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ARMS CONTROL TODAY

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Reviving The ABM Debate

Albert Carnesale

Debates on strategic weapons never die, they merely fade away and return. The issue which sparked the first public involvement in a strategic weapon decision—defending ballistic missiles—will return in the 1980's, for several reasons: heightened tensions between the U.S. and the Soviet Union, worries about the survivability of our Minuteman missiles, and the 1982 review of those provisions of SALT I which severely limited the ABM. Dr. Carnesale explores the key issues which are likely to dominate this renewed debate.

The 1972 Treaty on the Limitation of Anti-Ballistic Missile Systems was perceived widely as the obituary for America's domestic debate over whether to deploy an ABM system. In light of the stringency of the Treaty limitations on the development, testing, and deployment of ABM systems, termination of the debate was an understandable expectation.

The ABM Treaty

Embodied as the basic principle of the ABM Treaty is the undertaking by the Soviet Union and by the United States "not to deploy ABM systems for the defense of the territory of its country and not to provide a base for such a defense." An ABM system is defined as "a system to counter strategic ballistic missiles or their elements in flight trajectory, currently consisting of . . . ABM interceptor missiles, . . . ABM launchers, . . . and . . . ABM radars."

Under the treaty (as modified by a 1974 protocol), each side is permitted one geographically, quantitatively, and qualitatively constrained ABM deployment—either at its national capital or at an ICBM deployment area. Technological innovation is inhibited by provisions banning the development, testing, and deployment of "ABM systems or components which are sea-based, air-based, space-based, or mobile land-based" and of "ABM interceptor missiles for the delivery by each interceptor missile of more than one independently guided warhead." Moreover, the agreement provides that if exotic new "ABM systems based on other physical principles and including components capable of substituting for ABM interceptor missiles, ABM launchers, or ABM radars are created in the future," their deployment would be prohibited unless specific limitations were agreed upon through consultation and amendment of the treaty.

The ABM Treaty is of unlimited duration. The two sides are to review the agreement at five-year intervals, but the treaty remains in force unless one or both of the parties takes

positive action to terminate it. (Either party may withdraw upon six months notice "if it decides that extraordinary events related to the subject matter of this Treaty have jeopardized its supreme interests.")

The World Has Changed

The world has not remained as it was when the Treaty was ratified on October 3, 1972. While the vital signs of the ABM debate have been obscured for almost a decade, it appears that the patient is about to be revived (either by resuscitation or by resurrection). Even the jargon has been transformed: the term anti-ballistic missile (ABM) system is now less fashionable than ballistic missile defense (BMD), though the two are used interchangeably to describe systems for defense against ballistic missiles.

Most fundamental are the changes in the political and military setting. A central characteristic of the American political scene at the time of SALT I was disenchantment with the war in Vietnam and an attendant hostility toward all things military, including ballistic missile defense. Ending the war, establishing an opening to China, achieving detente in relations with the Soviet Union, and limiting nuclear weapons were high priority goals for the United States. Now America has emerged from its post-Vietnam era, the "China card" is firmly in hand, detente is viewed as a disappointment (at best), the SALT II agreements have been rejected, and the Russians are seen as adventurous and expansionist.

The balance of offensive strategic forces, which a decade ago tipped in favor of the United States, now is roughly level; indeed, in the view of some this balance now tips in favor of

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the Soviet Union. At the conclusion of SALT I the Soviets had not yet tested a MIRVed missile: now MIRVs of high yield and high accuracy are characteristic of the Soviet missile force. The numerical balance of defensive strategic weapons—BMD and air defenses—remains much as it was a decade ago; that is, decidedly in favor of the Soviet Union. The Galosh ABM system, with its number of launchers for interceptor missiles reduced from 64 to 32, remains deployed around Moscow. Meanwhile an American ABM system at Grand Forks, North Dakota, has gone through the full cycle of having been constructed, operated, and dismantled. In the field of air defense, the Soviets continue to modernize their massive network of surface-to-air missile (SAM) systems, while the United States has for all practical purposes completed the phasing out of its SAM deployments.

The Basic Questions

While the environment in which BMD-related decisions are made has been altered considerably over the past decade, the important underlying issues have changed hardly at all. The key questions remain these:

- For what missions (if any) are BMD deployments needed?
- Would BMD deployments based upon the technologies currently available provide adequate protection against projected threats?
- What would be the effects of BMD deployments upon the strategic balance and upon strategic stability?
- What would be the effects of BMD deployments upon America's relations with its allies?
- What would be the effects of BMD deployments upon the proliferation of nuclear weapons?
- What would be the effects of BMD development, testing, and deployments upon the prospects for arms control?

It is useful to examine each of these issues, and to identify those considerations which have changed since SALT I and those which have not.

For what missions (if any) are BMD deployments needed?

At the time of SALT I several BMD missions were under consideration by the United States: a "thick" area defense for protection of the population and economic base against even a massive Soviet attack; a "thin" area defense to protect against a potential Chinese threat or against accidental or unauthorized launches from any source; and a localized defense of B-52 bases and Minuteman silos. The thick defense notion was abandoned because it could not be accomplished with the BMD technologies then (or now) available; the thin defense against a yet-to-emerge Chinese threat was unable to attract popular support; and the survivability at that time of the bombers and ICBMs was unquestioned.



Phased array radar for the PAVE PAWS system. ABM radars are similar in shape but smaller. (U.S. Air Force Photo)

Estimates differed widely on the length of time over which the salutary survivability condition could be expected to persist, and ABM supporters came to focus primarily on the ICBM defense mission.

Today ICBM defense is the only BMD mission to receive serious attention. Most analysts agree that by the mid-1980s the Soviets could have the capability to destroy in a first strike more than ninety percent of the Minuteman force, and there's little relief in sight. Some form of shell-game deployment scheme for the MX missile might come into being in the early 1990s, but few would bet on it. Moreover, some analysts argue even that system might not be able to achieve acceptable levels of ICBM survivability without BMD.

Would BMD deployments based upon the technologies currently available provide adequate protection against projected threats?

Critics of BMD argued a decade ago that a BMD deployment would be inadequately reliable, excessively vulnerable, and cost-ineffective. They cited the inherent sophistication of BMD technology, the complexity of the integrated system, the inability (because of the Limited Test Ban Treaty) to test either the nuclear kill mechanism relied upon to neutralize incoming reentry vehicles or the effects of nuclear detonations upon radar performance, the infeasibility of a full-scale test under operational conditions, and the potential vulnerability of the system to countermeasures such as saturation, decoys, chaff, electronic jamming, radar blackout, and maneuvering reentry vehicles. The BMD proponents countered that deployment of a system (viz., Safeguard) based on then

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BMD Technology—A Layman's Guide

Jeff Porro

Every public debate over a U.S. strategic weapon system—the ABM, the B-1, the MX missile—has involved conflicting political arguments, budgetary choices, and judgments about sophisticated technology. For the layman, the disputes over technology have always been the most difficult to follow. If there is a renewed debate on the ABM in the 1980's, the technical arguments will be especially intimidating because they will involve some of the most sophisticated technology the U.S. has, or is developing. With this in mind, the following attempts to describe the technology in simple, layman's language.

