

# THE FUTURE OF THEATER NUCLEAR FORCES IN THE NEW TRIAD:

Strategy, Policy and Operational Issues for  
Deterrence and Warfighting

FINAL REPORT



A Study for  
The Defense Threat Reduction Agency  
ADVANCED SYSTEMS AND CONCEPTS OFFICE

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## THE FUTURE OF THEATER NUCLEAR FORCES IN THE NEW TRIAD

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**BACKGROUND:** The Defense Threat Reduction Agency (DTRA) was founded in 1998 to integrate and focus the capabilities of the Department of Defense (DoD) that address the weapons of mass destruction (WMD) threat. To assist the agency in its primary mission, the Advanced Systems and Concepts Office (ASCO) develops and maintains an evolving analytical vision of necessary and sufficient capabilities to protect United States and Allied forces and citizens from WMD attack. ASCO is also charged by DoD and by the U.S. Government, generally, to identify gaps in these capabilities and initiate programs to fill them. It also provides support to the Threat Reduction Advisory Committee (TRAC), and its panels, with timely, high quality research.

**ASCO ANALYTICAL SUPPORT:** DFI International has provided analytical support to DTRA since 1999 through a series of projects on nuclear, chemical, biological, and strategic issues. This work was performed for DTRA under contract DTRA01-00-D-0001.

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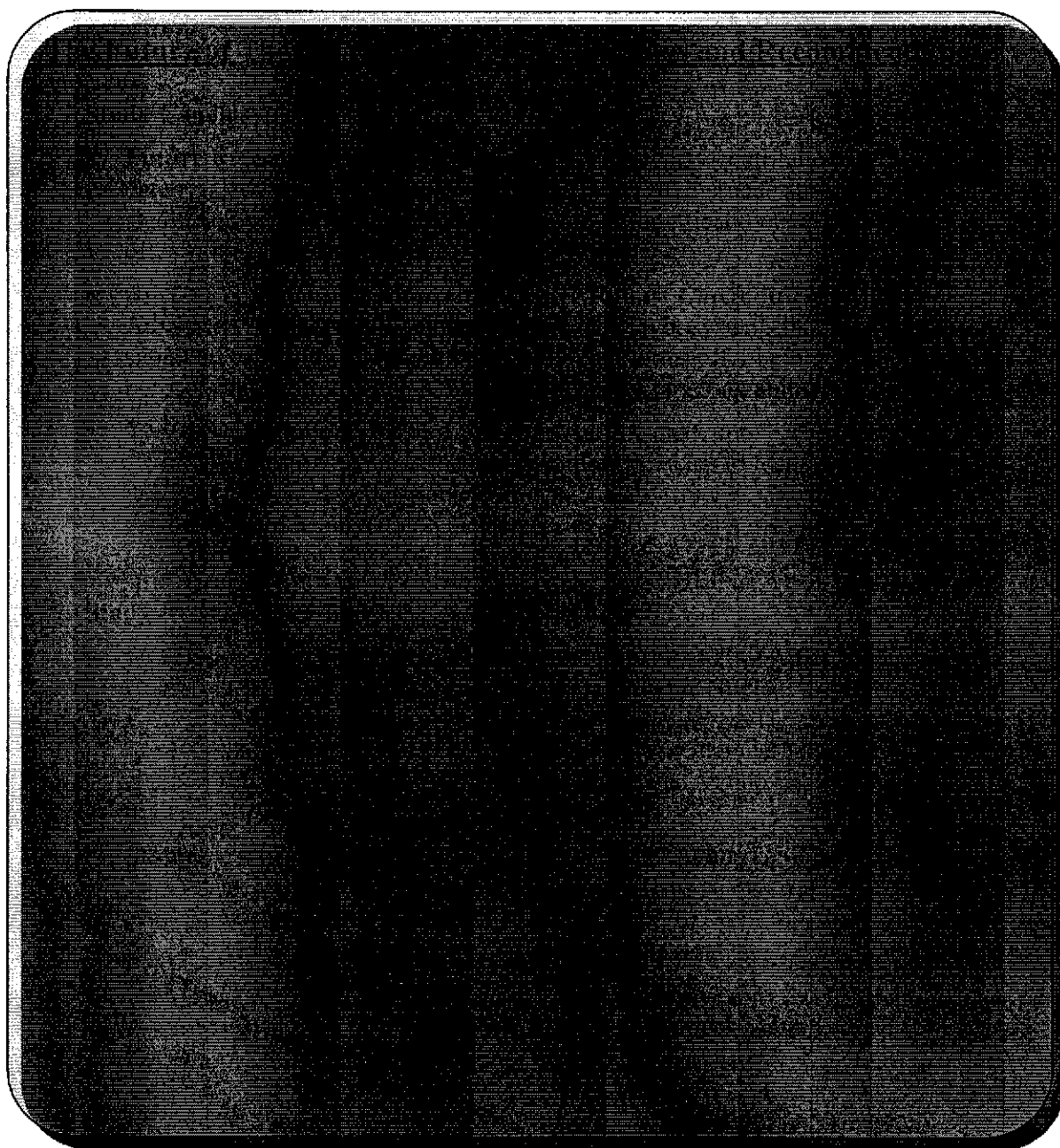
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# The Future of Theater Nuclear Forces in the New Triad

*A Strategy, Policy and Operational Issues for  
Deterrence and Warfighting*



## **Executive Summary**

### **Background**

Theater nuclear forces (TNF) played an important role in U.S. defense policy throughout the Cold War. Today's international security environment, however, differs significantly from the Cold War context that originally prompted the development of these weapons. The United States no longer faces a conventionally superior foe in Europe, and is unmatched in military power. Less powerful, hostile nations seek to counter the military superiority of the United States by pursuing programs to develop or acquire weapons of mass destruction (WMD). At the same time, the United States has begun implementation of the "New Triad" and is facing a variety of programmatic milestones concerning theater nuclear forces. The evolution of the strategic environment and the practical realities of the defense program require that the Department of Defense (DoD) re-examine the role of TNF in U.S. defense policy to determine what role, if any, these weapons should play in the future.

Sponsored by the Advanced Systems and Concepts Office within the Defense Threat Reduction Agency, DFI Government Services conducted a comprehensive assessment of what roles TNF might play in the future, what TNF systems or alternatives to TNF might be best suited to such roles, and the costs associated with TNF. Drawing on this assessment, the study team then developed policy recommendations for consideration by the Department of Defense.

### **Analysis of Future Roles for Theater Nuclear Forces**

Focusing on what contribution TNF could make to U.S. defense policy in terms of assuring allies and friends, dissuading future military competition, deterring adversaries and defeating such adversaries if necessary, the study examines the advantages and disadvantages of TNF as a class of weapons and in terms of specific TNF systems and alternatives. Ultimately, any assessment of the degree to which specific classes of weapons or specific weapon systems assure allies or dissuade or deter adversaries will be a subjective judgment based on available analytical evidence. The report focuses on outlining the advantages and disadvantages of TNF, which were then assessed comprehensively and formulated into study findings and recommendations. While a range of recommendations could flow from the analysis in the report depending on differing assessments of risk, the conclusions and recommendations outlined in the study are illustrative of the assessments being made by many of the nuclear experts and practitioners who were interviewed for the project.

Based on extensive research and interviews with nuclear experts inside and outside the Department of Defense, the study concluded that TNF appear to have only a limited role in future U.S. defense policy, primarily in terms of enhancing the ability of the United States to deter state adversaries from regional aggression, and possibly from use of WMD. Theater nuclear forces offer senior leaders a potentially credible military option to signal the willingness of the United States to escalate its retaliatory capabilities beyond conventional weapons if necessary. Particularly if such a capability can be maintained at minimal costs, regional combatant command staffs support continuing to resource some type of forward-deployable nuclear weapon. Theater nuclear forces do not appear to reassure allies and friends significantly, in fact allied concerns over the potential to escalate regional tensions and possible domestic opposition to supporting U.S. nuclear deployments in theater seem to outweigh the assurance that TNF provide from an operational perspective. Whether TNF contribute to dissuading potential adversaries from military competition and hostile policies toward the United States is unclear. Such deployments may in fact serve to underscore the overwhelming military power of the United States and reinforce the perception in the minds of some adversary nations that the only way to counter U.S. power is to develop or acquire nuclear weapons of their own. Finally, TNF do not appear to offer unique capabilities to defeat enemy targets when compared to advanced conventional forces or strategic nuclear forces. Although TNF, unlike even advanced conventional forces armed with precision-guided munitions, can defeat deeply underground targets, such targets can also be destroyed by a variety of strategic nuclear forces.

