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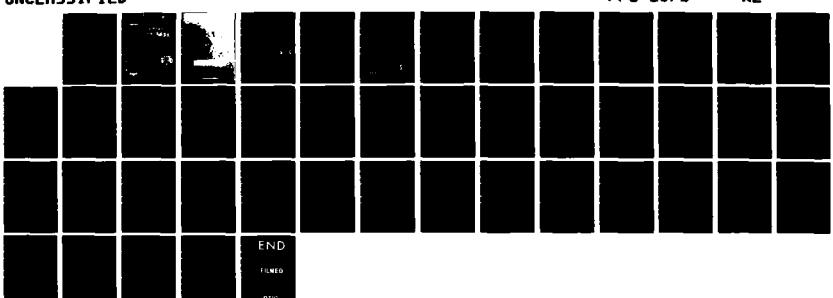

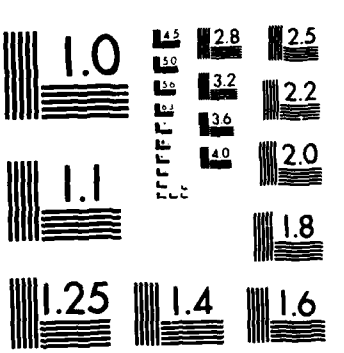

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Advancing technologies, particularly in micro-electronics and manifested in "smart" munitions, are offering the future prospect of nonnuclear weapons capable of performing some of the missions now assigned to strategic nuclear forces. That prospect may be advanced by increasingly voiced concerns about the possession or use of the large stockpiles of strategic nuclear weapons. The emergence of nonnuclear strategic weapons (NNSW), perhaps before the turn of the century, could have profound implications for current security concepts and policies. The purpose of the research reported here was to anticipate as many as possible of those implications and, thereby, improve the basis for U.S. Air Force planning. Current concepts for deterrence and for the waging of strategic and theater warfare were reexamined for the potential changes that might occur as a result of the advent of significant NNSW capabilities. Similarly, current policies for security alliances and for the proliferation and control of nuclear arms were reviewed for the stresses or changes that might accompany the emergence of NNSW. While many of the potential changes in security concepts and policies are so complex as to defy judgments about whether NNSW should be welcomed or rejected, there is little doubt that NNSW are emerging and that they will greatly complicate our ideas about how to prevent or wage wars. The salient uncertainties now, however, are technical: How far can NNSW go in posing alternatives to strategic nuclear weapons?

A RAND NOTE

THE RAND WINTER STUDY ON NONNUCLEAR STRATEGIC WEAPONS: EXECUTIVE SUMMARY

Carl Builder, Yoav Ben-Horin, Thomas Brown, Richard Darilek, Gerald Dennis, James Dewar, Cecil Hudson, Clifford Krieger, James Laney, Alan Platt, Richard Rosenberg, Walter Schrecker, Alan Vick

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Rand
1700 MAIN STREET
P.O. BOX 2138
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PREFACE

During the first four months of 1984, a group of Rand and Air Force researchers jointly explored some of the implications of latent or emerging capabilities for nonnuclear strategic weapons (NNSW) in what has been called the Rand Winter Study. The premise of the study was that NNSW are becoming increasingly feasible for consideration as alternatives to nuclear weapons for some strategic offensive and defensive missions because of technological advances on several fronts. If so, there could be major effects--before the turn of the century--on strategic postures and balances, on concepts for deterring and waging strategic and theater war, and on policies for the acquisition and control of strategic arms.

The objective of the study was to define those proximate and prudent actions that the U.S. Air Force should take to clarify or to prepare for the potential effects of NNSW. The study group prepared six research papers, each exploring a different area for implications of NNSW:

- Deterrence
- Strategic warfare
- Theater warfare
- Arms proliferation
- Arms control
- Strategic forces

These research papers were used as springboards for discussions at a two-day conference held at Offutt Air Force Base on 2-3 April 1984, with two dozen invited discussants drawn from the policy analysis and policymaking communities. This summary is based upon both the research papers and the conference discussions. The working drafts of the research papers have been collected and retained at Rand. Those interested in further details of the issues addressed in this summary, or in the research papers from which it has been drawn, are invited to contact any of the authors.

At the time of this study, four of the authors were active duty Air Force officers. Authors Krieger and Schrecker were assigned to the Directorate of Plans, Headquarters USAF, in Washington. Author Laney was assigned to the Directorate of Plans, Headquarters SAC, at Offutt Air Force Base, Nebraska. And author Dennis was assigned to The Rand Corporation as an Air Force Research Associate. Author Hudson is a Rand consultant; and the remaining authors are members of the Rand staff.

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CONTENTS

I. INTRODUCTION

This Note is about the future policy implications, particularly for the U.S. Air Force, of nonnuclear strategic weaponry (NNSW)--advanced conventional weapons that might be specifically designed or adapted to accomplish some of the military objectives now assigned to strategic nuclear forces. Our focus on NNSW is deliberate; it is motivated by the potential for major policy implications if nonnuclear weapons should prove effective in missions which have been traditionally considered the exclusive domain of nuclear weapons.

The apparent and growing interest in nonnuclear weaponry comes from two directions, one political and the other technical. The political interest arises, in large measure, from increasing concern about nuclear weapons--about the risks of their possession, proliferation, and use--for the United States, for alliances, and even for mankind. There is increasing political pressure to reduce the dependence on nuclear weapons. Concerns about the global climatic effects of nuclear war, epitomized by the nuclear winter debate, raise questions for many about the wisdom of continued reliance on nuclear weapons for the defense of Western Europe and other security goals not directly related to deterring nuclear attack. The technical interest arises from both limitations and opportunities. Competition for shrinking nuclear stocks, design and testing limits, and resistance to deployment of new nuclear weapons (e.g., the MX) may combine to compromise our ability to deploy the number of weapons necessary to meet the requirements of national strategy. On the positive side, there are new opportunities, afforded mostly through microelectronics, to pursue military objectives that were, heretofore, thought to be attainable only with nuclear weapons. These two int rests intersect when the new technical capabilities offer the prospective means for ameliorating some of the growing political and technical concerns about nuclear weapons.

Our purpose in focusing on strategic applications for nonnuclear weaponry is more complex. The theater applications of nonnuclear weaponry--as manifested in the growing reliance upon precisely guided

weapons for battlefield and deep attack missions--are longstanding and now widespread. It seems likely that the principal applications for nonnuclear weaponry for the present and immediate future will be within major theaters, as opposed to intercontinental or strategic warfare. The policy implications of greater reliance on nonnuclear weaponry for theater purposes are already in full debate. Moreover, since theories of theater warfare have by no means been dominated by nuclear weapons, the challenge to theater nuclear weapons posed by nonnuclear weaponry is familiar and acceptable, not stark.