The article is, therefore, no more than an introduction. Those interested in going further are directed to articles by William Davis, Clarence Robinson, and Jonathan Medalia (see Bibliography). Much of the analysis here is drawn from Davis' excellent work. Jeff Porro, however, is solely responsible for any mistakes of fact or interpretation.

What It Does

Ever since the superpowers began to deploy intercontinental ballistic missiles (ICBMs), defense technicians have been working on ways to prevent the enemy's ICBMs from reaching their targets. In the jargon of the 1960's, these defense-against-ICBM systems were ABM (Anti-Ballistic Missile) systems. In the 1980's, the arms control/national security experts talk about BMD (ballistic missile defense.)

What must a BMD system do to be effective against ICBMs? Modern ICBMs consist of a two or three stage rocket topped by a smaller payload, the "bus." Inside the bus are one or more re-entry vehicles (RVs) that contain the nuclear bombs. The bus also carries "penetration aids" (see below) designed to fool radar. ICBMs are launched from silos in the ground. The stages of the rocket fire one after the other, then drop off, boosting the bus through the atmosphere, roughly the way Redstone rockets carried our Mercury astronauts into space. The bus leaves the atmosphere, then travels—like a bullet—toward the target through space. While in flight outside the atmosphere, the bus releases the independently-targeted RVs which re-enter the atmosphere, proceed to their separate targets, and—if everything works right—destroy them. (Submarine-launched missiles, SLBMs, work much the same.)

Faced with these incoming RVs, a BMD must perform three tasks: locating, discriminating, and destruction.

Locating. A BMD must, first, locate the incoming RVs. It must employ RADAR and other devices (see below) which can detect and track relatively small objects, travelling very fast (up to 16,000 mph in space.)

Discrimination. A BMD system must then be able to tell which of these incoming objects are really RVs, and which are penetration aids: decoys, chaff, or something else carried in the bus designed to fool the defense. This is done through a combination of very sophisticated sensing devices and advanced computers.

Destruction. Finally, a BMD must have something which can destroy the RV. Usually (but not always, as we shall see) this means a BMD must have missiles of its own, "bullets which can hit other bullets" as President Kennedy put it.

Now things start to get complicated and jargon must intrude. Question: to be effective, must a BMD stop *all* enemy RVs from reaching their targets? Answer: that depends.

If you want what is called "area" defense, i.e. you want to protect large areas—like cities or airbases—from nuclear attack, you must knock down a very, very high percentage

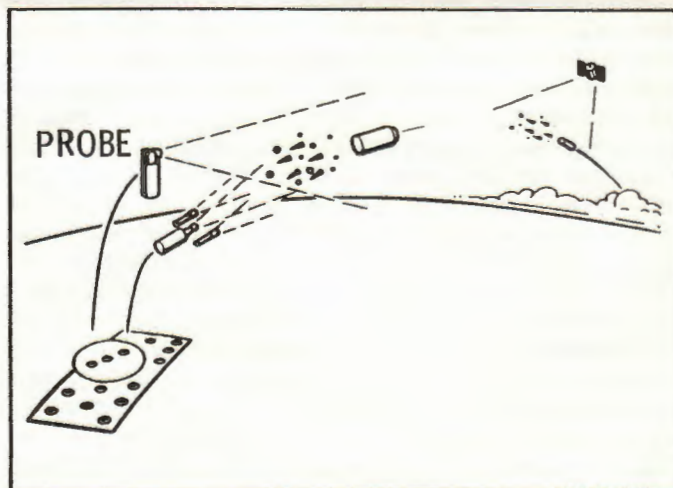
of incoming warheads. Area targets are large and they are "soft." (They don't have much protection from the effects of nuclear blast.) Therefore, RVs which come fairly close to an area target, say within a mile or two, can do catastrophic damage.

For example, suppose the Soviets launched ten warheads against the centers of each of the U.S.' thirty largest cities. If a BMD knocked down 90% of these RVs, and the survivors missed the city centers by two miles, thirty cities would still suffer destruction greater than Hiroshima and Nagasaki. In other words, an effective area defense BMD system would have to be virtually perfect.

If, on the other hand, you want "site defense," the problem becomes more manageable. "Site defense" means defending small military targets, especially missile silos. A silo has two advantages over a city. It is a much smaller target and it is much "harder." While a nuclear bomb detonated within

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EXOATMOSPHERIC DEFENSE



(Drawing courtesy U.S. BMD Systems Command.)

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miles of a city center would do terrible damage, an RV would have to come very close to a missile silo, no more than several hundred yards, to knock it out. A site defense BMD can, thus, ignore those RVs which will land far from a silo, and concentrate on those which will destroy the targets, i.e. direct hits or very near misses. Moreover, we could even afford to have some missile silos destroyed, as long as a certain percentage survive.

Now that we have an idea of the tasks of an effective BMD, let us look at the current U.S. plans to accomplish them.

U.S. BMD Technology

The Baseline Terminal Defense System. The Baseline Terminal Defense System (BTDS) is the BMD system on which, according to the Pentagon, the most technological progress has been made. The key word here is "terminal." The "terminal" leg of an RV's journey is its return flight through the atmosphere, from re-entry until it reaches its target. The U.S. BMD effort has historically concentrated on this "terminal" phase because the atmosphere slows down RVs, produces RV wakes which can be detected, and filters out lightweight objects designed to confuse radar. Sometimes labeled "endoatmospheric," for inside the atmosphere, the BTDS is employed for site defense.

Locating. BTDS locates the RVs with high-powered "phased array" radars. These are not the huge, swaying dishes seen in the movies. The dishes are too vulnerable to nuclear explosions. The BTDS radars are fixed, and relatively small. They are deployed in a kind of net arrangement, and are "modular," i.e. if one of the radars is knocked out, the net can still continue to operate. These radars are turned on when we have early warning of a Soviet attack. We get this early warning from our currently-existing system of spy satellites, some of which are stationed over Soviet silos. They can instantly detect the launch of a Soviet missile.