In addition to assessing the potential future utility of TNF as a class of weapons, the study also examined three specific types of representative TNF systems and two alternatives to TNF to determine whether one or more systems were particularly relevant to today's strategic environment. The study analyzed dual-capable aircraft (current platforms and the JSF), dual-capable aircraft armed with warheads to destroy hard and deeply buried targets (HDBT), submarines armed with nuclear cruise missiles (SSNs with the nuclear variant of the Tomahawk, TLAM-Ns, or its potential future replacement the Tactical Tomahawk, TACTOM-N), advanced conventional forces armed with precision guided munitions, and strategic nuclear forces such as the B-2 bomber or submarine-launched nuclear ballistic missiles. In terms of specific TNF systems and alternatives to theater nuclear forces, the study found that the most significant differences are not their various warfighting capabilities, but rather the ability of these systems to provide senior leaders with military options that assure allies and deter adversaries. No one system offers senior leaders with every desirable characteristic — visibility to signal intent and commitment, stealth to ensure surprise and minimize political tensions, sufficient destructive power to defeat deep underground (DUG) targets, and precision to minimize collateral damage — but a careful review of all five options reveals that certain combinations of

systems offer clear advantages and suggests the United States could do more to optimize its TNF capability.

Importantly, the study found that in terms of deterring adversaries in a crisis, the TNF systems and alternatives most likely to be effective are those that provide clear signaling capabilities while at the same time offer the possibility of stealth to keep adversaries off guard and minimize the political challenges associated with their deployment. Strategic bombers armed with existing nuclear munitions can be made highly visible, offer senior leaders the capability to demonstrate that the United States has the capacity to escalate beyond the conventional level if necessary, and are potentially deployable to U.S. facilities in regional theaters. Deployment of strategic bombers like the B-2 may entail fewer political costs to allies than hosting traditional DCA, especially DCA armed with HDBT warheads. As an alternative to TNF, the B-2 bomber in particular provides senior U.S. leaders with enough flexibility to be used for signaling, but also offers a less vulnerable profile than traditional DCA to air defenses or a preemptive adversary attack if it is launched from the continental United States or from a base in theater that is beyond the range of adversary aircraft and missiles. While strategic bombers are not generally viewed as theater weapons, at least one regional combatant command strongly noted their potential as an extremely viable alternative to traditional theater nuclear forces.

Before proposing specific recommendations concerning the future role of TNF in U.S. defense policy, the study also attempted to outline in broad terms the costs associated with TNF so that the advantages they may offer in terms of assurance, dissuasion, deterrence and defeat of adversaries could be put into context. Particularly if the Department of Defense considers development of HDBT-capable nuclear warheads for DCA or the deployment of a next-generation nuclear-armed Tactical Tomahawk cruise missile (TACTOM-N), maintaining TNF will entail significant operational and financial costs. Operational costs include certification requirements and forward basing preparations, while operational risks include the possibility of losing one or more undetonated cruise missile warheads. Financial costs include a wide range of maintenance, modernization, and infrastructure investments. Finally, any decision to deploy TNF on submarines or other naval platforms on a routine basis would be likely to impose significant policy and political costs because it would require the United States to abandon or significantly alter the terms of the 1991 Presidential Nuclear Initiative (PNI).<sup>1</sup>

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<sup>1</sup> The 1991 Presidential Nuclear Initiative, which does not have the standing of an official treaty ratified by the U.S. Senate but is generally viewed as politically binding, removed TLAM-Ns from ships, attack submarines and land-based naval aircraft to storage areas in the United States. The PNI was signed by President George H.W. Bush on September 27, 1991. As a result of the PNI, the United States does not deploy TLAM-Ns on submarines on a routine basis.

### Recommendations for Future TNF Policy

Based on this assessment, the study makes two major recommendations. First, characterizing U.S. nuclear forces as one part of a larger “strike spectrum” may facilitate greater clarity about the defining characteristics of nuclear systems in the U.S. arsenal and how they can best be used to support deterrence and warfighting efforts than the current theater versus strategic nuclear forces construct. Second, in light of the relatively modest contribution forward deployable nuclear weapons appear to make toward deterring adversaries, the United States should maintain a limited capability of this type as long such a capability can be maintained for minimal additional costs.

Shifting from a construct based on the division between theater and strategic nuclear forces to a comprehensive “strike spectrum” ranging from advanced conventional forces to forward-deployable nuclear forces (FDFN) to CONUS-based nuclear forces (CBNF) would focus military planners and senior leaders on the essential characteristics and strengths of the various military capabilities available for deterrence and warfighting and facilitate capabilities-based planning. Shifting toward a “strike spectrum” would clearly differentiate between types of weapons and highlight their strengths rather than create confusion over whether a particular system is a theater or strategic capability because it has a particular range or yield or could be used against a particular class of targets. For example, advanced conventional forces represent the “lower end” of this strike spectrum, in the sense that they offer U.S. leaders robust but non-nuclear, military options to communicate U.S. intentions or ultimately to defeat adversary targets. Forward-deployable nuclear forces offer senior leaders a military option that many adversaries would perceive as a more serious demonstration of U.S. intent than advanced conventional forces alone. The term “forward-deployable” highlights the essential characteristic of systems in this class of weapons, i.e. their ability to be deployed into theater to communicate U.S. commitment to allies and friends, and signal the seriousness of U.S. deterrent threats against its adversaries. Because the threat posed by FDFN can be made visible and proximate to adversaries, they offer an escalation option that can be clearly differentiated from advanced conventional forces and is likely to be perceived by adversaries as more credible than a potential strike by nuclear forces based in CONUS, which may be “out of sight, out of mind” for many potential adversaries. This strike spectrum construct highlights the essential differences between the various different capabilities available to U.S. leaders and focuses attention on how such capabilities might best be used while avoiding labels that create false distinctions about where such capabilities can be employed or against what kinds of targets.

In addition to rethinking how the United States differentiates between its nuclear forces, the Department of Defense may also want to weigh carefully the benefits FDFN offer relative to the costs of such a capability. While inherently difficult to quantify precisely, FDFN do appear to offer a potential

contribution to deterring adversaries in a crisis. Essentially these forces may provide senior leaders a military tool that signals a more serious U.S. commitment to allies and a potentially more credible and compelling threat to adversaries than advanced conventional forces alone. As such, FDNF may represent an option U.S. leaders wish to preserve in their portfolio of flexible deterrent options if such a capability can be maintained at a cost commensurate with its apparent modest benefits.

There are numerous ways to maintain a FDNF capability, but only a handful of FDNF options are relatively low cost. For example, moving beyond the TLAM-N to a TACTOM-N or an even more advanced nuclear cruise missile would cost at least \$1-2 billion, and the costs of designing the Joint Strike Fighter as a dual-capable aircraft are also likely to be substantial. Both systems would require specially trained crews, storage sites and other specialized nuclear infrastructure. The Department of Defense could choose to continue to maintain the TLAM-N system in storage, but this system offers limited utility due to the deployment limitations associated with the 1991 PNI.

In contrast to procuring a new FDNF system, or continuing to fund a FDNF system of limited utility, DoD should explore how it might employ existing systems such as the B-2 "stealth" bomber and routinely deployed SSBNs as TNF systems. Such deployments would require investments in theater nuclear infrastructure, but such investments would likely cost less than procurement of a new TNF system such as a dual-capable JSF or a new submarine-launched nuclear weapon. The B-2 is the only existing nuclear system that offers both a signaling capability and a stealthy capability to maintain operational surprise.

Similarly, DoD leaders could consider replacing the existing TLAM-N capability with SSBNs configured to re-target 1-2 ballistic missiles as needed to address potential regional contingencies. Unlike attack submarines armed with TLAM-Ns, the United States deploys a number of SSBNs regularly around the globe. If SSBNs were configured in such a way so that a small number of missiles on-board could be re-targeted from SIOP targets to potential regional targets and offered a range of potential yields, these missiles could be used to provide a forward-deployable nuclear capability that would ensure that DoD could provide senior leaders with a nuclear option relevant to a range of regional conflicts without levying a separate set of operational and fiscal requirements on the naval community.

Ensuring the United States continues to have a forward-deployable nuclear capability remains an important component of U.S. nuclear policy and force structure. By moving away from the Cold War concept of theater and strategic nuclear forces to the concept of a "strike spectrum" with capabilities ranging from conventional to FDNF to CONUS-based nuclear forces, policy makers will increase their ability to develop effective U.S. nuclear policies



and contingency plans. In addition to considering a new conceptual approach to nuclear forces, the United States could move to a more cost-effective and credible forward-deployable nuclear capability by phasing out the TLAM-N, foregoing designing the JSF to be dual-capable, and using existing systems such as the B-2 and reconfigured SSBNs to fulfill this role.