By contrast, the possibilities and, hence, the implications of nonnuclear weapons for strategic applications are not universally appreciated or accepted. We do not argue that NNSW will effectively substitute for nuclear weapons for most targets. Mobility, dispersal, concealment, hardening and other countermeasures may significantly limit the utility of even the most exotic NNSW. Substantial progress in hardening technology has been made in recent years; this may present the greatest technical challenge to NNSW. Entertaining the possibility of strategic applications for nonnuclear weaponry is, rather, a deliberate analytic device in this study to explore intellectually uncharted territory. We do not imply that strategic applications are more imminent or more important than tactical applications--only that they pose a starker challenge.

In our exploration of the policy implications of NNSW, we reviewed a broad spectrum of weapon technologies; high explosives, shaped charges, hypervelocity and self-forging projectiles, fuel-air explosives, and fragmentation bomblets. (We did not, however, include chemical or biological agents, energy beams, or conventional "iron bombs.") Nonnuclear munitions can be guided to their targets by a variety of techniques that include terminal seekers or homers, passive or active, map matchers or correlators, scene interpreters, and radio or inertial navigators. They can be delivered to the target area by standard delivery vehicles: long-range bombers, with or without standoff missiles, and by cruise and ballistic missiles launched from sea, land, air, or space platforms. We assumed that such weaponry, even if acquired or adapted primarily for strategic war, would also find applications in (and have implications for) third area and major theater

operations. We further assumed that such weaponry could be acquired by either or both the U.S. and USSR for strategic applications.

Our summary of the Rand Winter Study begins with a reminder of the constraints on NNSW that may be imposed by technological or physical limitations. Next, we separately outline the implications of NNSW for strategic and theater warfare and deterrence. We follow this with the implications of NNSW for three policy areas--alliance, arms control, and arms proliferation policies. While these seven sections have been placed in logical order, they are sufficiently self-contained to permit selective reading by the reader. The summary ends with the most salient conclusions and recommendations based upon what we think we learned that we didn't know before, as well as what we couldn't resolve in this study.

II. TECHNOLOGICAL CONSTRAINTS

We have made no attempt to define the status or to project the paths of all the technologies that might support the development of NNSW. Our premise in exploring the policy implications of NNSW was that their capabilities will become apparent and significant before the turn of the century. To appreciate the potential diversity and limitations of those capabilities, however, we did review the fundamental technical relationships that govern the effects of nonnuclear weaponry as applied to various targets.

The salient aspect of nonnuclear weapons, as alternatives to nuclear weapons, is that the available explosive energy will be enormously reduced--by at least three and perhaps as much as nine orders of magnitude. To compensate, nonnuclear weapons must rely on several or all of the following devices to accomplish their military objectives:

- Placing the weapon precisely with respect to the target
- Focusing the destructive energy of the weapon toward the target
- Coupling the destructive energy into the target
- Exploiting target systemic vulnerabilities

These devices multiply the effectiveness of any weapon, nuclear or nonnuclear, but the leverage they provide is essential for the latter.

The most evident of these is precise placement of the weapon with respect to the target. The difference in delivery accuracy between an unguided gravity bomb or an inertially guided ballistic missile and a terminally guided weapon can be more than two orders of magnitude. Since most weapon effects decay with the square of the distance, precision delivery can compensate in some instances, such as single point targets, for a reduction in destructive energy of four orders of magnitude. Such precision delivery, of course, is dependent upon the acquisition of navigation and/or terminal homing information external to the weapon in (or approaching) the target area, which comes at the cost of increased exposure to countermeasures.

By orienting and shaping the explosive and/or kinetic energy of weapons, the energy can be focused at or into the target instead of dispersing in all directions. Examples are shaped charges, self-forging projectiles, and hypervelocity projectiles. Depending on the target and attack objectives, the required nonnuclear payload may be reduced by several orders of magnitude. Focusing weapon energy, however, invites focused defenses, such as directional shielding and stand-off armor.

The manner in which the weapon energy is coupled into the target for destructive effect can also provide significant leverage. Targets that are hardened against blast pressure are typically more vulnerable to projectiles that concentrate the energy at a point. For example, explosive energy is more effective if released beneath, rather than on, runways and roads. Distributed weapons, such as fuel-air explosive clouds and fragmentation bomblets, can more effectively couple their energy into area targets than can conventional bombs.

If the design or operation of a target system is understood well enough to reveal its vulnerabilities, destructive energy can be applied selectively or topically for target neutralization. Critical elements of a target system--such as antennas, sensors, grid nodes, runways, and structural supports--may be effectively damaged, rather than destroying the entire target complex or system. Again, depending on the target and the attack objectives, selective application can reduce the required destructive energy by several orders of magnitude. Such selectivity, however, requires much greater knowledge of the target system--how it is designed and operated--and greatly increases the probability that the target system can be repaired or reconstituted.

All four of these general approaches for leveraging the destructive effects of limited energy are now apparent in diverse forms in the technology--as applied or in prospect. For many target and attack objectives, that leverage appears to be sufficient to offer technical options for nonnuclear weapons. Whether many of these technical options would be affordable or militarily effective is much more in doubt at this time. Because the designs and evaluations of complete nonnuclear weapon systems for strategic applications, including their delivery vehicles, are not available, the strategic military objectives which can be economically and effectively pursued with future nonnuclear weapons are uncertain.

Despite that important uncertainty, our review of the technology suggests several conclusions about what can and cannot be expected from NNSW: Nonnuclear weapons can be conceived to pursue military objectives now assigned to nuclear weapons, but they are likely to be less easily developed or deployed for targets which do not have distinctive signatures, are mobile, hard, or very large in area or numbers. For the next few decades, NNSW are most likely to find application against targets that are relatively few in number, are of moderate hardness or area, are fixed, and can be effectively neutralized by selective damage. The destructive effects of NNSW are likely to be less certain, permanent, or observable than those of nuclear weapons; and they are likely to be much more susceptible to countermeasures.

III. IMPLICATIONS FOR STRATEGIC WARFARE

Because there are many different views of strategic nuclear war, our study focused on those that fall within the current framework of the highest U.S. national security objectives. First among these objectives is the prevention of nuclear attacks on U.S. cities, industry, agriculture and so on. These are the so called "value" targets. There are two fundamental approaches to that objective: direct defense (an approach in which there is much current interest, but no current capability) and the threat (implicit or explicit) of retaliation against the attacker's "value" targets. The threat of retaliation is likely to be necessary even if the United States ultimately builds substantial defenses, because defenses alone cannot dissuade an enemy from undertaking an attack if there is no penalty for testing them and at least some chance of penetrating them.