Discrimination. A computer is used to discriminate the RVs from chaff and decoys. It decides when the incoming RVs should be attacked by looking at flight patterns, rates of fall, and other data. A computer is used because incredibly complicated and fast decisions are needed. Only when an incoming cloud of decoys, chaff and RVs is below 200,000 feet (less than forty miles) does the atmosphere slow down the chaff and decoys so the RVs can be separated out. The incoming cloud (now separating into RVs and chaff) must be tracked, the RVs discriminated out, and the RVs destroyed within fifteen seconds. This requires data processing of tens of millions of computer instructions in a single second.

It should be noted that some critics of BMD believe that the discrimination of chaff and decoys from RVs is a technical problem which has not yet been solved.

RV Destruction. Once located and discriminated out, the RVs are destroyed by an upgraded version of the Sprint missile, a small, short range, extremely fast rocket carrying a nuclear warhead.

Exoatmospheric Defense. As complex as the technology for the BTDS is, it pales in comparison to that required for destroying RVs outside the atmosphere (exoatmospheric defense.) In exoatmospheric BMD, incoming RVs are attacked in space at altitudes above 300,000 feet (about 60 miles.) Attacking incoming RVs at this distance gives the defense more time—hundreds of seconds instead of fifteen—but makes the three tasks of BMD more difficult.

Preliminary Locating. Current U.S. plans are to first locate the RVs outside the atmosphere with extremely sophisticated optical sensors. These would be carried above the atmosphere by rockets when our intelligence gives early warning of a Soviet attack. Once outside the atmosphere, these sensors would survey the incoming RV cloud and give the defenders on the ground preliminary information on the numbers of RVs and where they are going.

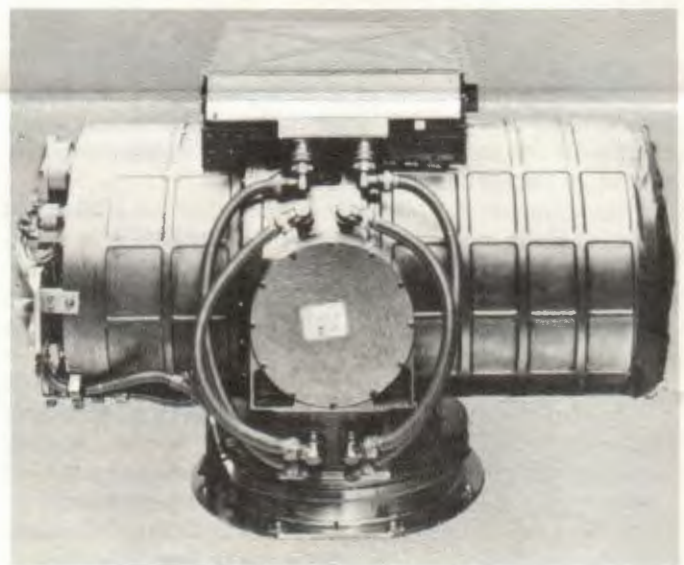
After this information is received, interceptor rockets would be fired toward the incoming RVs. These interceptor rockets will be required to perform extraordinary functions.

Advanced Locating and Discrimination. First, each interceptor would carry miniature computers and small optical sensors. These would allow each interceptor to locate the RVs more exactly and discriminate them from chaff and decoys.

Destruction. The interceptor rockets would also carry multiple kill vehicles, stacked on buses, much like RVs on ICBMs. These vehicles, unlike Sprint missiles, would not be nuclear-armed. In the jargon, they will perform NNK—non-nuclear kill. They will destroy incoming RVs either by hitting them, or by releasing small clouds of fragments which will destroy the RVs.

In order to appreciate the technology involved in such a system, we can compare it to BTDS. In the BTDS, the locating, discrimination, and destruction functions require equip-

Continued



BMD Optical Sensor (BMD Systems Command.)

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ment that is housed in moderately-sized buildings. Exoatmospheric defense requires that these functions be performed by the individual interceptor rockets, which are relatively small. Very small components must perform very sophisticated tasks. The optical sensors currently under development, for example, will be about one foot in diameter. (See page 4).

As you might expect, the Pentagon is decidedly upbeat about our ability to develop the technology needed. Critics believe such technology is a long way off, at best. They also argue that the Soviets could defeat exoatmospheric defense with relatively simple countermeasures, such as placing balloons around incoming RVs.

Layered Defense. Pentagon BMD planners argue that the best way to use an exoatmospheric system and an endoatmospheric system is to combine them. This is layered defense. In it, the exoatmospheric BMD thins the incoming RV cloud. The BTDS would then have only to deal with the RVs which leak through.

LoADS. If Soviet RVs are as accurate as the Defense Department believes, BMD is one way to prevent U.S. missiles from being destroyed by a Soviet attack. Another is to make our missiles mobile, moving them around so the Soviets don't know where they are. This is the idea behind the MX which—according to current plans—will be shuttled around on huge vehicles, over special highways, between a series of protective shelters. To be sure of knocking out a single missile, Soviet RVs would have to knock out all the shelters where an MX could be hidden.

As you might expect, Pentagon planners have thought about adding a BMD system to the MX. They call this MX-compatible system the Low Altitude Defense System (LoADS.)

LoADS closely resembles the BTDS system, with a number of important special features. First, LoADS units are to fit into MX shelters. Thus, some of the key component parts of LoADS have to be smaller than those of BTDS. The missile planned for LoADS, for example, is one half the size of the BTDS' upgraded Sprint.

Second, LoADS intercepts incoming RVs at a much lower altitude than BTDS (50,000 feet vs. 200,000.) That means that locating, discrimination, and destruction must be done within ten seconds rather than fifteen. Finally, all the components of LoADS would have to be harder than the components of a BTDS.

Critics of LoADS point out that its deployment would clearly violate the provisions of the 1972 ABM Treaty. They also argue that LoADS could be beaten if the Soviets develop RVs which could maneuver, evading the interceptor warheads.

Preferential Defense. Combining the MX mobile basing with LoADS brings us to another concept important to BMD: preferential defense. Simply stated, preferential defense means you use your BMD to defend a limited number of missile silos, not all. This increases the chance that the limited number will survive.

To illustrate, suppose we have ten silos and ten BMD in-



Experimental Interceptor for Exoatmospheric BMD (BMD Systems Command)

terceptors. The Soviets decide to attack each silo with two RVs. When the first wave of ten Soviet RVs arrives (one for each of our silos), we decide to defend all of our ten silos. This means we attack each of the ten incoming Soviet RVs. All of our BMD interceptors are used. When the second wave of ten Soviet RVs arrives, our BMD is exhausted, and all our silos are lost.

If, instead, we used preferential defense, we would attempt to defend only five of our missile silos with our ten interceptors. With ten BMD interceptors we could defeat the two Soviet RVs targeted on the five silos we choose to defend. Five silos would survive.