## Introduction

Theater nuclear forces played an important role in U.S. defense policy throughout the Cold War. Today's international security environment, however, differs significantly from the Cold War context that originally prompted the development of these weapons. The United States no longer faces a conventionally superior foe in Europe, and is unmatched in military power. As a result, less powerful but hostile nations seek to counter the military superiority of the United States by pursuing programs to develop or acquire weapons of mass destruction. At the same time, the United States is reshaping its own nuclear policy, as outlined in the 2001 Nuclear Posture Review (NPR). The Department of Defense has begun implementation of the "New Triad" and is facing a variety of programmatic milestones concerning theater nuclear forces. The evolution of the strategic environment and the practical realities of the defense program require that the DoD re-examine the role of TNF in U.S. defense policy to determine what role, if any, these weapons should play in the future.

During the Cold War, TNF strengthened the transatlantic link between the United States and its NATO allies and also provided senior leaders with deterrent options for regional conflicts outside Europe. Are TNF still needed for these purposes? Looking to what roles these weapons might play in the future, the central question is whether TNF play a unique or especially efficient role in protecting U.S. interests against its adversaries, particularly rogue states. It is not clear today whether U.S. conventional strike power is sufficient to deter the use of chemical or biological weapons, or even the limited use of nuclear weapons, by a future adversary. At the same time, the "doomsday" associations of CONUS-based and submarine-based strategic nuclear forces (SNF) may strip them of some of the credibility needed to threaten adversaries effectively when conventional forces alone may not be enough. To determine whether TNF have a future role in U.S. defense policy, and what types of forces may be most useful, policy makers need to determine whether these forces provide deterrent and military options that are more credible than those offered by conventional weapons or strategic nuclear forces.

An analysis of what roles TNF could play in the future is needed not only because the strategic environment has changed so dramatically since the Cold War, but also because DoD is facing immediate programmatic questions concerning TNF systems. In particular, DoD will need to decide soon whether to continue funding maintenance of the nuclear variant of the Tomahawk (TLAM-N), currently stored in warehouses but available for deployment on attack submarines if needed. DoD is also likely to design the Joint Strike Fighter to be nuclear capable, a decision that will need to be finalized as JSF nears production in 2010. As the Department implements the

new nuclear policy outlined in the NPR, it also will need to determine whether new TNF capabilities should be pursued.

This study examines several key issues related to TNF:

- The roles TNF played during the Cold War and whether those roles remain relevant today and in the future,
- How TNF as a class of weapons may contribute to U.S. defense policy in the future,
- The advantages and disadvantages of specific TNF systems and alternatives relative to potential future roles for TNF

Based on this broad, cost-benefit analysis, the study makes specific recommendations concerning how the Department of Defense should address TNF as it builds the future defense program.

### **Project Approach**

In support of the Defense Threat Reduction Agency's Advanced Systems and Concepts Office, DFI Government Services undertook a comprehensive effort to analyze current and potential roles for TNF, focusing on strategy, policy, and operational issues. The study included a historical analysis to identify the range of roles TNF played during the Cold War and determine their relevance to the present; an analysis of the advantages and disadvantages of both TNF as a class of weapons as well as of specific TNF systems and alternatives, and development of policy recommendations for the role of TNF in the future.

The historical analysis focused on determining what roles TNF played during the Cold War and whether those roles remain relevant in today's strategic environment. To conduct this analysis, the study team reviewed historical literature and examined past policy assumptions and decisions, operational concepts, missions (especially in regional scenarios), and warfighting doctrines. The historical analysis also examines the key problems faced by earlier planners and critical policy debates concerning the potential employment of theater nuclear forces.

Using the results of the historical analysis as a starting point, the study team then identified a set of possible future roles for TNF, focusing on the key defense policy goals outlined in the 2001 Quadrennial Defense Review: assuring allies and friends, dissuading, deterring, and if necessary, defeating any and all adversaries. Once possible future roles for TNF were identified, the study team examined the advantages and disadvantages of TNF as a class of weapons in each of these roles, as well as the pros and cons of specific TNF systems and alternatives. The study team concluded its analysis by examining

the costs — operational, budgetary, and political — associated with theater nuclear forces.

To supplement this analysis, the project team interviewed personnel from the nuclear planning staffs at several combatant commands, including European Command, Central Command, Pacific Command and Strategic Command. As the potential operational end-users of TNF, the command staffs have a unique perspective on many of the issues surrounding the future of this capability. Interviews with command staff focused on gaining insights into how planners in the regional theaters viewed the utility of TNF, particularly in terms of assuring allies and deterring adversaries. The study team also explored whether command staffs viewed specific TNF systems or TNF alternatives as particularly useful.

Based on this analysis, the study team developed specific recommendations for what roles TNF might play in the future, what systems appear most relevant, and how TNF best fit into broader U.S. nuclear policy. Ultimately, any assessment of the degree to which specific classes of weapons or specific weapon systems assure allies or dissuade or deter adversaries will be a somewhat subjective judgment based on available analytical evidence. Certain study conclusions are based primarily on empirical information, such as the finding that theater nuclear forces entail significant budgetary and operational costs. Other study conclusions, such as the finding that TNF play little role in assuring allies or dissuading adversaries, involve a greater degree of subjectivity due to the inherent difficulties associated with evaluating empirically what assures allies or deters adversaries. While a range of recommendations could flow from the analysis in the report depending on differing assessments of risk, the conclusions and recommendations outlined in the study are illustrative of the assessments being made by many of the nuclear experts and practitioners who were interviewed for the project.

### **Historical Analysis of TNF Roles**

Although the strategic environment has changed dramatically over the last decade, the historical experience of TNF in the Cold War may still offer lessons relevant to U.S. defense policy in the future. The study team concluded that TNF fulfilled two primary roles throughout the Cold War — deterring Soviet aggression despite U.S. relative conventional weakness by coupling the United States to its NATO allies, and strengthening U.S. deterrent threats in regional conflicts outside Europe. Clearly TNF are no longer strongly needed to ensure the commitment of the United States to Europe, but they may continue to offer utility in regional contexts.

In the European theater, the standing presence of theater nuclear forces served both to underscore the seriousness of the U.S. commitment to Europe, and to

create a series of credible steps on the escalation ladder that would deter the Warsaw Pact and encourage it to seek stable and peaceful relations with the West. Under the “flexible response” strategy that took shape in the 1960s, these forces provided NATO with the credible means to defeat an attack by numerically superior Warsaw Pact conventional forces without immediately escalating the conflict into a homeland-to-homeland exchange.<sup>2</sup>

Beginning in the mid-1970s, the deployment of a new generation of Soviet SS-20 mobile intermediate-range ballistic missiles (IRBMs), fostered concerns that the Warsaw Pact was acquiring a fundamentally new warfighting capability. Some European leaders, particularly West German Chancellor Helmut Schmidt, feared that the SS-20s might drive a wedge between the United States and its European allies by allowing the Soviets the possibility of a massive response to any first use of nuclear weapons by NATO. By forcing the decision whether to escalate to a homeland-to-homeland exchange on the United States, this scenario threatened to create a break in the escalation ladder, undermining the credibility of a potential NATO nuclear first strike.

After a contentious debate in the late 1970s, NATO decided to respond to this challenge with its own new generation of “theater” nuclear weapons, some of which became operational in the early 1980s. But by this time, European leaders faced domestic opposition to the deployment of nuclear weapons designed for use solely on European soil. The resulting tensions within NATO encouraged the Reagan Administration to conduct talks with the USSR to eliminate all intermediate-range missiles. The Intermediate-Range Nuclear Forces (INF) Treaty, concluded in 1987, ended the controversy by eliminating the entire class of weapons from the inventories of both sides.

NATO planners also faced the challenge of assuring the credibility of nuclear deterrence by “coupling” the United States and Europe at the operational level. To persuade Soviet leaders that NATO would be capable of conducting a first strike, they developed plans for the employment of theater nuclear weapons that integrated European armed forces into nuclear policymaking, planning, and execution. In 1966, NATO created the Nuclear Planning Group (NPG), involving Europeans in policy, operations, and nuclear stewardship. The Alliance developed “dual-key” processes requiring agreement from U.S. and European leaders for launch authorizations, and arranged for the delivery of nuclear weapons in Europe by European air forces. This environment of shared planning and execution of nuclear options involved the sharing of risks, authority, and political consequences between the United States and Europe, and fundamentally linked the fate of the United States to that of Europe.

