy of the 1960s and 1970s, deterrence rested on the threat of inflicting "unacceptable damage" on the Soviet Union if it attacked. Current strategic doctrine holds that deterrence requires that the United States not only have the capability to wage an all-out attack, but also the means to engage in a nuclear war that could involve a series of limited attacks. Not everyone agrees with this view, however. Some, for example, would prefer simpler, more direct approaches such as retaining an assured capability to destroy a large number of Soviet cities and industrial facilities. By this last metric, both superpowers have many times the needed numbers of nuclear warheads.

This study does not attempt to measure the deterrent capability of the Administration's program or alternatives to it. Instead, it concentrates on quantifying the changes in U.S. strategic weapons inventories that would be brought about by these approaches and on explaining their qualitative effects.

Important Qualitative Aspects of the Administration's Plan. The Administration's plan has some aspects that cannot be readily quantified. Most important, it seeks to maintain a triad of strategic nuclear forces, each able to survive a Soviet first strike. A survivable triad serves as a hedge against a technological breakthrough that might neutralize any one element; it also complicates Soviet planning for both attack and defense; and it requires the Soviets to spread their research and development efforts against three different types of systems. Moreover, in a nuclear war the triad of forces would act in concert; for example, an attack on U.S. land-based missiles could provide several minutes of warning that would enable the bomber force to respond. The Administration also argues that maintenance of the traditional force configuration is essential to the U.S. bargaining position in arms control negotiations.

The modernization of all three triad elements over a number of years would also provide open production lines for the manufacture of additional systems should the threat increase. Finally, modernization would decrease the average age of U.S. forces and equipment, presumably improving their

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reliability and maintainability. In 1990, for example, 60 percent of bomber weapons would be carried by aircraft less than 15 years old, compared with only 10 percent today.

HOW THE ADMINISTRATION'S PLAN WOULD BE AFFECTED BY ARMS CONTROL

Arms control agreements could be expected to modify the Administration's modernization program, but not to a great extent. The Administration's proposals in the Strategic Arms Reduction Talks (START) would limit both the United States and the Soviet Union to 5,000 ballistic missile warheads--half of which at most could be on land-based missiles--and 850 ballistic missiles.

It might be necessary to change the ballistic missile limit to accommodate the follow-on land-based missile (SICBM), especially if it has only one warhead. This could be done by raising the limit to more than 850 missiles, changing to a new type of limit, or relying solely on the warhead limits.

With this exception, the Administration's modernization program could be completed under START, so long as enough older systems were retired first. Because of the high priority accorded strategic modernization, the Administration might choose to implement a START agreement by retiring older systems, though it has not publicly said so. This might mean 15 to 20 percent fewer surviving warheads, but would not greatly affect the numbers of surviving hard-target warheads because these are primarily on new systems. Investment costs would not be much reduced. Operating costs would decrease as older systems were retired, but there would probably be added costs to dismantle these systems. On balance, costs would be lower by about $16 billion through the year 2000--a few percent of total strategic costs in this period.

Continued adherence to the numerical limits of the Strategic Arms Limitation Talks (SALT) would have less effect on the modernization program than would START. For example, relative to the Administration's program unconstrained by SALT, counts of surviving warheads after a Soviet first strike would be 6 percent less under the SALT limits in 1990, and there would be almost no difference by 1996.

ALTERNATIVES TO THE ADMINISTRATION'S PLAN

The scope and high cost of the modernization program has led to some alternative proposals. The Congress could terminate the MX missile.

It could make an even more far-reaching decision and discontinue funding for new land-based missiles, emphasizing submarine-based missiles instead. Or it could terminate the B-1B bomber program, in favor of upgrading existing B-52 bombers and expanding the air-launched cruise missile program.

Alternative 1: Adopt the Administration's Plan Without the MX Missile System

As part of its modernization of the land-based missile force, the Administration proposes to substitute 100 MX missiles for currently deployed Minuteman missiles in silos near Cheyenne, Wyoming. The system would probably be fully deployed by 1988. An alternative would be to cancel production and deployment of the MX missile, but provide for research and development--and possible production and deployment--of the small ICBM recommended by the President's Commission on Strategic Forces.

Arguments Favoring the MX. Although the discussion below suggests that few of the 100 MX missiles would be likely to survive a Soviet first strike should the United States choose to ride out the attack, deploying the MX would nonetheless provide some advantages. The calculations of Soviet ability to attack and destroy Minuteman silos are theoretical. In an actual attack, the Soviets could not be certain of destroying all or even most of the MX missiles, and this might contribute to deterrence. They might be further deterred by the consideration that the United States could conceivably launch all of the MX missiles after receiving warning of a Soviet attack but before Soviet missiles reached their ICBM targets. This could occur if the United States launched its ICBMs on warning--which is neither assumed nor precluded by current U.S. policy--or if it launched them after other strategic forces had been attacked.