Clearly, preferential defense is well suited to an MX with BMD. Only the shelter containing the MX would be defended. But an attacker would have to assume that all shelters would be defended. To be sure of knocking out one MX, he would have to expend a great number of RVs.

Simple BMD and Boost-Phase BMDs. The BMD technologies so far described are those into which the Pentagon is putting most of its current research and development efforts. There are two other kinds of BMD, which should be mentioned briefly. The first are "simple" BMD systems. Richard Garwin was the first to propose them as low cost, rapidly deployable ways to defend Minuteman. They include: putting nuclear bombs in Minuteman fields and setting them off to create erosive dirt clouds which would kill incoming RVs; throwing up showers of simple projectiles—rocks—which would hit the RVs and knock them out; and sending up showers of projectiles with simple homing devices. The Pentagon does not believe such devices will be effective. Proponents of simple BMD believe this is a self-fulfilling prophecy, because the Pentagon has never studied simple systems in depth.

Finally, we have discussed BMD systems which operate after RVs have re-entered the atmosphere (BTDS and LoADS), and BMD designed to operate against RVs while they are outside the atmosphere (exoatmospheric defense.) Not surprisingly, some thought is being given to intercepting Soviet ICBMs even earlier, in the boost phase, before the missiles leave the atmosphere. This would involve a system of satellites and lasers which are, at present, little more than a gleam in a defense engineer's eye.

Jeff Porro is Editor of Arms Control Today

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current technology, despite its (in their view exaggerated) imperfections, would increase the cost (in deliverable offensive warheads, and therefore, in rubles) to the Soviets of an attack against American land-based strategic forces and would vastly complicate Soviet calculations of the effectiveness of such an attack.

The basic arguments of BMD opponents and proponents have changed little in the intervening decade. BMD technology has improved, but the current and projected threats are more formidable than before.

What would be the effects of BMD deployments upon the strategic balance and upon strategic stability?

BMD affects the operational utility of strategic offensive forces. To be useful in a retaliatory role, the forces should be capable of surviving an attack and subsequently penetrating to designated targets in the homeland of the adversary. The survivability of one's ICBMs and to a small extent one's heavy bombers could be enhanced by one's deployment of a defense against ballistic missile attack, but deployment of BMD by the adversary would degrade the penetrability of all of one's offensive weapons: ICBMs and SLBMs directly, and bombers and cruise missiles indirectly (by affecting adversely the execution of precursor ballistic missile attacks upon the air defenses).

The tension between survivability and penetrability is at its worst with area defenses, for such defenses degrade penetration to all retaliatory targets, counterforce and countervalue. The tension is at a minimum when defenses are limited geographically and qualitatively to localized protection of ICBMs, for then penetration to countervalue retaliatory targets such as cities is unimpaired. Indeed, BMD deployments which enhance the pre-launch survivability of offensive strategic forces without degrading their ability to penetrate to countervalue targets would, in principle, enhance strategic stability.

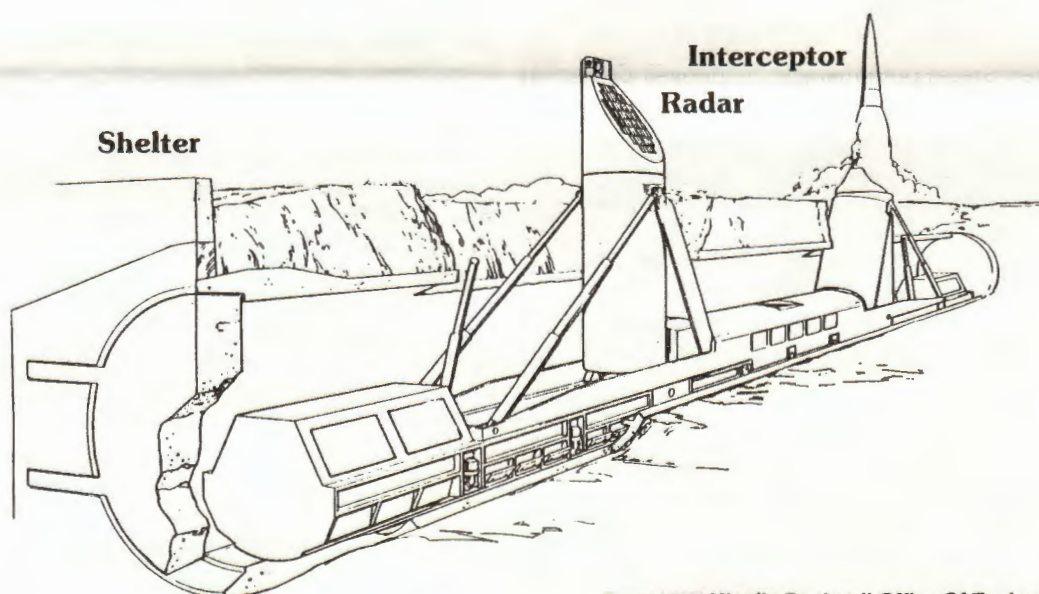
What would be the effects of BMD deployments upon America's relations with its allies?

How an American BMD would affect relations between the United States and its allies has been and continues to be unclear. The anti-BMD argument is that an American defense would be viewed by our allies as an attempt to make their homelands, rather than our own, the targets of choice. The pro-BMD line is that reduced American vulnerability would be attractive to our allies because it would increase our willingness to risk escalation of a war that might start elsewhere (e.g., in Europe.)

The effect on our allies of Soviet BMD deployments is more easily seen. The missile forces of the United Kingdom and France now can penetrate with high confidence to virtually any target in the Soviet Union. If the Soviets were to deploy BMD at levels significantly higher than now permitted by the ABM Treaty, the British and French independent deterrent forces could be neutralized.

Continued

LoAD Defense Unit



From "MX Missile Basing," Office Of Technology Assessment, U.S. Congress

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What would be the effects of BMD deployments upon the proliferation of nuclear weapons?

Any direct connection between perturbations in the magnitude or structure of the massive strategic arsenals of the superpowers and the acquisition of nuclear weapons by additional countries remains elusive. BMD opponents maintain that American and/or Soviet BMD deployments would be viewed as further steps in the arms race and, therefore, would undermine the Non-Proliferation Treaty. They note that in Article VI of the Treaty each of the parties—including the United States and the Soviet Union—"undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date . . ." They hold that the non-proliferation cause is more likely to suffer than to benefit if the ABM Treaty—the principal accomplishment (for better or worse) of more than a decade of SALT—were to be scrapped. Moreover, they maintain, BMD deployments would signal the superpowers' intention to monopolize not only the ability to attack with nuclear weapons, but also to remain invulnerable to such an attack—a signal which is likely to be counterproductive. The proponents of BMD argue that BMD deployments by the superpowers would reduce incentives for proliferation by reducing the felt need for independent deterrent forces and by rendering small offensive arsenals useless against the heavily defended nations.