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<sup>2</sup> NATO (North Atlantic Treaty Organization). North Atlantic Military Committee. *Final Decision on MC 14/3 - Overall Strategic Concept for the Defense of the North Atlantic Treaty Organization Area*. 16 January 1968. [<http://www.nato.int/docu/stratdoc/eng/a680116a.pdf>]

By making the potential use of nuclear weapons integral to NATO war plans, and preparations for their use virtually automatic as the Alliance mobilized for war, this strategy of coupling helped to overcome some of the inherent problems of forward deployment of nuclear weapons in the European theater. American military commanders viewed forward-deployed weapons as most useful early in a hypothetical conflict, when they could smash the Soviet front lines with less risk to NATO troops, aiming to break the Soviets' will to continue their offensive. The limitations of command-and-control technologies also dictated a need for delegating release authority during war to commanders in the field. Yet European leaders, particularly German officials, on whose national soil such weapons would be used, were understandably reluctant to dwell on nuclear use any sooner than the last possible moment. The momentum for nuclear use built into NATO war planning helped to overcome the loss of credibility that these differences may have created. As a result, while serious internal divisions existed within NATO on the role of TNF, forward-deployed weapons in Western Europe made NATO's threat of first use credible, helping to deter Soviet attacks.

Theater nuclear weapons also played roles in several crises outside of Europe. These events included U.S.-Chinese confrontations in the Taiwan Straits, (1954 and 1958), tensions with North Korea (1975), and the Middle East crisis of 1973. In these cases, American and Soviet officials did not face the complexities of European alliance relations. They were able to use TNF to signal their resolve to support allies, and to provide credible forces to deter or defeat enemies. In each case, forward deployment of TNF appeared to reinforce a superpower's deterrent threat and strengthen its hand in crisis diplomacy.

The presence of forward-deployed U.S. nuclear weapons in Guam, Hawaii, and Japan may have enhanced the credibility of President Eisenhower's threats to consider using tactical nuclear weapons against China.<sup>3</sup> In 1954 and 1958, mainland China applied military pressure against Taiwan, conducting heavy shelling of small Taiwanese-held offshore islands. In both instances, these actions led President Eisenhower and his key advisers to believe that it was important to prevent China from seizing the island, lest this outcome whet the mainland's appetite for an attack on Taiwan itself. After Taiwan's January 1955 decision to evacuate some of the less defensible islands, Eisenhower indicated publicly that he saw no reason why nuclear weapons "shouldn't be used exactly as you would use a bullet or anything else,"<sup>4</sup> a sentiment echoed the next day in Vice President Nixon's assertion that "tactical atomic weapons are now conventional and will be used against the

<sup>3</sup> Norris, Robert S., William M. Arkin and William Burr. "Where They Were." *The Bulletin of the Atomic Scientists*, vol. 55, no. 6, November/December 1999, pp. 26-35.

<sup>4</sup> Betts, Richard K. *Nuclear Blackmail and Nuclear Deterrence*. Washington, D.C: The Brookings Institution, 1987, pp. 59.

targets of any aggressive force.”<sup>5</sup> These statements, as well as a leak in March from the Chief of Naval Operations concerning U.S. nuclear planning against China, have led many experts to conclude that nuclear threats were a significant factor in the subsequent Chinese decision to desist. In the renewed crisis of 1958, the combination of a clearly enunciated nuclear threat with the actual deployment of nuclear-capable systems – 8-inch howitzers deployed to the island of Quemoy – appears to have had the same effect.

American experience in Asia offers another possible example of the utility of TNF in regional crises. After the fall of Saigon to the North Vietnamese in 1975, U.S. officials became concerned that North Korea might become emboldened enough to launch an attack on South Korea. To reinforce the credibility of the U.S. commitment, Secretary of Defense Schlesinger for the first time publicly confirmed the presence of U.S. nuclear weapons in Korea, and threatened nuclear retaliation against any attack on Seoul.<sup>6</sup> The feared North Korean adventurism did not materialize.

Finally, during the October 1973 war between Israel and the combined forces of Egypt and Syria, the Soviet Union may have deployed nuclear weapons to Egypt in support of its own crisis diplomacy with the United States. The failure of a cease-fire to take hold left several Egyptian divisions encircled by Israeli forces and facing the threat of annihilation. Moscow threatened unilateral action to enforce the cease-fire – understood at the time as the deployment of Soviet troops to Egypt – if the United States did not restrain Israel. A few days previously, U.S. intelligence detected radioactive materials on a Soviet ship entering the Mediterranean. The ship docked at Port Said in Egypt on October 25. The presence of a Scud missile brigade nearby led the U.S. intelligence community to fear that the ship carried nuclear warheads.<sup>7</sup> Concerned over the situation, the United States raised its military readiness level worldwide, including taking steps intended to draw attention to U.S. nuclear capabilities. The crisis was soon resolved.

Each of these crises demonstrates how regional deployments of TNF provided a relatively visible nuclear capability that appeared to make superpower nuclear threats more credible than strategic forces alone.

Although there appears to have been a broad consensus among U.S. decision-makers regarding the political-military utility of TNF, U.S. military commanders during the Cold War period struggled with questions of their military utility and with the high costs of maintaining TNF in the operational

<sup>5</sup> Chang, Gordon H. “To the Nuclear Brink: Eisenhower, Dulles, and the Quemoy-Matsu Crisis.” *International Security*, vol. 12, no. 4, Spring 1988, pp. 108.

<sup>6</sup> Marden, Murrey. “Schlesinger Sees Buildup in Soviet Arms.” *The Washington Post*, 21 June 1975.

<sup>7</sup> Blechman, Barry M. and Douglas M. Hart. “The Political Utility of Nuclear Weapons: The 1973 Middle East Crisis.” *International Security*, vol. 7, no. 1, Summer 1982.

force structure. For example, a NATO exercise in 1989 simulating the integrated command and control procedures in a wartime setting showed the difficulty in gaining consensus on the most effective military use of the weapons in a crisis.<sup>8</sup> During the first Gulf War, when asked about the military utility of forward-deployed nuclear weapons, one senior U.S. military commander expressed reservations regarding the effectiveness of these weapons against a conventional military force deployed in the field.<sup>9</sup>

Based on these findings, can theater nuclear forces continue to play a uniquely effective role in protecting U.S. interests in the strategic environment of the present and the foreseeable future? In view of the absence of a major adversary in Europe, there is clearly a greatly diminished need for TNF to serve as a significant physical embodiment of the commitment of the United States to Europe's security. At the same time, threats from less powerful but hostile nations in the process of acquiring weapons of mass destruction, potentially including nuclear weapons, persist. Based on historical experience, TNF may still have a role in regional crises, particularly when there appears to be an asymmetry in what is at stake for the United States compared to its adversary.

## Assessment of TNF As a Class of Weapons

### Analysis and Findings

To determine whether TNF continue to be relevant to the current and future strategic environment, particularly in terms of regional crises, the study team conducted a four-part analysis. The study team first identified what broad roles TNF might play in the future, focusing on the four defense goals outlined in the 2001 Quadrennial Defense Review. Potential roles for TNF in the future include assuring allies and friends in peacetime and in crisis, dissuading adversaries in peacetime, and deterring, and if necessary defeating adversaries in crisis and wartime. The team then analyzed the advantages and disadvantages of these weapons for each role, both as a class, and in terms of specific TNF systems relative to potential alternatives such as conventional and strategic nuclear forces. Finally, the team outlined the costs associated with TNF to put their potential benefits into a broader context. The study team's analytic approach is outlined in Figure 1 below.

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<sup>8</sup> Daalder, Ivo H. *The Nature and Practice of Flexible Response: NATO Strategy and Theater Nuclear Forces Since 1967*. New York: Columbia University Press, 1991.

<sup>9</sup> Horner, General Charles. 1996. "The Gulf War: Oral History of General Charles Horner," *Frontline*. Public Broadcasting System, 9 January.



### Analytical Approach: Roles for TNF

Drawing on research and interviews, the study team explored the potential contribution of TNF to enhancing US security during peacetime, crisis, and wartime

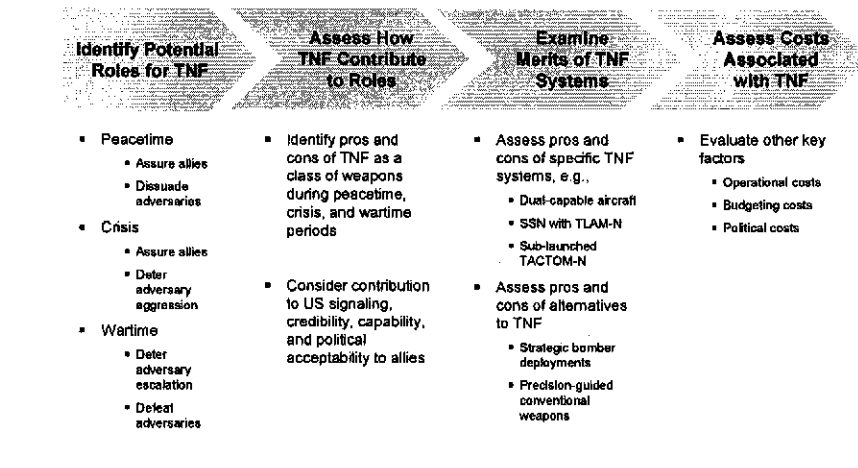


Figure 1

As part of the analytic approach, the study team reviewed a wide range of relevant literature and met with numerous nuclear policy and regional experts to discuss the key issues being examined in the study.<sup>10</sup> Finally, the project team interviewed personnel from the nuclear planning staffs at several combatant commands, including European Command, Central Command, Pacific Command and Strategic Command. As the potential operation end-users of forward-deployable nuclear weapons, the command staffs have a unique perspective on many of the issues surrounding the future of this capability. Interviews with command staff focused on gaining insights into how planners in the regional theaters viewed the utility of TNF, particularly in terms of assuring allies and deterring adversaries. The project team also explored whether command staff viewed specific TNF systems or TNF alternatives as particularly useful.