Because the United States has depended and will continue to depend upon the threat of retaliation to prevent attacks on its value targets, the United States must, as a second objective, also prevent effective attacks on its strategic nuclear forces. The United States has followed, with varying emphasis, three fundamental approaches to this objective: threatening reprisals against the attacker's value targets, threatening retaliation against the attacker's remaining forces, or making U.S. forces survivable against attacks. For many years, U.S. declaratory policy has suggested that while retaliation against a wide spectrum of targets (including cities) is always possible, the emphasis is on the targeting of military forces. Furthermore, many believe that the Soviets view countervalue objectives as subordinate to counterforce objectives. Currently, the emphasis is on making U.S. nuclear forces survivable by mobility, hardening, and concealment. The capacity to retaliate against the attacker's remaining forces has also been sought, but with considerable public debate over the effects on first-strike stability. The threat of reprisals against value targets, as a response to attacks upon U.S. forces, is no longer considered as credible or appropriate as it once was, but the capability remains inherent in the forces themselves.

NNSW could eventually play an important role in supporting the second objective (preventing attacks on U.S. strategic nuclear forces) and in the second approach to that objective (threatening rataliation against the attacker's strategic forces). If the Soviets were able to attack U.S. strategic nuclear forces with NNSW, a capability to counterattack only with nuclear weapons might not be a credible deterrent. Therefore, as NNSW become increasingly effective and the dangers of using nuclear weapons become more apparent, it may be necessary for the United States to acquire or adapt NNSW for counterforce attacks simply to deter such attacks against our own strategic nuclear forces. While that is clearly not the only role NNSW could play--nor the only role we examined--it is the one we explored most carefully because of its association with the highest U.S. national security objectives as described above. (It should be pointed out, however, that U.S. technological superiority and the requirements of NATO strategy suggest that the United States and its allies are more likely to deploy these weapons before the Soviets do. If NATO enjoys an initial monopoly on this technology it might compensate for our conventional weaknesses in the theater. Even if the United States were the first to deploy these systems and they were initially viewed as primarily theater in orientation, the implications for central strategic exchanges would be no less profound.)

Contemplating NNSW for counterforce--as an additional strategic option or as a deterrent to the exercise of such options--raises a number of important issues. These can be expressed in the form of arguments and their rebuttals:

1. The imperative of "use it or lose it" makes NNSW attacks on strategic nuclear forces futile and escalatory. If either side perceives that NNSW attacks are in progress and could be successful, the nuclear forces under attack would be used, prompting a nuclear war. While this was a valid argument before the present size and parity of the nuclear arsenals, the mutual reluctance to cross the nuclear firebreak may now be so great that the belligerents will be very reluctant to use nuclear forces even if those forces are under direct attack.

2. If strategic nuclear forces can be made survivable aginst nuclear attack by hardening, mobility, or concealment, they should certainly be survivable against NNSW. However, a counterforce campaign with NNSW could be quite different from our current notions of a nuclear counterforce campaign, particularly in terms of the time available to find and attack forces.
3. A counterforce campaign with NNSW would consume more long-range delivery capabilities--and, therefore, more potential nuclear capabilities--than it would destroy. This may be true in some cases, but it is not clearly true for all possible operations and campaign objectives.
4. Additional options for attacking strategic nuclear forces--on either side--will make war more likely because its consequences will appear less horrible. If a way to "win" a campaign or war is perceived, it will be acted upon. Whatever the abstract merits of this position, both the United States and Soviet Union have possessed many options for limited conflict for years without any apparent lessening of deterrence. Few in either government take the prospect of superpower conflct lightly whether this conflict is nuclear or not, limited or not.
5. The Soviets would not consider nonnuclear attacks on U.S. nuclear forces; therefore, there is no need for the United States to acquire capabilities just to deter such attacks. There is evidence that the Soviets do, in fact, seriously consider the possiblity of using nonnuclear forces for attacks on opposing nuclear forces.

On balance, the arguments against the acquisition of a NNSW capability to attack strategic nuclear forces do not seem compelling. The dangers associated with NNSW counterforce attacks would be sufficiently apparent and great that they would probably only be resorted to, like nuclear weapons themselves, under extreme circumstances and, then, only as the lesser of two evils. Moreover,

beyond these arguments and speculations, there is merit in exploring NNSW counterforce campaigns because they contrast with commonly held perceptions about nuclear counterforce operations.

Counterforce campaigns with NNSW could look remarkably different than putative notions of nuclear counterforce campaigns, mostly because the destructive pace and, hence, the time urgency will be greatly reduced. Furthermore, the relative vulnerabilities of the various types of strategic nuclear forces to nonnuclear attack may be quite different from their vulnerability to nuclear attack:

1. Although missile-carrying submarines (SSBNs) at sea are generally considered to be the most survivable of the strategic nuclear forces in a short nuclear war, they may be the most vulnerable if subject to nonnuclear attacks by conventional antisubmarine warfare (ASW) forces over an extended period of time.
2. ICBMs in fixed and hardened silos are often considered to be the least survivable of strategic nuclear forces in a nuclear counterforce campaign because of the increasing accuracy of missiles. But they may be so numerous and hard as to pose a very difficult class of targets for NNSW, at least until the turn of the century.
3. Bombers are likely to be intermediate in their survivability--between ICBMs and SLBMs in both nuclear and nonnuclear counterforce campaigns. Their survivability depends upon the continued availability of warning and on the duration of the war.

Air and missile defenses are likely to become much more important in determining the outcomes of nonnuclear than nuclear counterforce campaigns. Defenses (and countermeasures in general) should be more effective against NNSW because of the slower destructive pace of the exchanges and, in some cases, the more extended exposure of the attacking NNSW in the target area. In the prevailing view of spasmodic nuclear wars, defenses can be overwhelmed, caught off-guard, and high attrition of the attackers need only be suffered once. But if the NNSW

attacks extend over a period of time, the defenses can adapt and be reconstituted, and high attrition is less easily sustained, particularly for manned, reusable delivery vehicles.