What would be the effects of BMD development, testing, and deployments upon the prospects for arms control?

BMD-related activities consistent with the provisions of the ABM Treaty are unlikely to affect the prospects for further arms control, but there can be no doubt that abrogation of the Treaty would be a devastating blow to arms control—one from which it would not soon recover. The fuzzy areas are those which involve attempts (whether or not successful) to modify the Treaty.

A fundamental arms control objective of the United States is to achieve meaningful constraints on Soviet arms. Such constraints are not available gratis. The price to be paid by the United States for constraints upon the Soviet threat is the acceptance of constraints upon American forces. The benefit to the United States potentially to be derived by relaxing or eliminating the current constraints on BMD is the deployment of defenses that would enhance the survivability of our ICBMs. The potential cost to the United States is the deployment by the Soviet Union of BMD systems that could threaten the ability of our strategic offensive forces—ICBMs,

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The ACA Board

The Arms Control Association is pleased to announce two additions to the Board of Directors: Dr. Marshall Shulman, a distinguished analyst of the Soviet Union, former Special Adviser to the Secretary of State, and currently professor at Columbia University's Russian Institute; and the Honorable Gerard Smith, SALT I negotiator, and former Director of the Arms Control and Disarmament Agency.

The Arms Control Association

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ABM Debate

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SLBMs, heavy bombers, and cruise missiles—to penetrate to (at least some of) their targets. In the end, our overall assessment of any proposed arms control accord—including a modified ABM Treaty—should be based primarily on a weighing in the balance of these benefits and costs.

In this light it is interesting, if not remarkable, that absent from America's extensive public debates over arms control and BMD has been any sustained consideration of the implications for United States security of Soviet BMD deployments and programs. Rather, the debates have focused almost exclusively on the pros and cons of American BMD.

The near-term American interest in BMD deployment is confined to systems for defense of ICBMs. To deploy such defenses at a meaningful level would require modification of or abrogation of the ABM Treaty. In either of these events, the Soviets too would be free to deploy BMD. Only in the case of modification of the treaty would Soviet BMD be subject to mutually agreed constraints, and the revised constraints would be less stringent than those currently in effect.

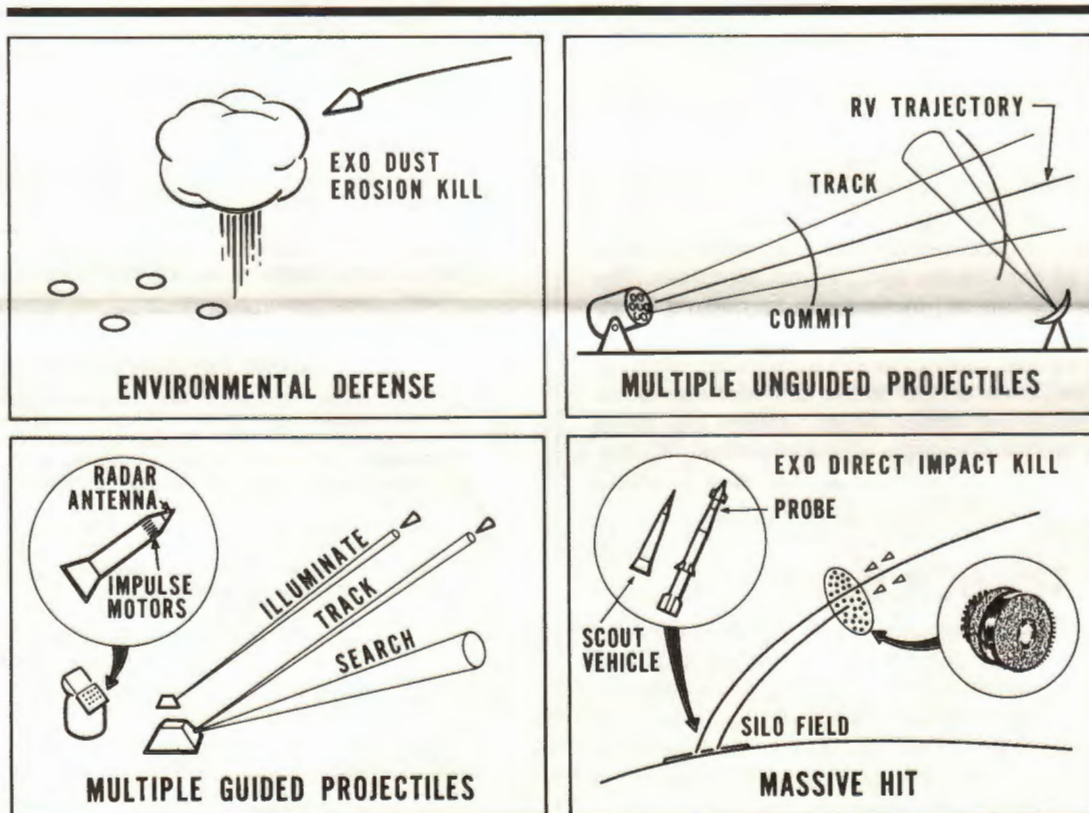
The Choice

Choices must be made among realistic alternatives. A world in which the United States has strategically important BMD deployments, while the Soviet Union does not, is attractive to Americans, but in all likelihood is unattainable. Similarly, a world in which the Soviet Union has important BMD deployments, while the United States does not, would be unacceptable to us. In the real world, either both nations will have significant BMD deployments or neither nation will have them.

The ABM Treaty, with its severe constraints on ballistic missile defense, represents a joint Soviet-American selection of a world in which neither side has a meaningful defense. To move from this non-BMD world to one in which both sides have extensive BMD deployments would be to gamble for high stakes: one possible outcome could be enhanced strategic stability, but another could be disastrous instability. The burden of proof rests on those who would have us make the move.

Albert Carnesale is Professor of Public Policy at the Center for Science and International Affairs (CSIA), John F. Kennedy School of Government, Harvard University. An earlier version of this paper was presented at a symposium at CSIA on "U.S. Arms Control Objectives and the Implications for Ballistic Missile Defense," sponsored by the Ballistic Missile Defense Advanced Technology Center.

SIMPLE BMD SYSTEMS



Courtesy BMD Systems Command

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Common Sense About (Ballistic Missile) Defense

H. L. Mencken once stated that to every human problem there is one simple solution—and it is always wrong. Ballistic missile defense (BMD) is the simple "solution" to strategic instability.