### TNF as a Class of Weapons: Role Analysis

Theater nuclear forces potentially could play a number of roles in the future. First, TNF may contribute to assuring allies and friends, in peacetime and during crises. Theater nuclear forces may also dissuade adversaries during

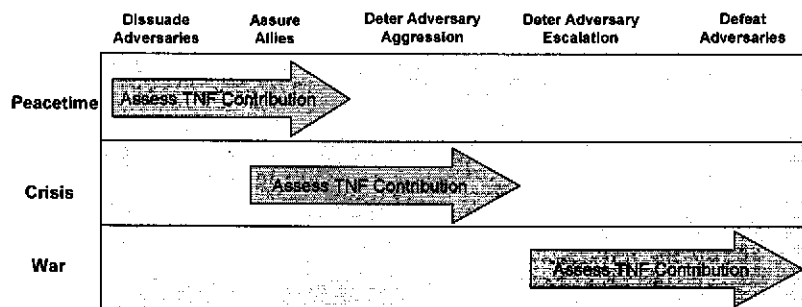
<sup>10</sup> Experts interviewed by the project team include: Dr. Victor Utgoff, IDA; Ms. Michele Flournoy, CSIS; Ms. Elaine Bunn, NDU, and BG Frank Klotz, NSC. The study team also interviewed staff in the following DoD offices and combatant commands: N-514 in the Navy Staff, XONO in the Air Staff, the J5 Nuclear Policy office, OSD Forces Policy, as well as members of the nuclear planning staffs at U.S. European Command, Central Command, Pacific Command and Strategic Command.

peacetime from competing militarily with the United States or taking other actions with negative consequences for U.S. security. They also may play a role deterring adversaries from aggression, and possibly even use of WMD during a crisis. Finally, should a crisis escalate into open hostilities, TNF may contribute to defeating adversaries decisively. The study team examined the advantages and disadvantages of TNF as a class of weapons in terms of each of these possible future roles (Figure 2). In particular, for each role the study team focused on assessing the political impact of TNF, their signaling capability in terms of allies and adversaries, their credibility, and finally, their military capability.

### Identify Key Roles for TNF

With robust advanced conventional (ACW) and strategic nuclear force (SNF) capabilities, do TNF make a unique and meaningful contribution to US deterrent and / or operational capabilities?

#### Key TNF Roles



Task II Objective: Assess the pros and cons of TNF during peacetime, crisis and wartime in terms of key US strategic goals— assuring allies, dissuading, deterring and defeating adversaries

Figure 2

### Assuring Allies in Peacetime and Crisis

In terms of assuring allies of a U.S. commitment to their security in peacetime, deploying nuclear weapons into the theater may boost the credibility of U.S. security guarantees. Nuclear deployments also may dampen incentives for allied nations to seek their own independent nuclear capabilities, or to build or sustain large conventional military capabilities dedicated to territorial defense. If coupled with effective diplomacy, in some cases nuclear deployments could perhaps even provide an economy of force, allowing the drawdown or redeployment of U.S. conventional forces to higher priority theaters without compromising the perceived strength of U.S. commitment.

Although TNF may reassure allied governments of U.S. commitments to their security, forward deployment of nuclear forces into the theater may also become politically controversial. Allies who are not facing a compelling threat may encounter strong domestic opposition to TNF deployments and question the need for nuclear weapons on their soil as a result, making such deployments difficult to sustain. For example, while domestic opposition in Europe to existing U.S. nuclear deployments in theater is not strong, many experts and military planners argue that NATO has no appetite to focus on TNF in Europe for fear of drawing public attention to the topic.

Characterizing the issue of U.S. TNF in Europe as a Pandora's Box best left unopened, several experts interviewed by the study team stated that if NATO took up the issue, many European governments would face strong public support for eliminating these weapons from Europe altogether. Bureaucratically, TNF in Europe help certain NATO allies justify defense spending, which may lead these allies to be supportive of maintaining TNF in Europe, but in view of the low threat level, these governments would likely find it difficult to build a strong military justification that these forces are needed for deterrence or warfighting. In regions less stable than Europe, such as the Korean peninsula, allies may face the opposite problem, i.e. TNF may actually reassure allied governments and publics of the strength of the U.S. commitment to their security, but this reassurance may be outweighed by concerns that such deployments will provoke regional adversaries and increase instability in the theater.

In a crisis, TNF offer allies and friends a potentially highly visible reminder of U.S. commitment to their security, which may increase their ability to stand firm against a particular adversary. Particularly if faced with a WMD threat, allies may feel that TNF are more likely than conventional forces alone to deter an adversary from aggressive actions. On the other end of the spectrum, allies may feel that a U.S. threat to use a strategic nuclear weapon is not particularly credible, and hence unlikely to deter adversary aggression. Allies may view TNF as an intermediate option that provides additional deterrence beyond conventional forces but that is also more credible than threatened use of strategic nuclear forces.

Precisely because certain types of TNF can be very visible reminders of U.S. commitment and U.S. threats against an adversary, allies may in fact be reluctant to allow nuclear basing or operations on their soil for fear of increasing their exposure as a potential target or increasing the potential for a crisis to escalate out of control. Public concern about support for U.S. nuclear deployments may create additional negative pressure on allied governments. Finally, because of the inherent uncertainty surrounding deterrence, allies may simply harbor doubts about whether adversaries in the region will find U.S. nuclear-backed threats credible. Particularly during a crisis, most experts at the combatant commands and outside DoD were skeptical that allies would be

particularly assured by U.S. theater nuclear forces. In most cases, they argued, allies are likely to conclude that the assurances such deployments might offer would be outweighed by the greater exposure to potential adversary hostile action hosting or supporting such forces would engender.

On balance, TNF do not appear to offer clear advantages for assuring allies. The existing TNF in Europe may provide some disincentive for allies in that region to develop an independent nuclear capacity, but this benefit is of minimal value as long as the general threat level to European allies remains low. In other regions, the benefits of theater deployment appear likely to be outweighed, to varying degrees, by allied concerns about domestic resistance and provoking adversaries into accelerated proliferation activity or regional aggression.

#### **Dissuading Adversaries**

In terms of dissuading adversaries, the study team focused on determining whether TNF as a class of weapons contribute to the ability of the United States to discourage future military competition and complicate military planning for its adversaries. When deployed into theater as part of the permanent U.S. footprint, TNF may serve to demonstrate very visibly the firmness of the U.S. commitment to the security of its allies in the region, which may have a dissuasive effect on its adversaries. By demonstrating clearly its superior military capabilities, TNF deployments may enhance the ability of the United States to convince potential adversaries to abstain from menacing behavior or, at a minimum, to moderate menacing behavior.

At the same time, deploying nuclear weapons into the theater, even in peacetime, could aggravate regional tensions. By highlighting the nuclear aspect of U.S. military superiority, TNF deployments might tend to underscore the so-called "lesson of the Gulf War," i.e. that the only adversaries the United States hesitates to engage militarily are those that already have nuclear weapons. As a result, such deployments may actually increase the likelihood that potential adversaries will seek to develop or acquire their own WMD arsenals and delivery systems to offset U.S. superiority.

In the absence of visibility into adversary decision-making, it is not at all clear whether TNF can significantly dissuade adversaries. Theater nuclear weapons do demonstrate a high level of U.S. commitment to the security of friends and allies, and may serve as a reminder of the overwhelming superiority of the U.S. military. But the very strong reasons not to use nuclear weapons – operational, political, and otherwise – are likely to reduce their credibility as a threat against a conventionally inferior opponent, and dampen their dissuasive power as a result.