In addition to counterforce campaigns, we also explored, more briefly, the potential application of NNSW in other kinds of strategic campaigns, both as deterrents and additional strategic options:

1. Attacks on warning and information systems, including space assets and their ground support systems. If the warning systems necessary for launching aircraft or missiles out from under an attack could be destroyed with NNSW, then whether or not there was an intent to "launch on warning," the capability to do so could be denied, and those forces could be more credibly held hostage to a nuclear attack. Soviet ground support of space information systems may be more vulnerable, but U.S. space assets may be less quickly replaced.
2. Attacks on high-value industries and services such as petroleum production, transportation, communication, power and so on. During World War II many thousands of tons of high explosives were required to effectively destroy petroleum refineries, factories, rail yards and other critical industrial targets. NNSW may offer a more selective means of disabling critical industries. On the other hand, some industries may be more robust targets than they were in World War II. In any event, the utility of NNSW attacks on the industrial and war-supporting infrastructure should not be completely discounted without further examination.
3. Attacks on projection forces and theater support bases. For many, this appears to be the most attractive and important application for NNSW. Airlift and logistics depots appear to be particularly vulnerable on both sides, in addition to the classical targets of air bases, troop casernes and columns, and transportation routes.

NNSW offer the prospect of a slower pace of warfare. The widespread perception that any direct confrontation between the superpowers will quickly lead to a large-scale nuclear war could be altered by the increased opportunities for bargaining and crisis resolution in the early states of war. That possibility depends greatly on the way specific NNSW capabilities and employment plans affect the pace of battle and on the prospects for distinguishing nonnuclear from nuclear attacks.

IV. IMPLICATIONS FOR THEATER WARFARE

If NNSW are acquired or adapted in the future for some of the objectives which are now served by strategic nuclear forces, they will have been preceded by the acquisition of tactical weaponry based upon the same technologies. Indeed, it seems most likely that NNSW will come about as evolutionary adaptations of advanced tactical weapons to long-range (i.e., intercontinental) delivery vehicles. Thus, many of the questions posed by high-technology weapons--whether they are to be augmenters of conventional weapons or alternatives to nuclear weapons--will have to be addressed and resolved in the context of theater postures before they will be faced in the intercontinental arena.

Furthermore, when significant NNSW capabilities are acquired, they will have obvious utility in theater operations, much more so than current strategic nuclear forces. The strategic bomber force has a demonstrated conventional capability in its ability to drop "iron bombs." And the assignment of strategic nuclear forces (e.g., SLBMs) for attacks on theater targets has long been an integral part of U.S. nuclear force planning. Nevertheless, theater forces--both conventional and nuclear--have been acquired and evaluated without much direct reference to the potential role of strategic forces in theater war. Strategic forces--in their capacity to deliver either conventional or nuclear weapons--have been treated as possible augmenters for the theater forces, but not as certain or central to theater campaigns.

Will the advent of NNSW change this state of affairs? If not, then the impact of NNSW on concepts (as opposed to the conduct) of theater warfare is likely to be small. Understanding the implications of NNSW requires an appreciation of the implications of current strategic forces--in both their nuclear and conventional capacities--for the conduct of hostilities within a theater.

The current strategic bomber force is clearly dual-capable. This poses several problems when considering the confident or certain application of strategic bombers at the theater level:

1. Since strategic nuclear delivery vehicles are a limited commodity--limited by arms control or resource availability--the first demand on the strategic bombers will be their role in executing the strategic nuclear war plans (i.e., the SIOP). For theater war planning, this means that the strategic bombers may be called upon to fulfill their primary strategic role at the very time that they would be most useful in the theater. Given the obvious national priorities, theater needs can be expected to suffer.
2. If strategic bombers remain dual-capable, then simply adding more bombers, over and above those required for the nuclear war plans, will create problems under current arms control conventions that impose limits on strategic nuclear delivery vehicles. Since those limits are imposed to cap outstanding demands for nuclear forces on both sides, we are unlikely to see much slack in delivery vehicle allowances that might be dedicated to theater use.
3. If dual-capable strategic bombers were made available for theater campaigns--as they were in Vietnam--two additional problems might arise:
    - Because of current unified and specified command arrangements and the potential recall of the strategic bombers, the bombers may be assigned tasks that are not well integrated with the use of other forces or with overall theater war plans.
    - If the theater-assigned bombers are withdrawn at some point to take up strategic nuclear weapons delivery assignments, it will be a clear signal of changing focus and/or intent. The signal's desirability would depend on whether it was interpreted as a sign of resolve or an invitation for preemption.

For all of these reasons, dual-capable NNSW may not influence current thinking about theater warfare. So long as strategic arms control counting conventions remain tied to strategic nuclear delivery

vehicles (as opposed, say, to nuclear weapons or yields), this is likely to be the case. If the delivery vehicles for NNSW are dual-capable ballistic missiles instead of bombers, the problems cited above are likely to become even more limiting because their costs and lack of reuse will put an even greater premium on their retention for nuclear war plans. For dual-capable ballistic missiles, questions of signature, discrimination, and domestic political opposition must also be considered.

If the current limitations imposed by arms control conventions and command arrangements are somehow surmounted, NNSW might have a greater effect on theater operations. NNSW might then become transition forces, providing leverage at the boundary between what is now separately conceived as theater and strategic warfare. NNSW, rather than theater nuclear weapons, could be perceived as the primary instrument for either terminating theater warfare or initiating strategic exchanges.

The role of NNSW in the theater might very well be similar to that of Theater Nuclear Forces. Just as the existance of Theater Nuclear Forces threatens possible escalation against targets in Eastern Europe and the Soviet Union, so might NNSW link theater and strategic warfare. NNSW would be used as a deliberate escalatory step short of theater nuclear and central strategic systems, emphasizing the tight coupling of these forces. Indeed, to the extent that the use of NNSW is viewed as less provocative than nuclear weapons against the same target set, they may reinforce the linkage. In an environment characterized in the West by concern that NATO's "seamless web" of conventional, theater nuclear and strategic nuclear forces has unraveled, NNSW might make a significant contribution to the credibility of NATO's escalatory threats.

Conventional weapon delivery capabilities of the strategic nuclear forces for theater campaigns are now limited to bomber delivery of "iron bombs," mines, and the Harpoon missile. Those limitations are not imposed by technology, but by resources and priorities. Given the national and command priorities to forces for nuclear deterrence, and the arms control and funding constraints on nuclear delivery vehicles, conventional munitions development and acquisition for the strategic bomber force have clearly suffered. When the choice has been between

acquiring (or retaining) delivery vehicles or developing new conventional munitions for those vehicles, the vehicles have won. Now, when the rationale for retention of some of the older bombers (the B-52Gs) might rest on their conventional capabilities, the lack of suitable munitions for them may, ironically, undercut arguments for retention.