BMD means strategic instability. If a magic wand were waved installing an effective BMD around U.S. and Soviet missile silos, strategic stability might be enhanced. But a real-life transition to a defense-dominated balance would be more unstable than the era we are living in now.

If we and the Soviets decided to amend the ABM Treaty and deploy a defensive system, the result would be an arms race in which the Soviets might take an initial lead. Their BMD research and development, plus their extensive air defenses, suggest they can have an impressive system in place sooner than we could. (Soviet BMD might not, in fact, be terribly effective, but our defense planners would have to assume it was.)

If that happened, the worries we now have about Minuteman vulnerability would pale next to doubts about our overall ability to deter a Soviet attack. We would no longer be sure that our missiles and bombers could deliver an effective second strike.

Even if the U.S., not the Soviets, took the initial lead, we would still face more dangerous problems than we do now.

At the very least, the Soviets would be prompted to build more missiles and add more warheads. Moreover, while a Soviet ABM might not be effective against our strategic forces, it could work well against the nuclear forces of France, Britain, and China. We have a continuing interest in ensuring that these forces can get through.

Arms Control is stabilizing. The way to avoid this unstable offensive/defensive escalation is to use arms control. Enhancing the survivability of U.S. strategic forces can best be achieved by limiting the potential threats to our forces from the Soviets. SALT I froze the numbers of Soviet strategic systems. SALT II limited the number of warheads which the Soviet could throw at our ICBMs. Future arms control could do more.

We've placed our faith in technology before, with results no one wants to repeat. In the late 1960's and early 1970's, we thought going ahead with MIRV would create a more favorable strategic balance. SALT I, thus, allowed MIRV technology to go forward. The result has been what some call the new strategic problem of the 1980's—Minuteman vulnerability.

Creative arms control is clearly a more reliable (and inexpensive) method of dealing with strategic problems than erecting a technological facade of security.

Arms Control in Print — Paul M. Cole

Of Special Interest:

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The Price of Defense: A New Strategy for Military Spending, by the Boston Study Group, is now available to ACA members at a Special discount: \$6.00 for the \$15 list price hardbound copies. *The Price of Defense* assesses our military capabilities and the defense budget, offering proposals for a sober, more efficient and less costly defense establishment.

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For additional information and/or an application, call or write: Richard A. Sockol, Washington Center for Learning Alternatives, 1705 Desales Street, NW, Washington, D.C. 20036 (202) 659-8510.

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Dear Brother or Sister,

Autumn, 1980

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One Less Bomb
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In Concord, Massachusetts on May 18, 1980, Elizabeth H. Alcaide delivered a sermon entitled:

"THE I.C.B.M. & THE KINGDOM OF GOD."

She planted a mustard seed when she said, "Let's find a way to get rid of ONE NUCLEAR WARHEAD safely and completely, Let's do it unilaterally. Let's do it NOW. And let's do it as a simple symbolic gesture of faith: no more, but no less."

We, as a group of citizens, are convinced that the UNITED STATES has far more NUCLEAR weapons than are necessary to defend the U.S. from any threat by any other nation or group of nations.

We believe that our own arsenal of OVER 31,000 nuclear weapons now stockpiled presents a GREAT DANGER of accidental nuclear war.

SIMPLE STEP

On July 4th, 1980 we took the FIRST STEP in the proverbial journey of one thousand miles. We assembled at the historic OLD NORTH BRIDGE in Concord, Massachusetts and 71 citizens and tourists from as far away as Gettysburg Pa., Belgium & Japan signed the first petition in our drive for ONE LESS BOMB.

We have formed the ONE LESS BOMB COMMITTEE, with the purpose of petitioning our government to REMOVE and DISMANTLE one nuclear weapon.

The goal of the campaign is to gather one MILLION signatures by JULY 4th, 1981, and take them to the President of THE UNITED STATES.

We hope you will join us in this symbolic act to show that we are capable of TURNING THE CORNER, of altering our pattern of thinking, of providing a link to the next step, and the next..... on our journey towards peace. SIGN the petition. CIRCULATE it among those you meet every day.

ONE LESS BOMB COMMITTEE

Our committee was formed at the First Parish in Concord, Massachusetts and is ecumenical in scope. If you would like more petitions or information please write us,
One Less Bomb - 551 Hayward Mill Rd. , Concord, Mass. 01742

People of any age may sign the petition and you do not have to be a citizen of The United States.

FUNDS URGENTLY NEEDED FOR PRINTING AND POSTAGE

Middlesex Institution for Savings

64 Main Street - Concord, Mass. 01742

ONE LESS BOMB - Account number 94963 - A non profit organization.

COMMITTEE MEMBERS

Christopher Roof

Elizabeth H. Alcaide

Carol Dwyer

Theodore C. Michals

William A. Montoya

K.S. Norwood

Marvin Drake

Nancy P. Jones

Dot & Ken Shuman

Joan Sparrow

From: _____

ONE MILLION Signatures by July 4th 1981.

WE THE UNDERSIGNED, ALARMED BY THE GROWING THREAT OF GLOBAL DESTRUCTION, ASK YOU, THE PRESIDENT OF THE UNITED STATES AND COMMANDER-IN-CHIEF, TO TAKE THE FIRST STEP TOWARDS DISARMAMENT BY ORDERING THE DISASSEMBLING OF ONE NUCLEAR BOMB.

NAME	STREET	TOWN OR CITY	STATE
------	--------	--------------	-------

[illegible]

Please return as soon as filled to:
Elizabeth H. Alcaide or Bill Montague in care of:
ONE LESS BOMB COMMITTEE
551 Hayward Mill Rd. - Concord, Massachusetts 01742
FUNDS NEEDED
Middlesex Institution for Savings - 64 Main Street - Concord, MA. 01742
Account number 94963 - One Less Bomb

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CONCORD, MASSACHUSETTS, THURSDAY, JULY 2, 1981

Twenty Five Cents

Call for 'one less bomb' going out on the 4th

by William Porter

The US government has thousands of nuclear bombs. More than enough, all cities and most experts agree, to obliterate any enemy. A local group has been gathering signatures on petitions for the last year asking the government to dismantle just one of those nuclear bombs.

That group -- the One Less Bomb Committee -- will wrap up its current campaign Saturday, Independence Day, July 4, with a ceremony at the Old North Bridge beginning at 9:45 a.m.

Saturday's event, organizers say, is to be an "Independence Day Service of Celebration and Renewal." Speaking on behalf of the "One Less Bomb" drive will be Dr. Johnathan Fine, chairman of the National Executive Committee of Physicians for Social Responsibility.

The idea to petition for "One Less Bomb" originated five years ago with Elizabeth Alcaide's daydream.

Alcaide, a student ministerial assistant at the First Parish Church, said her vision was of a ship at sea.