#### **Deterring Adversaries in Crisis and Wartime**

In terms of deterring adversaries during a crisis, TNF provide U.S. senior leaders with a military option that can be used to signal in a highly visible way the commitment of the United States to its allies and friends and the seriousness of its deterrence threats. Theater nuclear forces also provide a military option that may deter adversaries without requiring large-scale deployments of U.S. conventional forces. The ability to threaten military action without exposing large numbers of U.S. forces increases the credibility of U.S. threats, and may facilitate the ability of the United States to conduct major combat operations in one theater while deterring a significant adversary in another region. Secretary of Defense Rumsfeld underscored the potential to use forward deployed nuclear weapons as a "force multiplier" when he decided in March 2003 to deploy twelve B-1 and twelve B-52 bombers to Guam to signal to North Korea that while the United States was focused on Iraq, it continued to be mindful of its security interest on the Korean peninsula. Finally, TNF may add to the ability of the United States to deter its adversaries simply by keeping adversaries guessing about whether such forces are in theater, and if so, whether the United States would actually use them in response to regional aggression or use of weapons of mass destruction. Many experts believe publicly threatening at least the possibility of nuclear retaliation during the first Gulf War may have kept Saddam Hussein from using chemical or biological weapons. Planning for the more recent war against Saddam Hussein was certainly underway long before hostilities began, which meant that deployment of attack submarines armed with TLAM-Ns, for example, was certainly possible. Whether contingency plans for Operation Iraqi Freedom included such options is classified, but in deciding whether to use weapons of mass destruction to try to halt U.S. forces advancing on Baghdad, Saddam Hussein would have been prudent to factor in the possibility that such forces were in theater and available for use against targets in Iraq.

While TNF may provide useful military options for signaling purposes, adversaries generally perceive the U.S. threshold for nuclear use to be very high. As a result, they may not consider nuclear threats to be credible prior to the outbreak of hostilities, which would limit the potential contribution of TNF to deterring regional aggression. Allied concerns about TNF deployments, as discussed in the previous section, may further undermine the credibility of such forces. Many of the experts the study team interviewed emphasized that these disadvantages are likely to be particularly pronounced in cases where the United States is seeking to deter adversaries in Asia. North Korean leaders, for example, may be quite skeptical of the credibility of U.S. threats to use nuclear weapons in response to aggression, simply because such a strike would incur extensive collateral damage against South Korea and possibly even U.S. forces.

Moreover, while adversaries may question the credibility of TNF deployments, in certain circumstances some adversaries may be concerned

enough with the potential for their use in a conflict to consider a preemptive attack. The inclusion of preemption as an explicit option in the National Security Strategy of the United States may exacerbate this possibility. The risks associated with a TNF deployment intended to deter an adversary are particularly high when regime survival is a stake for the adversary and it possesses weapons of mass destruction. Once again, North Korea is an example of an adversary with an extensive WMD arsenal that appears to approach most conflict scenarios involving the United States with the assumption that its primary choice is between using WMD with the attendant risks of a nuclear response or jeopardizing the survival of the regime. Although the consequences of being on the losing end of that gamble are severe, adversaries like North Korea may well accept the risks because the alternative is certain destruction of the regime.

Once a conflict has begun, TNF deployments may provide U.S. senior leaders with a tool to deter the use of WMD and ensure the conflict remains conventional. The credibility of U.S. nuclear threats is likely to be greater in wartime than during a crisis simply because the stakes are higher once hostilities commence, hence TNF may be more effective as a deterrent during wartime than in the earlier phases of a crisis. Assuming the United States employs the full range of its conventional forces at the outbreak of a war, TNF deployments offer a clear escalation option that is likely to be credible enough to warrant serious consideration by the adversary and hence has the potential to increase the ability of the United States to deter WMD use against its forces, allies and territory.

While some adversaries may view TNF deployments as more credible than threatened U.S. use of strategic nuclear forces, others may perceive the nuclear threat to be inherent during a conflict with the United States, making the distinction between TNF and SNF less relevant and eroding the deterrent value of theater nuclear weapons. As is the case during the initial phases of a crisis, once full-scale hostilities commence, adversaries whose regimes are at stake and who possess weapons of mass destruction may choose to launch a preemptive WMD attack in the face of TNF deployments, reasoning it makes more sense to "use or lose" their trump card than gamble and lose on the credibility of U.S. threats. In a related vein, adversaries might choose to employ the "salami slice" approach, judging that the credibility of U.S. threats to retaliate with nuclear forces in theater is low as long as their use of WMD is limited. Certain adversaries may decide that a strategy of limited use of chemical or biological weapons could serve its interests no matter how the United States chooses to respond. If the United States fails to respond to limited WMD use with theater nuclear forces deployed earlier in the conflict, the adversary exposes the hollowness of U.S. threats and undermines its entire deterrence policy. If the United States does respond using a theater nuclear weapon, it would likely attempt to do so with minimal collateral damage and if the international reaction to nuclear use was sufficiently negative, it might

actually generate pressure for a peace settlement on terms that allow the regime to continue.

Theater nuclear forces appear better suited to deterring adversaries in crisis than in wartime, particularly in terms of deterring possible use of weapons of mass destruction. TNF provide senior leaders with a tool to signal U.S. commitment to its allies during a crisis, as well as the seriousness of its retaliation threats to an adversary. The usefulness of TNF in deterring adversaries is illustrated by the fact that planners in regional combatant commands whose areas of responsibility include flash points such as the Taiwan Straits, the Korean Peninsula and the Middle East universally argued that the United States should retain some sort of deployable nuclear forces, even if their absolute deterrent value is impossible to quantify. For these commands, TNF are a useful, if not irreplaceable component of the war planning and warfighting toolkit.

#### **Defeating Adversaries in Wartime**

In terms of defeating adversary targets in wartime, theater nuclear forces are highly capable and provide senior leaders with the ability to destroy almost any target. The nuclear planning staffs at the regional combatant commands repeatedly emphasized that from a planning perspective, the only real difference between TNF and SNF is the fact that employment of certain types of TNF would require revisiting the decision the United States made in the 1991 PNI to withdraw these systems from all surface ships, attack submarines and naval aircraft bases. When deployed into the theater, TNF systems can be used relatively quickly against time-sensitive or rapidly emerging targets. Furthermore, if such systems could be armed with warheads capable of destroying hard and deeply buried targets at some point in the future, TNF would offer a definitive capability to destroy enemy WMD as well as to deny any and all sanctuary to adversary leadership.

While TNF are highly capable from a strictly operational perspective, in most cases strategic nuclear forces offer the same military effectiveness. Even advanced conventional forces can be used to tremendous destructive effect against many types of targets, and their use does not threaten destruction of the political taboo against use of nuclear weapons. The political ramifications of nuclear use, particularly a United States first use of nuclear weapons, would be enormous. Even if the United States used a theater nuclear weapon in response to an unprovoked chemical or biological attack, first use of nuclear weapons would risk legitimizing such weapons, undermine the global nonproliferation regime, and likely create a global political backlash against the United States with unpredictable consequences.

On balance, TNF do not offer substantially unique capabilities to defeat adversary targets. Among nuclear systems, CONUS-based platforms and SSBNs also could be employed in a timely fashion, and collectively can

deliver a wide range of warhead yields. Strategic bombers, like DCA, can be re-targeted up to the last minute. While TNF certainly provide greater destructive capabilities than even advanced precision conventional forces, such forces offer considerable destructive power and are far more likely to be employed because they are so much more politically palatable to senior U.S. leaders. As a result, TNF do not appear to offer significant benefits in terms of warfighting relative to advanced conventional forces and strategic nuclear forces.

## **Assessment of Specific TNF Systems and Alternatives**

### **Analysis and Findings**

After assessing what roles TNF as a class of weapons might play in the future, the study team then focused on assessing the relative utility of a range of specific, illustrative TNF options that might be used to fulfill these roles. The project team also assessed the advantages and disadvantages of advanced conventional forces and strategic nuclear forces in each of these roles.

Because there was not likely to be significant differences among specific TNF systems and TNF alternatives in terms of how these systems contributed to dissuading adversaries or significant differences in how these systems contribute to assuring allies in crisis versus in peacetime, the study team focused on assessing these systems for their contribution to three roles in particular: assuring allies in crisis, deterring adversaries, and defeating adversaries.

The study team selected the following five options as illustrative theater nuclear force systems and potential alternatives, to include strategic nuclear systems and advanced conventional forces:

#### **1. Dual-Capable Aircraft (DCA) with Existing Warheads**

- At present, F-15E and F-16C/D aircraft capable of delivering B-61 nuclear gravity bombs are stationed at airbases in the United States and on NATO airbases in Europe. The F-35 Joint Strike Fighter (JSF) is likely to play this role in the future.

#### **2. DCA with HDBT Weapons**

- In view of current DoD interest in development of a new Robust Nuclear Earth Penetrator (RNEP) designed to destroy hard and deeply buried targets (HDBT), future dual-capable aircraft could be armed with an HDBT-capable weapon.



### 3. Submarine-Launched Nuclear Cruise Missile (N-CM)

- Fast attack submarines (SSNs) can be armed with Nuclear Tomahawk Land Attack Missiles (TLAM-N) and deployed for use in regional contingencies, although they are currently not deployed at sea routinely due to the 1991 PNI. A future variant of this option includes a next-generation Nuclear Tactical Tomahawk (TACTOM-N) deployed either on SSNs or on *Ohio*-class ballistic missile submarines reconfigured as guided missile submarines (SSGNs).