A similar dilemma could arise more generally for NNSW. To the extent that the emphasis in NNSW development is on capabilities for attacking fixed targets in the presence of fixed air defenses, the resulting munitions and delivery vehicle penetrability is likely to be inadequate over tactical battlefields with large numbers of mobile defenses. Indeed, the important challenges for long-range nonnuclear weaponry in theater operations are the ability to acquire and attack mobile targets in the face of widespread mobile air defenses. Today, we can shoot farther than we can see; and to see better, we would have to get closer and risk exposure to defenses. Thus, NNSW's potential in theater operations will depend on the degree to which these systems and associated tactics become specialized against static strategic targets and defenses.

V. IMPLICATIONS FOR DETERRENCE

The implications of NNSW for deterrence are confused because there are many different theories of deterrence. There is no single approach--nor even a few salient views--of deterrence that satisfy all interests or concerns. We were unable to consider all of the varied meanings given to deterrence and then to trace out all of the implications of NNSW capabilities. However, we were able to develop some general analytic frameworks for thinking about the potential implications of NNSW for deterrence. And we were able to apply these frameworks to enough cases to observe that NNSW are not likely to be uniformly--or even predominantly--viewed as either a boon or a bane.

One of the analytic frameworks we used to explore the implications for deterrence of NNSW was the notion of escalation within a multidimensional space rather than along a one-dimensional ladder. Our escalation space characterized military operations in four dimensions--by their geographic locale, the type of weaponry employed, the kind of targets being attacked, and the attendant damage (the combination of intended and collateral damage) caused. The value of this multidimensional approach to measuring escalation is that it makes the unique characteristics of NNSW more apparent for thinking about deterrence; however, it makes escalation more ambiguous. Escalation on a one-dimensional ladder is obvious; escalation in a multidimensional space is not. A war described by points on several dimensions may not be clearly more or less escalatory if the points on several of the dimensions have moved in opposing directions. For example, is the use of nuclear weapons in a third area more or less escalatory than the use of conventional weapons in each other's homelands?

The problem of escalation ambiguity will become more severe with NNSW. NNSW will open up new areas within this escalation space, marked by lower attendant damage than either current nuclear or conventional weapons. NNSW may offer the prospect of being able to attack sensitive targets in the homelands, but without resort to nuclear weapons and without much attendant damage--directions that are mixed with respect to

escalation. Is the use of NNSW against homeland targets less escalatory than nuclear weapons against the same targets? Put differently, what drives escalation and retaliation, the weapon used or the target destroyed? We find that people, including the authors of this report, differ in their perceptions of which dimensions are most important in defining what is, and is not, escalatory.

We have specifically asked ourselves whether the use of theater nuclear weapons (TNW) in the defense of NATO would be more or less escalatory than the use of NNSW against Soviet strategic homeland targets. We haven't found any clear answer to the question. The locale and targets for the NNSW would be more escalatory, but the type of weapons and attendant damage would be less escalatory than with the TNW. Clearly, the context for the question is important, but we are not sure of agreement even if the context were more completely defined. On the other hand, if NATO were prepared to use Theater Nuclear Forces against targets in Eastern Europe or the Soviet Union, but used NNSW instead, it seems reasonable to conclude that nonnuclear weapons would be less escalatory than the use of nuclear weapons against the same target set.

If, as we have assumed here, NNSW are capable of effective attacks against important classes of strategic targets with considerably less attendant damage, then, to the degree that the use of nuclear weapons and attendant damage are perceived as contributors to escalation, NNSW may be seen as providing less-escalatory strategic options. Even so, their effect on deterrence may be mixed. The more that effective and less escalatory NNSW are perceived as credible options, the more they may deter an opponent from acting provocatively, but the less easily their owner may be deterred from using them. The apparent threat of NNSW options may enhance deterrence; but if NNSW are used--where nuclear weapons would not be--because they are thought to be less provocative or escalatory, they could lead the participants into a game of rising stakes. If that war escalates to the use of nuclear weapons, then deterrence (of a different kind) would have been impaired.

In sum, we think the most general effect of NNSW on deterrence will be to reduce the probability that war will be initiated with nuclear weapons. However, their effect on the deterrence of lesser hostilities, which might escalate to the use of nuclear weapons, depends upon whether

one focuses on being the user or victim of NNSW. Thus, NNSW may be perceived as a boon or bane depending upon how one perceives the path of greatest risk to the use of nuclear weapons--by preemption or by escalation.

Since the conclusion of World War II, the United States has relied on nuclear weapons to deter the Soviet Union from attacks on itself or its allies, since they are the only weapons capable of attacking the full range of sources of Soviet military power. This reliance on nuclear weapons has been driven by technological and economic considerations. In order to place the full range of Soviet targets at risk, the United States has relied on nuclear destructive potential. Nuclear weapons compensated limitations in the accuracy and firepower of conventional munitions and in the size of the military forces the public was willing to support.

NNSW may present an alternative to nuclear weapons for attacks on more latent sources of military power, up to and including military-industrial infrastructures. But we see nothing to suggest that NNSW will ever completely replace nuclear weapons. Great caution in crises and in war, therefore, will still be necessary since the omnipresent threat of mutual devastation will remain. The validity of mutual deterrence is unlikely to be challenged by the advent of NNSW.

VI. IMPLICATIONS FOR ALLIANCE POLICIES

In our exploration of the implications of NNSW for alliance policies, we looked at two separate aspects of NNSW acquisition:

1. The impact of U.S. and/or Soviet acquisition of NNSW on alliance relationships
2. The impact of the potential acquisition of NNSW by allies on alliance relationships

The establishment of credible nonnuclear options by the United States would appear to increase the credibility of American guarantees to defend itself and its allies. But Europeans are likely to be ambivalent about the ways NNSW deployments will affect their particular security concerns. Whereas they are likely to welcome opportunities to increase the credibility of U.S. security guarantees to NATO and raise the nuclear threshold, they will be concerned about prospects for crisis and arms race stability. Europeans may fear that NNSW will embolden the United States to freely use such force in more remote regions and, directly or indirectly, invite war in Europe.

France and Great Britain may feel great ambivalence about these systems since Soviet acquisition could undermine the credibility of French and British nuclear forces. How would the French or British respond to an attack on their nuclear forces by Soviet NNSW? It seems unlikely that they would retaliate with their surviving nuclear forces since Soviet nuclear forces would be cocked and ready to go. Unless the French and British could also acquire NNSW, it seems that U.S. acquisition would be a mixed blessing from their perspective, perhaps enhancing alliance security but most definitely reducing French and British security independence.

The acquisition of NNSW by the superpowers could have diverse and far-reaching effects on the military balance in Europe, but no major shift or direction is apparent. For example, U.S. lines of communication for the reinforcement of NATO may be more vulnerable to

NNSW than the Soviet lines of communication to the Warsaw Pact. At the same time, it is quite possible that the United States will enjoy a technological lead in NNSW that would give it a continuing advantage, even though the United States would confront a larger array of Soviet targets.