"There were two groups of people on the ship, one from the United States and the other from Russia, but really the whole world was represented," she said. "Behind each group was a pile of bombs. Carter stood in front of one, and Brezhnev stood in front of the other. It was strangely peaceful."

"I saw some children pull the tarpaulin from one of the piles of bombs. They dragged the bomb to the edge of the ship and threw it overboard. The adults looked at each other in astonishment. The other group did the same thing -- threw a bomb over the side. The suggestion to me was that you could do it again and keep on doing it."

Alcaide described the reverie to some friends, and on May 18 of last year at the First Parish, she incorporated it in a sermon. "I felt it would be a great advance for humanity to dismantle one of these (nuclear) weapons of unimaginable destruction," she said. "It wasn't a very comfortable sermon, but it seems to be the most pressing religious issue of all time."

Through her discourse, entitled "The ICBM and the Kingdom of God," Alcaide suggested that a way be found to "get rid of one nuclear warhead safely and completely in the full consciousness that it is a symbolic gesture of faith ... And a growing momentum of public opinion -- American, Soviet and Third World opinion together -- will demand that it be done again and again and yet again."

Soon after Alcaide's sermon was delivered, the "One Less Bomb Committee" was formed to petition the government to dismantle one nuclear weapon. The petition reads "We the undersigned, alarmed by the global threat of world destruction, ask you, the president of the United States, to take the first step towards disarmament by ordering the disassembling of one nuclear bomb."

The petition alleges "The United States has a stockpile of 30,000 nuclear warheads," and concludes by stating that "Three new bombs are constructed every day in the United States."

The document was signed by 71 citizens and tourists at Concord Bridge last July 4, and later was distributed to every state through churches around the country.

The committee, while "convinced that the United States has far more nuclear

weapons than are necessary to defend the US from any threat from any other nation or group of nations," hoped the petition would garner a million signatures by July 4, 1981, and planned to deliver them to the president. (The Reagan administration has requested \$222.2 billion for defense spending next year, an increase of \$44.2 billion over fiscal year '81.)

Alcaide said the proposal drew approximately 4,000 written responses, and indicated 23,000 people, at least one from each state, have signed the petition. The committee (of which Alcaide is a member) is working out a strategy for approaching President Reagan, with the help of Senators Paul Tsongas and Edward Kennedy and Congressman James Shannon.

A New York City man sent the committee a letter saying he loved the "one less bomb" idea, and adding, "My wife will not rest until she has Ronald Reagan sign that petition."

A former Carlisle resident wrote from Franklin and said the simplicity of the suggestion "is so eloquent. Only in Concord."

In Washington, a Pentagon spokesman said the US Intercontinental Ballistic Missile (ICBM) force is primarily a product of the technology of the 1960s, and added the newest of those weapons were deployed in 1972. On the other hand, he indicated,

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Call for 'one less bomb' going out on the 4th

Continued from page 1

the bulk of the Soviet ICBM force has been developed within the past decade.

The Russian ICBM force is fast becoming "larger, more powerful, and more accurate," the spokesman said. "We no longer are assured of the slim margin of advantage over the USSR, but we are not behind them," he added.

The "One Less Bomb" petition is a necessary first step toward disarmament, Alcaide says. "We feel that if the president could go along with this in a positive way, then other countries would respond."

At any rate, according to Alcaide, "We are on the brink of huge escalation of nuclear arms. Not to try to do it is really just a way of trying to go ahead."

According to Bill Montague, co-chair of "One Less Bomb," the petitions have already been signed by people from all over North America and several countries overseas.

"If the world is worth saving, we will have to start somewhere," said Mr. Montague. "This somewhere is as good as any. The greatest goal is not the task; it is to start. I would like to say we have started."

An independence day call for peace

By William Porter

"How long can we go before history repeats itself?" asked Dr. Johnathan Fine of the small group gathered at the Old North Bridge last Saturday -- Independence Day -- to condemn the nuclear arms race.

Fine, a specialist in internal medicine and public health, and chairman of the National Executive Committee of Physicians for Social Change, was referring to the probability, greater than most realize, he says, that nuclear weapons will be used again in the near future.

Fine was the featured speaker for the ceremonies to celebrate a

year-long effort initiated by a local committee to collect signatures on a petition asking the president to dismantle one nuclear bomb in a symbolic gesture of faith.

Fine noted that 35 years have passed since the atomic bombs were dropped on Japan and that 200 armed confrontations have ensued with "no world war three and no nuclear war."

But now, according to Fine, "Two bitter rivals possess between them 50,000 nuclear weapons, and are manufacturing 10,000 more during the 1980's."

Today, Fine said, six nations possess nuclear weapons "poised in a constant state of readiness" and added "20 more may join the nuclear club in the next two decades."

He hypothesized the blast from a single one-megaton nuclear bomb over a city such as Boston would immediately kill between 200,000 and 500,000 people and cause an equal number of "lingering" deaths.

A professor of physics at MIT has estimated 17 such bombs would be used in an attack of Boston, according to Fine.

Fine added, "I realize now that good men and evil technology threaten civilization ... that secrecy shrouds nuclear weapons and torture."

The special observance for the holiday was sponsored by the One Less Bomb Committee of Concord, the Nuclear Freeze Committee and the Physicians for Social Responsibility.

The ceremony was "in celebration of our freedom to speak to each other, and particularly to our government," said master of ceremonies Marvin Drake from Acton, representing the One Less Bomb Committee.



Doris Smith holds protest sign at One Less Bomb ceremonies Saturday at the Old North Bridge. (Photos by Ann Ahearn)

Drake, presently an engineer, formerly a college professor, and once a researcher for the military, said the service was a step toward reducing "the threat of nuclear war to ourselves and our children, and advancing the cause of peace."

The One Less Bomb Commi-

tee will send its petition with over 20,000 signatures collected over the last year to the president asking him to dismantle one nuclear bomb.

"This symbolic act," according to Drake, "is the first step away



Dr. Jonathan Fine

NUCLEAR WEAPONS FREEZE
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(212) 904-6730
One Less Bomb
NATIONAL DAY OF PEACE
93 Pilgrim Rd.
Concord
MOBILIZATION FOR SURVIVAL
13 Sellers St.
Cambridge, Mass.

Dear Brother or Sister,

Concord, Massachusetts on May 18, 1980, Elizabeth H. Alcaide delivered a sermon titled:

She planted a mustard seed when she said, "Let's find a way to get rid of ONE NUCLEAR WARHEAD safely and completely, Let's do it unilaterally. Let's do it NOW. And let's do it as a simple symbolic gesture of faith: no more, but no less."