### 4. Strategic Bomber Deployments

- B-2 or B-52 bombers can be deployed to forward bases during a crisis, and can deliver nuclear-armed air-launched cruise missiles (ALCMs) or advanced cruise missiles (ACMs) or nuclear gravity bombs.

### 5. Advanced Conventional Forces (ACF)

- The United States has a range of air, sea, and land-based platforms that can be deployed in theater and used to deliver highly precise advanced conventional munitions with considerable destructive effects.

#### Assuring Allies

The study team examined each of the five options in terms of their ability to assure allies during a crisis. Although specific platforms offered particular advantages and disadvantages, options that offer strong signaling capabilities generally appeared more likely to be effective in assuring allies. At the same time, because these types of options offer a more visible presence, their overall effectiveness seems to depend on whether allies and friends are willing to absorb the costs — political, operational, and budgetary — of providing basing or overflight rights for such systems.

For example, DCA are relatively visible and easily moved, which means they can be used to signal U.S. commitment and intentions in a reasonably clear manner. Their visible presence on the territory of a friend or ally may strengthen the credibility of the U.S. commitment to that country. Countries that host U.S. nuclear munitions, dual-capable aircraft, and supporting infrastructure, or that possess aircraft of their own capable of carrying U.S. nuclear munitions, work closely with the United States on nuclear matters. This nuclear cooperation likely serves to underscore on a practical level the commitment of the United States to those nations. The joint training and exercises the United States conducts with these countries in connection with its DCA capability concretely offer adversaries a reminder of both the capabilities of the United States military and the commitment of the United States to use those capabilities in defense of its friends and allies. The

presence of these assets in a given theater is highly visible and may increase the credibility of U.S. deterrence policy, which in turn means allies may feel more assured than they would if only less visible TNF options were available.

At the same time, while nuclear-armed DCA, nuclear armed-DCA with the additional capability of an HDBT warhead, and strategic bombers deployed in theater all offer significant signaling capability, their effectiveness in assuring allies during a crisis can be offset somewhat by their very visibility. If allies fear that hosting such visible U.S. capabilities or infrastructure increases the potential for them to become targets, or if their publics oppose such deployments, the ability of these options to assure allies decreases. These concerns may be particularly acute for DCA armed with nuclear HDBT munitions, because their potentially unique ability to deny adversaries sanctuary may invite preemption. Conversely, while ACF deployments are highly visible, if there are already significant deployments of this nature in a volatile theater, the value of additional ACF may not be as clear and the degree to which allies are reassured may not increase significantly.

In contrast to the relatively high visibility of DCA or strategic bombers deployed in theater, submarines armed with nuclear cruise missiles such as TLAM-N or TACTOM-N are stealthy by design. Although these platforms are highly capable, their effectiveness depends on maintaining their invisibility. Because allies are unlikely to know when such capabilities are deployed in their region, they are less likely to be assured by their presence than by more visible TNF systems or alternatives. Moreover, allies may worry that adversaries who realize that TLAM-Ns require considerable advance planning to be deployed may not find them particularly credible, and hence may not find this type of system very reassuring. If the PNI were lifted and TNF were redeployed at sea on a routine basis, they would likely serve as a greater deterrent to adversaries and hence be more assuring to allies as well.

In terms of assuring allies, the specific TNF systems or alternatives most likely to be effective are those that provide clear signaling capabilities while minimizing the political challenges associated with their deployment. DCA and strategic bombers armed with existing nuclear munitions are highly visible, offer senior leaders the capability to demonstrate that the United States has the capacity to escalate beyond the conventional level if necessary, and may entail fewer political costs to allies than hosting a DCA armed with an HDBT warhead. Advanced conventional forces, while highly visible, may not be as assuring to allies because it is unclear whether adversaries would correctly interpret the intent behind the deployment of additional conventional platforms into theater during a crisis. Finally, submarine-launched nuclear cruise missiles do not appear to offer substantial potential for assurance, since they are not visible to allies or adversaries.

**Deterring Adversaries in a Crisis**

In a crisis, conveying the presence of nuclear warheads underscores U.S. commitment and credibility to an adversary. As is the case with assuring allies, TNF systems and alternatives that offer strong signaling capabilities generally appear more likely to be effective in deterring adversaries. For example, DCA are relatively visible and easily moved, which means they can be used to signal U.S. intentions to an adversary. The dual-capable nature of these aircraft, however, requires that in order for these systems to be effective as a TNF platform in deterring adversaries, they must be understood to be likely nuclear delivery platforms. If an adversary fails to understand their presence in theater as a nuclear asset, they will simply be another conventional platforms that would likely represent just a marginal, quantitative increase of conventional forces already in theater. Deploying DCA to bases already equipped to host U.S. nuclear munitions, at a minimum, would create a more persuasive signal of nuclear deployment that is more likely to increase the credibility of U.S. deterrence threats.

At the same time, nuclear-armed DCA (with or without HDBT warheads) or strategic bombers deployed in theater also present disadvantages in terms of deterring an adversary during a crisis. As noted in the discussion of the pros and cons of TNF as a class of weapons, deployment of a visible nuclear capability within an adversary's reach could invite preemptive attack, particularly in light of U.S. doctrines that highlight the possibility of preemption by the United States. These concerns may be particularly acute for DCA armed with nuclear HDBT munitions, due to their potentially unique ability to deny adversaries sanctuary.

Advanced conventional platforms such as aircraft carriers also offer significant signaling capability, but if there are already major conventional deployments in an already volatile theater, the additional advanced conventional forces may not significantly contribute to U.S. efforts to deter its adversaries. Whether ACF can effectively deter adversaries from WMD use is particularly unclear, but many experts expressed skepticism that ACF alone would be sufficient to deter such activity, particularly if the adversary believed the survival of its regime was at stake.

While submarines armed with nuclear cruise missiles offer minimal signaling capability, their stealthy nature may contribute to deterring adversaries by forcing adversaries to assume for planning purposes that such platforms are in theater and could be used by the United States during a conflict. In general, war planners at the regional combatant commands argued that stealthy TNF systems such as submarines armed with TLAM-Ns were inherently valuable because they "keep the bad guys guessing." War planners also noted that because submarines armed with TLAM-Ns, or a future variant of the TLAM-N, do not require host-nation support or forward-based infrastructure, they

were less likely to create political controversy with U.S. allies and friends that might cause adversaries to question the potential for their use.

In terms of deterring adversaries in a crisis, the TNF systems and alternatives most likely to be effective are those that provide clear signaling capabilities while also offering the possibility of stealth to keep adversaries off guard and minimize the political challenges associated with their deployment. Strategic bombers armed with existing nuclear munitions can be made highly visible, offer senior leaders the capability to demonstrate that the United States has the capacity to escalate beyond the conventional level if necessary, and are potentially deployable to U.S. facilities in regional theaters. Deployment of strategic bombers like the B-2 may entail fewer political costs to allies than hosting traditional DCA, especially DCA armed with HDBT warheads. As an alternative to TNF, the B-2 bomber in particular provides senior U.S. leaders with enough flexibility to be used for signaling in a crisis, but also offers a less vulnerable profile than traditional DCA to air defenses or a preemptive adversary attack if it is launched during a conflict from the continental United States or from a base in theater that is beyond the range of adversary aircraft and missiles. While strategic bombers are not generally viewed as theater weapons, at least one regional combatant command strongly noted their potential as an extremely viable alternative to traditional theater nuclear forces.

#### **Defeating Adversaries in Wartime**

As noted in the discussion of the merits of TNF as a class of weapons in terms of their ability to defeat adversaries in wartime, there do not appear to be significant differences among the various TNF systems and alternatives in terms of their technical capabilities. Whether deployable in theater or generally viewed as a strategic platform, the nuclear systems the study team assessed provide powerful capabilities for senior leaders seeking to defeat adversaries during wartime. Dual-capable aircraft armed with nuclear gravity bombs can reach and destroy most potential enemy targets, including DUG targets; next-generation nuclear weapons could potentially provide DCA with an HDBT capability. The primary disadvantage of these systems is their relative vulnerability to enemy air defense or to a preemptive attack in the course of ongoing hostilities. Submarine-launched nuclear cruise missiles, like DCA, offer promptness and effective use against emerging targets with the added advantage of limited vulnerability to preemptive enemy attacks. The primary disadvantage of the TLAM-N is potential for the missile to fall short of the target, leaving an un-detonated nuclear warhead at an unknown point on the battlefield.