The acquisition of NNSW by allies in Europe could loosen America's wartime escalation control by providing individual allies (France, West Germany) with independent, nonnuclear means for attacking strategic targets in the USSR. On the other hand, this very prospect could produce an increase in deterrence of the USSR. As for possible U.S. influence over allied acquisition of NNSW, the United States could surely facilitate and accelerate this process, but there may be little it can do to prevent allied NNSW proliferation altogether, especially in the cases of France and Britain.

Such independent allied capabilities would not, in themselves, fundamentally alter the NATO-Warsaw Pact military balance. For one thing, the costs of NNSWs are likely to be so high that large-scale acquisition of such weaponry by NATO allies might be precluded. Small independent NNSW forces cannot provide NATO allies with anything akin to the the "proportional deterrence" that the British and French hope to derive from their independent nuclear forces. The likelihood that these NNSW forces would be small, therefore, suggests that their potential role as escalatory "wild cards" will predominate over any contribution they might make to the East-West balance.

The advent of superpower NNSWs and their potential acquisition by European allies themselves may well resurrect, with renewed vigor, many of the traditional political military debates that have been waged within the alliance during the past 25 years. These debates--over strategies for deterrence, over "coupling," over escalation possibilities, and even over arms control--remain unresolved. The introduction of NNSWs will only fuel such debates, not end them. As long as the parameters of East-West confrontation in Europe remain what they are today--massive Soviet conventional and nuclear superiority over

a divided Europe that is dependent, as a result, on the United States for both conventional defense and ultimate nuclear deterrence--it appears unlikely that European acquisition of NNSWs will fundamentally change either U.S.-European relations and roles within the alliance or the East-West balance.

It is unlikely that any Warsaw Pact country other than the Soviet Union will possess or operationally control NNSWs in the foreseeable future. The Soviet Union has never permitted the development or acquisition of strategic weapons of any kind, nuclear or conventional, by its Eastern European satellites. As long as the present structure of the Warsaw Pact persists, no change in this policy is probable. Such a capability in the hands of Soviet allies would enable them to create more independent mischief and uncertainty, in either a Western or an Eastern direction, than the USSR is likely to countenance.

America's other major ally, Japan, would seem less likely than France or the UK to acquire NNSW, since to do so would represent a more dramatic and perhaps more politically traumatic step than any the Japanese have taken since the 1940s. However, NNSW appear to be a very natural direction for Japan's high-technology industries. Japan's acquisition of NNSW might also come about as a result of decisions by Japan in the late 1980s and 1990s to dramatically improve the country's self-defense capabilities. In that case, it seems most likely that Japan would opt for theater-range NNSWs only, sufficient to put at risk the air and sea bases in the Soviet Far East from which attacks on Japan could be launched. If Japan should choose to acquire NNSW, it could be a positive development in terms of U.S. interests (e.g., in encouraging Japan to play a greater role in regional defense affairs) and might merit American support.

VII. IMPLICATIONS FOR ARMS CONTROL POLICIES

In considering the implications of NNSW for arms control policies, we found it useful to arbitrarily define two time periods: (1) a transition period over the next decade or so and (2) the long run. During the transition period, a fairly small number of first-generation NNSW may be gradually acquired and deployed by the United States. While important in both policy and planning terms, NNSW during this period would not be a significant consideration in either U.S. defense or arms control policy. In contrast, in the long run there might be sufficient NNSW on-hand or foreseen so as to make these weapons a potentially major factor in American arms control and defense planning.

Given the recent U.S. experience with arms control and widespread disillusionment resulting from it, it seems likely that arms control will be closely synchronized with overall U.S. foreign and defense policy considerations during the course of the transition period. Thus, arms control will not be pursued independently of broad defense and foreign policy considerations. During the postulated transition period:

1. The American public is likely to continue to support nuclear arms control in the abstract;
2 The U.S. government is likely to maintain some SALT-START regime and offer new arms control initiatives; and
3. The continuing U.S. distrust of the Soviet Union is likely to ensure that the verifiability of prospective treaties will be the dominant criterion. Yet adequate verification may prove increasingly problematic in the course of the next decade as systems become smaller, more mobile, and harder to find, especially as the search for concealment techniques accelerates in an effort to maximize survivability. Dual capability, inherent in NNSW, also presents a verification problem.

These considerations taken cumulatively will undoubtedly alter the incentives of the superpowers with respect to arms control.

Because NNSW may be perceived by technology enthusiasts as an alternative to nuclear weapons for many strategic missions, the advent of NNSW might fuel enthusiasm for new nuclear arms reduction agreements. At the same time, NNSW will undoubtedly complicate an already difficult arms control process, perhaps forcing such efforts in the direction of comprehensive negotiations that cut across heretofore distinct boundaries and weapon categories. Even if arms control initiatives remain directed at specific levels of "strategic" nuclear weapons and regions of the world, the acquisition (or the prospect of substantial acquisition) of NNSW will force the United States to integrate its planning for arms control in a much more systematic way than has typically taken place thus far. In any event, it is doubtful that there will be any international agreement to ban or seriously limit NNSW in the near future.

Looking at the period beyond the transition, there are a number of political, military, and technological uncertainties--differing implications for arms control flow from different assumptions about this time period. For study purposes, we made three assumptions about this period:

1. Both the United States and the Soviet Union will acquire--or have the capability to acquire--a sufficient number of NNSW so that these weapons become a significant factor in both U.S. and Soviet defense planning.
2. Based on current and prospective technological advances, the United States will lead the Soviets in the acquisition of the new weapons.
3. Efforts to ban or significantly limit NNSW through the conclusion of an international agreement will not have been successful during the transition period.

With these three assumptions, we invented--as an analytical construct--four illustrative arms control regimes. These "worlds" were not intended to be exhaustive of possible futures; they do, however, illustrate and illuminate some important political, military, and arms control issues that might attend NNSW developments in the long run.

One possible future would be characterized by the modest acquisition of NNSW by both superpowers, with arms control playing a role in U.S. defense policy similar to today. In this case, there would be a continuation of a SALT-like arms control framework. Negotiations would go forward, in both bilateral and multilateral fora, to limit nuclear as well as nonnuclear weapons. As an increasing number of NNSW were acquired, ongoing U.S. arms control efforts might increasingly take these new weapons into account. This might mean, for example, that the United States would try through the arms control negotiating process to raise established weapons ceilings (to allow NNSW to be deployed legally). Among other things, it might also mean some substitution of nonnuclear weapons for nuclear ones, if the U.S. government decided that it was in its best interest to retain and adhere to existent aggregate weapon ceilings.