2. as a group of citizens, are convinced that the UNITED STATES has far more CLEAR weapons than are necessary to defend the U.S. from any threat by any other nation or group of nations.

we believe that our own arsenal of OVER 31,000 nuclear weapons now stockpiled presents GREAT DANGER of accidental nuclear war.

SIMPLE STEP

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We have formed the ONE LESS BOMB COMMITTEE, with the purpose of petitioning our government to REMOVE and DISMANTLE one nuclear weapon.

An independence day call for peace

Continued from page 1

Drake said the Nuclear Freeze Committee "seeks a bilateral freeze on the manufacture and deployment of nuclear weapons by the United States and the USSR, before the number of such weapons grows beyond that which we can control."

The Physicians for social responsibility, Drake said, are "seeking to educate people on the horrors of nuclear war and to show that we cannot survive such a war."

"I am deeply concerned and afraid that sooner or later the leaders of the world will make a mistake, that they will lose their tempers; at that moment, we will all be lost," Drake said.

Rev. Dana Greeley of the First Parish Church lauded the efforts of the One Less Bomb Committee, which met on the same spot a year ago and collected 71 signatures to kick-off the campaign. Greeley said he also "would certainly commend those who are promoting the idea of a moratorium or a freeze on nuclear weapons," and he questioned both the wisdom of and need for continued production of nuclear weapons.

An ancient adage has it, Greeley said, "that the way to begin any long journey is to take the first step." The dismantling of a single bomb would be that symbolic first step, according to Greeley "toward a sane position of cooperation and negotiation."

"I rebel every time I read in the newspaper or somewhere that such and such is being done in our national interest," Greeley continued. The national interest, he said, "is a very narrow interest. It is humanity's interest for the future that we should bear in mind."

Greeley noted the United States is the only country to have dropped a nuclear bomb so far, and concluded that "everything we can do in the name of peace could not compensate for the dropping of those nuclear bombs and for the manufacturing since then of nearly 30,000 of them."

Bill Montague of the One Less Bomb Committee read the petition and said that although the goal was to draw one million signatures by last Saturday, he was happy with the approximately 20,000 that had been raised.

Montague read a statement he said was made on July 5, 1961 by General Douglas MacArthur before a congressional committee on the Philippines. Montague quoted the general as saying, "Global war has become a Frankenstein that would destroy both sides. It contains the germ of a double suicide."

Leo Cunningham, a Concord-Carlisle High School student who Drake introduced as one of last year's "impromptu speakers," pointed out the economic imprudence of continued production of nuclear weapons, and said the money would be better spent in other ways, on social, health and environmental programs, for example.

"If we all sign the petition today," Cunningham said, "maybe the Soviet Union would see what we are doing as a first step, would talk with us about why we shouldn't have bombs, and all countries could take apart their bombs." He added, "We could have the world peace that everyone is talking about so excitedly."

Members of the One Less Bomb Committee then read letters received from people around the country concerned about the proliferation of nuclear weapons. One wrote from California: "I am 83 years of age, and I look forward to seeing the year 2000 AD, when I will have had life in three centuries. I certainly don't want any interference from atomic bombs. Send me some petitions quickly."

The committee brought along a cardboard model of a three megaton nuclear bomb, which was taken apart by Acton's Brad King, a self-defined "inventor" and "back door engineer."

According to Drake the real thing could destroy the city of Boston, and "some of us standing here," as well.

The goal of the campaign is to gather one MILLION signatures + take them to the President of THE UNITED STATES.

We hope you will join us in this symbolic act to show that we are capable of TURNING THE CORNER, of altering our pattern of thinking, of providing a link to the next step, and the next..... on our journey towards peace. SIGN the petition. CIRCULATE it among those you meet every day.

ONE LESS BOMB COMMITTEE

Our committee was formed at the First Parish in Concord, Massachusetts and is ecumenical in scope. If you would like more petitions or information please write us, Box 651, Howard Mill Rd. Concord, Mass. 01742

One Less Bomb - 551 Hayward Mill Rd. , Concord, Mass. 01742

Christopher Roaf Nancy P. Jones Carol Dwyer K.S. Norriss
William A. Montague Elizabeth H. Almeida
Marvin Drake
Dorothy J. Green Bud King
Theodore J. Wache
Bernard B. Green

THE FIRST MOVE

From Dr. Helen Caldicott's book Nuclear Madness (page 94):

"Someone must make the first move away from death and towards life. I really have anything to lose? We are doomed if we don't — but we may the human race if we DO. The elimination of nuclear weapons should NATIONAL GOAL. I believe that the Russian people are so frightened nuclear war that they would heave a momentous sigh of relief and would their own leaders to follow America's moral initiative toward nuclear

Rev. Dana Greeley

ONE LESS BOMB

ONE LESS BOMB

We the undersigned, alarmed by the growing threat of global destruction, ask you, The President of The United States and Commander-In-Chief, to take the FIRST STEP towards disarmament by ORDERING the DISASSEMBLING of ONE NUCLEAR BOMB.

The United States has a stockpile of 30,000 nuclear warheads. Three new bombs are constructed every day in the United States.

Dear Friend! 1) Please
copy + disperse this
petition. 2) Each write
one letter a week: Presi-
dent Regan,
Congress, local
newspapers!

THE FIRST MOVE

From Dr. Helen Caldicott's book Nuclear Madness (page 94):

- "Someone must make the first move away from death and towards life. Do we really have anything to lose? We are doomed if we don't -- but we may save the human race if we DO. The elimination of nuclear weapons should be a NATIONAL GOAL. I believe that the Russian people are so frightened of nuclear war that they would heave a momentous sigh of relief and would want their own leaders to follow America's moral initiative toward nuclear dis-

DEAR CITIZENS

Will you help us in gathering signatures for the disassembling of ONE NUCLEAR BOMB?

Enclosed are several petitions large and small. We will mail you as many as you will require.

This is a national petition drive started in Concord Massachusetts on July 4th 1980 at the Old North Bridge.

WE HOPE YOU WILL HELP.

FUNDS are needed. Please mail whatever you can afford to:

ONE LESS BOMB

#94963

Middlesex Institution for Savings

64 Main Street

Concord, Mass. 01742

(A non-profit organization)

OUR OBJECTIVE

Our objective is to gather over 1 MILLION signatures by July 4, 1981, to be delivered with publicity to the President of The United States, demanding the disassembling of one nuclear bomb as a FIRST STEP in the only direction we can take. When this is accomplished we will ask the Russian Government to do the same.

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Thank you,

ONE LESS BOMB COMMITTEE

551 Hayward Mill Road

Concord, Massachusetts 01742

FOR FASTER INFORMATION CALL:

617-369-8751

Christopher Roof

William A. Montague

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Corothy J. Gunn

Nancy P. Jones
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