Deployment of the MX missile, the first new U.S. land-based missile in 13 years, might also facilitate reaching an arms reduction agreement with the Soviets. This, according to the President's Commission on Strategic Forces, would hold down the costs of deploying a survivable land-based missile force using the SICBM. Deploying the MX would facilitate arms reduction by showing determination to keep pace with Soviet deployment in recent years of a whole new generation of land-based missiles, plus continuing Soviet modernization of its ICBM force. The MX would also give the United States the capability to destroy those Soviet targets most hardened against nuclear blast, just as the Soviets can destroy such targets in the United States with their modern, land-based missiles.

In addition, deploying the MX would open a production line for land-based missiles, which would facilitate expansion of the land-based missile force if required by Soviet actions or by problems with other U.S. forces. Finally, proponents of the MX point to the positive attributes of a land-based missile force such as sureness of command and control, accuracy of warheads, high peacetime alert rates, and targeting flexibility.

Small Quantitative Contribution of the MX. Despite these advantages, the MX in Minuteman silos would be no more survivable in the face of Soviet attack than the missiles they replaced. CBO estimates that a major Soviet strike that the United States rides out could destroy all but 10 percent of them in 1990, and all but 5 percent by 1996 as accuracy continues to improve.

This limited survivability, coupled with the major buildup in other U.S. strategic forces, means that deploying the MX would contribute relatively little to U.S. retaliatory capabilities. Specifically, 100 MX in Minuteman silos would contribute:

- 3 percent in 1990, and less than 1 percent in 1996, of all U.S. hard-target warheads that would be expected to survive and be available for retaliation in the nuclear scenario considered most likely--a Soviet first strike occurring after some warning.

- 5 percent in 1990, and 1 percent in 1996, of all hard-target warheads that would be expected to survive a Soviet attack occurring without warning.

By other measures, the contribution of the MX would be larger, though in most cases still modest. In 1990, for example, MX would contribute 11 to 52 percent of all prompt, hard-target capability that would survive a Soviet first strike that occurred after warning of the attack; the total warheads of this type contributed by MX, however, would be fewer than 100. By 1996, as many new submarines and land-based missiles entered the force, the contribution of MX would fall to between 1 percent and 7 percent of the prompt, hard-target capability remaining after a Soviet first strike. The ranges depend on whether or not Trident submarines equipped with the new Trident II missile are counted, and assume that 600 surviving warheads are provided by SICBM. Prompt, hard-target weapons could be most important in deterring, or, should deterrence fail, in fighting a limited nuclear war involving a series of exchanges with the Soviets.

The MX would contribute more substantially if the United States chose not to ride out a Soviet first strike. If the United States launched all land-based missiles, including the MX, before they came under actual

attack, then the contribution of the MX would increase significantly. It would contribute between 17 and 35 percent of available surviving prompt, hard-target weapons in 1996 under this assumption. The range depends again on whether or not Trident II missiles contribute to this measure. U.S. policy neither assumes nor precludes such a launch-on-warning strategy.

Qualitative Arguments Against the MX. Some fear that the MX missile, if deployed in a nonsurvivable basing mode, would be destabilizing in a crisis. According to this view, the Soviets might be tempted to launch first to preclude a U.S. first strike. Moreover, even without the MX, the United States would retain some of the advantages of land-based missiles with the 1,000 remaining Minuteman missiles. In reply to the argument that the MX is needed to keep the Soviets interested in arms control, opponents contend that the rest of the U.S. strategic buildup may be enough to ensure serious negotiations.

Savings from Terminating the MX. Terminating the MX would mean spending no more money on missiles or basing in 1984 and beyond. According to the Air Force, this would yield total savings in 1984-1988 of $17.9 billion in budget authority (see Summary Table 1). This would represent about 7 percent of total strategic costs in this period. Total savings in 1984 and beyond would be $18.4 billion. There would be no significant change in operating costs, because the United States would continue to operate the Minuteman missiles scheduled to be replaced by the MX.

For consistency with recent Administration announcements, this study shows savings relative to the current MX plan. Savings relative to the President's January 1983 Budget would be higher because that budget assumed an earlier, more expensive version of MX. In 1984 and beyond, savings relative to the budget would total $28.6 billion of budget authority.

An Alternative Approach. The Congress could decide to spend some of these savings on improving existing Minuteman missiles. At least the same increase in prompt hard-target capability generated by the MX could be obtained at lower cost by upgrading the present force of Minuteman III missiles. Specifically, by installing the MX guidance system on 550 Minuteman IIIs, and higher-yield warheads on 250 missiles not currently having them, a force of hard-target Minuteman IIIs could, according to the Air Force, be in place by around fiscal year 1993 at a cost of about $14 billion. This would save about $4.4 billion over the Administration's current MX plan.

Nevertheless, the upgrading might not produce a force with as much operational flexibility as the MX system. Neither would it be deployed as