A second case would be characterized by constrained acquisition of NNSW by both superpowers, with arms control playing a dominant role in U.S. defense policy. Under these conditions, with cooperation the central theme in U.S.-Soviet relations, the acquisition of NNSW might further in important ways the overall superpower relationship as well as the role of arms control. As the acquisition of NNSW increased, the superpowers would likely be forced to address directly, and with some urgency, the definitional problems regarding weapons and verification ambiguities that now cloud both U.S.-Soviet relations and current arms control efforts. For example, the onset of NNSW might ultimately force the superpowers to properly define "tactical," "operational," "theater," and "strategic" weapons as well as "conventional" and "nuclear" weaponry. To agree on precise definitions of these terms and associated weapon systems would likely require the superpowers' reaching agreement on cooperative measures for the verification of arms control agreements that covered a wide range of dual-capable weapon systems.

A third case would be characterized by widespread and unlimited acquisition of NNSW by both superpowers, with arms control playing a minimal role in U.S. national security policy. Sustantial U.S. acquisition of NNSW would further complicate the already troubled superpower relationship. Definitional problems and verification ambiguities that exist today concerning "theater" and "strategic" weapons, for example, would become intractable as an increasing array of NNSW was added to the U.S. and Soviet arsenals. Adequate verification of arms control agreements under these circumstances would become impossible. Indeed, as both more and better NNSW were added to the inventories of the superpowers, arms control agreements--SALT I and SALT II, among others--would likely fall by the wayside. Aggregate ceiling limitations on weapon systems would be ignored or renounced as the superpowers came to realize that cooperative measures were politically impossible and adherence to agreed-upon limits could not be adequately verified by national technical means.

A fourth, and admittedly farfetched, case would be characterized by the substantial acquisition of NNSW by the superpowers, with the pursuit of negotiated control of nuclear weapons being moot. Under this regime, significant unilateral reductions in the superpowers' nuclear arsenals--at least from a military point of view--are possible. If substantial numbers of NNSW were acquired and these weapons proved highly capable through observed tests, superpower incentives to expand or even maintain current nuclear arsenals might diminish. For, under these hypothetical circumstances, there would be few reasons to employ nuclear weapons in the event of escalation to strategic exchanges. Indeed, the possible decreased utility of nuclear weapons combined with the versatility of NNSW could lead to something resembling a strategic "free market" wherein there would be reduced superpower concern about the size of the adversary's nuclear arsenal. Under such a situation, acquisition of nuclear weapons beyond those needed for a secure reserve to deter countervalue attacks could well be seen as not being cost-effective, since a comparable monetary investment could buy more usable and hence more credible NNSW.

Although none of these four cases serve as predictions, they collectively span the probable ranges of implications of NNSW for arms control policies. The determinants of the actual path are likely to be found in the evolution of U.S. and Soviet attitudes toward each other, toward NNSW, and toward other weapons developments, including strategic defense systems and weapons based in space.

VIII. IMPLICATIONS FOR ARMS PROLIFERATION POLICIES

If postwar history is any guide, precision-guided munitions will continue to spread beyond the superpowers. In many cases, medium and even short range delivery vehicles would give these munitions "strategic" punch. We will thus consider such weapons as NNSW, recognizing that they nevertheless differ from superpower NNSW in significant ways. These weapons will probably spread to a greater number and variety of states than those currently credited with having nuclear weapons capabilities. The acquisition of NNSW is likely to be considered less politically momentous than possession of nuclear weapons. And since the operational requirements that most nonsuperpower states would impose upon NNSW for their purposes would surely be less demanding than the requirements of the superpowers--particularly the range requirements--NNSW may well spread faster and farther than nuclear weapons have.

Some states, such as France, Britain, Israel, and India, may have the technological prowess to develop NNSW independently or semi-independently. Others, such as Saudi Arabia, Iraq, and Iran, while unable to develop NNSW for themselves, may purchase such weapons outright. Others still, such as Syria or Pakistan, may be the beneficiaries of the strategic and commercial competition that, in the past, has facilitated the spread of advanced technology and weaponry. Yet, the cost of the more capable NNSW may increase rather than decrease the gap between the superpowers and other nations.

The implications of NNSW proliferation beyond the United States and the USSR may be conveniently divided into three categories by nations:

1. The first-order allies of the superpowers, such as the UK, Japan, and the two Germanies.
2. The special case of China.
3. The highly capable regional powers, such as Israel, India, and South Korea.

The possibilities and implications of NNSW proliferation among the first category were discussed earlier, under the implications for alliance policies. The other two categories are treated below.

China represents a special case for the proliferation of NNSW. For the PRC, the advent of NNSW may result in a net disadvantage. The PRC is in the unenviably unique geostrategic position of confronting a superpower (some would argue both superpowers) directly and alone. The gap between its operational military requirements and its resources, therefore, is daunting. The advent of NNSW may widen that gap even further, since the PRC clearly lacks the economic and technological resources necessary to keep up in a NNSW race with the superpowers.

China's strategy of "proportional" nuclear deterrence currently depends on a nuclear force that is relatively small and vulnerable to the enormous threat it is meant to counter. A rising specter of NNSW preemption could, at the extreme, put this strategy of "proportional" deterrence in jeopardy, adding further urgency to the already difficult and costly quest for increased survivability of China's nuclear forces. They could decide to "ignore" the development of NNSWs, thus seeking at least to minimize the psychological and political effects of such developments; they could devote increasing resources to their continuing efforts to obtain nuclear force survivability (especially SSBNs); or they could seek a closer politico-military association with one of the superpowers, hoping thereby either to defuse or counter the main threat. In any event, the PRC's need and requests for technology transfers may increase.

A deterioration in China's strategic situation with respect to the Soviet Union is probably not in the U.S. interest. If such deterioration should come about, the United States could transfer NNSW weaponry or technology, but that might alarm not only the Soviets but also China's neighbors, many of whom are American allies. Alternatively, the United States could attempt to assist China's efforts to make its nuclear forces more survivable, but this raises a host of problems and is implausible outside of a formal treaty relationship. More generally, such fears may overstate the strategic impact of NNSW for the PRC. The PRC has remained remarkably aloof from such concerns in the past; it is difficult to envision their pursuit of such a costly and complex technology.

The effects of NNSW proliferation among the highly capable regional powers--those that figure in the U.S.-USSR rivalry and which are potential nuclear states--pose a much more complex picture because of their potential to alter regional balances, to affect the relations with and between the superpowers, and, ultimately, even the regional incentives toward nuclear proliferation. Although the number of considerations and the important differences between the nations involved call for a case-by-case analysis, several general observations can be offered:

- Regional proliferation of NNSW might lead regional nuclear states (e.g., Israel or India) to increase the number and dispersal of their small nuclear forces.
- Crisis stability might be eroded as NNSW are perceived as effective means for first-strike surprise attacks in regions where attack warning capabilities have historically been, and are likely to remain, limited or primitive. Regional balances are likely to be seen as increasingly delicate.
- If the survivability of strategic (and possibly nuclear) assets were threatened by NNSW, the natural firebreaks in regional combat may become eroded and the danger of wartime escalation increased.
- Because of all of the above, superpower involvement in regional balances and conflicts might increase in both importance and frequency.

For the wide range of highly capable regional powers, it seems fair to conclude that the diverse impacts and consequences of NNSW proliferation would generally exacerbate current U.S. political dilemmas involving regional balances and confrontations. NNSW proliferation would raise anew questions of whether to extend security guarantees as well as arms and technology transfers to various regional powers. U.S. and Soviet transfer and guarantee policies may play important roles in spurring or delaying nuclear proliferation, as well as in stabilizing or destabilizing post-proliferation balances.

But if there is one thing that clearly emerges from our exploration, it is that the prospects for and the impact of NNSW proliferation would vary greatly in diverse geopolitical settings. U.S. national security interests and appropriate policies would vary likewise. We can find no simple, general rules that can be established in advance and applied across the board to facilitate proliferation results favorable for the United States. The traditional American tendency to seek general principles for foreign policy may in fact run counter to the requirements of effective management of nonnuclear as well as nuclear proliferation among regional powers.

IX. CONCLUSIONS AND RECOMMENDATIONS

The objective of the Rand Winter Study was to define those proximate and prudent actions the Air Force should take to clarify or to prepare for the potential impacts of NNSW. To fulfill that objective, we have asked ourselves two simple questions:

1. What couldn't we resolve from the study that we thought we could?
2. What did we learn from the study that we didn't already know?

Our conclusions and recommendations derive directly from the answers to these two questions.

First, with respect to unresolved issues, we were unable to resolve definitively the escalation potential of nonnuclear weaponry. We could not, for example, decide whether the use of NNSW against Soviet homeland targets would be more or less escalatory than the use of theater nuclear weapons in a conventional war outside the Soviet borders or, for that matter, necessarily any less provocative than the use of strategic nuclear weapons against targets in the Soviet homeland. To resolve that uncertainty, at least two actions appear appropriate:

1. Soviet specialists should be enlisted to examine possible Soviet reactions to the acquisition and use of NNSW. Much of our current uncertainty about the escalation potential of NNSW is wrapped up in our speculations about Soviet perspectives and reactions. While it is true that even the Soviets don't know how they will react to NNSW, Soviet specialists could help make our discourse more informed.
2. Crises and warfare at the threshold of nuclear weapon use should be gamed to both stimulate and simulate the attitudes and behavior of U.S. and Soviet decisionmakers toward executing NNSW and nuclear options. Gaming could reveal factors that we have not yet considered in trying to comprehend the escalation potential of NNSW.

We were also unable to say which of the several possible applications of NNSW in central strategic warfare might be the most promising or likely. Certainly counterforce applications appear to be the most provocative, but not necessarily the most likely or useful. To better resolve that uncertainty, two actions are appropriate:

1. A much better technical fix than we now have on the capabilities and costs of NNSW. This will require the development of several specific operational approaches and the preliminary design of some candidate NNSW which can then be evaluated for both cost and effectiveness.
2. A reevaluation of the requirements for strategic targeting in the light of modern nonnuclear weaponry. Our present understanding is based on the choice and contrasts between nuclear weapons and "iron bombs," but that understanding probably does not apply to NNSW capabilities. In particular, there is a need to reexamine, with NNSW in mind, the requirements for counterforce and industrial targeting as they may evolve over the next several decades. Along the way, it would be prudent to examine the relative vulnerabilities of U.S. and USSR target arrays to attacks by NNSW; there are some obvious asymmetries that should be sorted out.

We couldn't resolve whether NNSW in the long term were desirable or not. We could agree that they are here now in rudimentary form and limited capabilities and that trends--generally but not universally--favor their future development and deployment. They are likely to evolve most directly from prior developments in theater weaponry and from long-range bomber capabilities; but we could not agree among ourselves on whether they would have any net utility in intercontinental warfare. We also were divided as to whether they would (or should) be mostly sought as deterrents to Soviet use of NNSW or as additional U.S. strategic options (quite independently of Soviet NNSW capabilities).

Nor could we agree on whether long-range ballistic missiles would ever be attractive delivery vehicles for NNSW. Some of us argued that ballistic missiles for the delivery of NNSW would be too costly and too easily confused with a nuclear attack; others argued that ballistic missiles would be faster, more confident in penetrating defenses, and would avoid the risks of air crews being captured and made into political hostages.

With respect to what we learned, we discovered that our understanding of the intellectual and policy implications for NNSW has now outrun our understanding of their technical capabilities, costs, and effectiveness. Before we can go much further toward the objectives of this study, we need to set the weapon systems designers and military operations analysts to work on developing more concrete descriptions of NNSW and how they might be used.

We also discovered that the conceptual and policy implications of NNSW over the long term--as addressed in this study--are only one side of the coin. On the other side are the current and near-term decisions on force programming and arms control that will determine whether or not the forces and munitions required for future NNSW will be available in the next decade. Force programming decisions include retention of the B-52G bombers and the development of a precision long-range standoff missile for bombers. Arms control decisions include acceptance or rejection of counting conventions for nuclear arms that could severely restrict or eliminate the opportunities for developing or deploying long-range nonnuclear weaponry of the kind considered here.

But if near-term decisions about force programming and arms control of NNSW are to be argued and resolved in the larger context of U.S. national security interests, we will have to have a clearer picture about where NNSW may be leading us. And that will require that we first know considerably more about the technical and operational capabilities of future NNSW. An appropriate action to fill this need is a master plan for the introduction of NNSW which would integrate the near-term force programming decisions with national security and budget policies.

Thus, if there is any single conclusion that comes from this study, it is this: We have gone about as far as we can with theoretical speculations about NNSW in the abstract. We have reached the point where technical designs and analyses of NNSW systems and operations are the most important missing elements. However, the necessary designs and analysis will demand a scope of effort that is likely to develop a momentum of its own. In effect, developing the information that is most needed next to answer questions about the desirability of NNSW may well generate its own constituency for a favorable answer.

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