While advanced conventional forces do not offer the same degree of destructive power as do nuclear systems, the political threshold for their employment is dramatically lower, which increases their appeal from the perspective of war planners. These systems are capable of destroying a wide

range of adversary targets, with increasingly greater precision and effectiveness. Advanced conventional forces offer U.S. leaders tremendous destructive potential against enemy targets, but with greater control and more acceptable collateral damage limits than existing nuclear systems can offer. Ultimately, however, these weapons cannot be used to destroy all types of DUG targets or all hard and deeply buried targets; nor do they offer great potential in terms of agent defeat capabilities. While existing nuclear systems also lack these capabilities currently, there is greater chance such capabilities will be available on future nuclear systems due to their unique characteristics.

As summarized in Figure 3, in terms of specific TNF systems and alternatives to theater nuclear forces, the most significant differences are not their various warfighting capabilities, but rather the ability of these systems to provide senior leaders with military options that assure allies and deter adversaries. No one system offers senior leaders with every desirable characteristic — visibility to signal intent and commitment, stealth to ensure surprise and minimize political tensions, sufficient destructive power to defeat DUG targets, and precision to minimize collateral damage — but a careful review of all five options reveals that certain combinations of systems offer clear advantages and suggests the United States could do more to optimize its TNF capability.

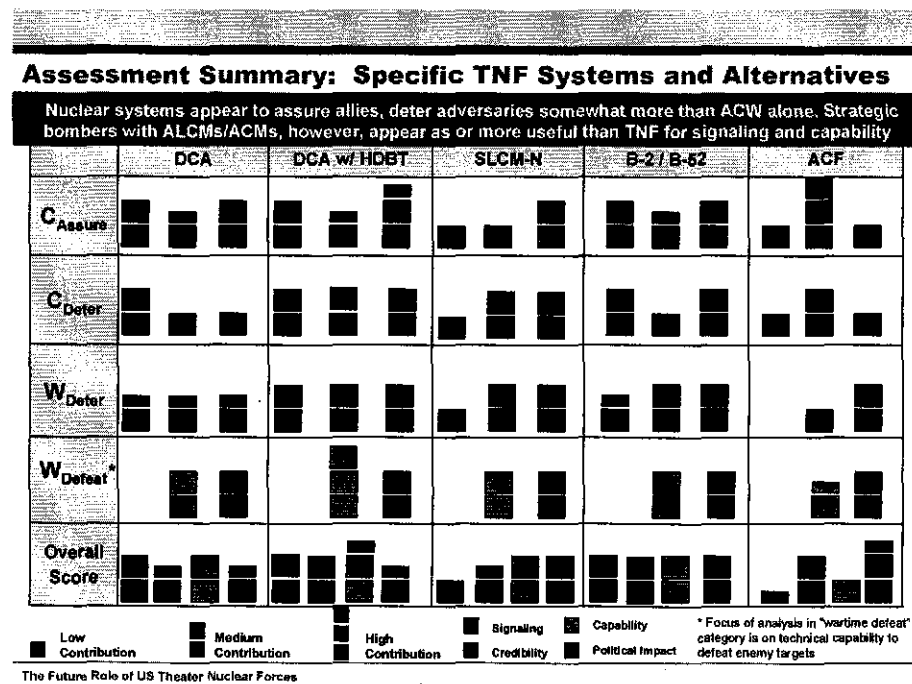


Figure 3

### **Costs Associated with Theater Nuclear Forces**

Before developing policy recommendations based on the preceding analysis, the study team also attempted to outline in broad terms the costs associated with TNF so that the advantages they may offer in terms of assurance, dissuasion, deterrence and defeat of adversaries can be put into context. Particularly if the Department of Defense considers development of HDBT-capable nuclear warheads for DCA or the deployment of a next-generation nuclear-armed Tactical Tomahawk cruise missile (TACTOM-N), maintaining TNF will entail significant operational and financial costs. Operational costs include certification requirements and forward basing preparations, while operational risks include the possibility of losing one or more undetonated cruise missile warheads. Financial costs include a wide range of maintenance, modernization, and infrastructure investments. For defense planners charged with the necessity of making resource-informed decisions, it will be crucial to determine whether the additional capabilities and flexibility offered by TNF, beyond the capabilities already available in ACF and SNF, can be developed and maintained at an acceptable cost.

In terms of operational costs, dual-use platforms such as DCA and SSNs armed with TLAM-Ns demand specially trained crews, certifications, and a wide range of security arrangements. These specialized requirements are in addition to the requirements associated with the conventional missions of these platforms. For example, forward bases where TNF systems and warheads will be received and housed must also be specially equipped to handle the unique operational requirements of nuclear weapons platforms. Such requirements include storage systems for nuclear warheads, special security procedures, and specialized equipment maintenance.

Certain types of TNF also entail specific operational risks. Because cruise missiles cannot be tracked closely in flight, TLAM-Ns, ALCMs, and ACMs pose potential security and proliferation challenges. Any nuclear-armed cruise missile that falls short of its target or warhead that fails to detonate is at risk of being recovered by an adversary. In contrast, if an airdropped nuclear gravity bomb were to fail to detonate, it could be located and destroyed readily, most likely by dropping another bomb on the target.

In addition to the operational costs and risks associated with TNF systems, the maintenance, refurbishment, and modernization of TNF platforms and warheads would be costly. Next-generation weapons in particular would require considerable investment. For example, available estimates for TACTOM-N indicate such a system would cost least \$1.5 billion, while certification of the F-35 JSF as dual-capable will require, at a minimum, additional avionics, software, and testing.<sup>11</sup> While the Department of Defense

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<sup>11</sup> Cost estimate for the TACTOM-N provided in discussions with staff in Navy N514 office. CBO has estimated the costs of procuring just over 1700 conventional TACTOM missiles at approximately \$1.6 billion over the FY04-08 period. See CBO Cost Estimate of the

currently spends only approximately \$15 to 20 million annually for research and development on an HDBT weapon (the Robust Nuclear Earth Penetrator), funding for this capability would need to increase substantially in order for DoD to field such a warhead.<sup>12</sup>

Finally, expanding the nuclear infrastructure to support a more robust TNF capability – either in terms of TNF platforms or the geographic scope of activities – would likely entail significant costs. Currently, only the EUROM theater is capable of supporting regular deployment of nuclear weapons in theater. If DoD decided to deploy SSNs armed with TLAM-Ns on a rotational basis, most theaters would require some additional infrastructure – primarily to handle emergencies – to support some deployments.

Finally, any decision to shift certain platforms to a routine TNF footing would be likely to impose significant policy and political costs. Although military planners on the regional combatant command staffs argued that revisiting the 1991 PNI would make submarines armed with TLAM-Ns much more operationally useful, if even consideration of such a policy shift became known publicly, the United States would likely face considerable political controversy, particularly in light of existing concerns in the international community about the nature of U.S. foreign policy.

### **Outdated Theater Nuclear Forces-Strategic Nuclear Forces Dichotomy**

Not only did assessing TNF as a class of weapons and in terms of specific systems and alternatives reveal the potential and limits of this particular capability as part of the broader U.S. defense arsenal, it also highlighted the continuing confusion perpetuated by the theater nuclear forces/strategic nuclear forces construct. The TNF/SNF construct does not help policy makers focus on what role these weapons might play in the future, how these weapons are truly unique or whether this capability remains relevant to the current strategic environment.

Differentiating strategic from tactical or theater nuclear forces has long presented challenges. Definitions that point to range, targets, or warhead yields to distinguish one class of weapons from the other contain persistent ambiguities. For example, “strategic” platforms can deliver “strategic” weapons to “tactical” targets, while refueled “tactical” aircraft can deliver “tactical” weapons over “strategic” ranges to targets of either description.

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TACTOM program as described in S. 1050, the Senate version of the FY04 National Defense Authorization Act. [<http://www.cbo.gov/showdoc.cfm?index=4280&sequence=0>]

<sup>12</sup> In the FY04 National Defense Authorization Act, Congress approved the Administration's request to allow the National Nuclear Security Administration (NNSA) to spend as much as \$15 million to continue feasibility, cost and concept studies related to the Robust Nuclear Earth Penetrator.

Targets themselves do not break down cleanly into these two categories; airfields and command posts, for example, could be considered either tactical or strategic. Warhead yields also lack an obvious strategic-tactical demarcation, but overlap extensively, e.g., "tactical" TLAM-N warheads with a 200 kt yield in comparison to "strategic" ALCM warheads with a 5 kt yield. The existing TNF/SNF construct obscures a central and particularly relevant difference in today's strategic environment between the various types of existing nuclear systems, i.e. whether they can be forward deployed into theater.

### **Policy Recommendations And Conclusions**

A careful examination of what roles TNF could play in the future in terms of assuring allies, dissuading adversaries, and deterring and defeating adversaries makes clear that Cold War concepts about "theater nuclear forces" and even the kinds of systems themselves are far less relevant in today's new strategic environment. While discussions with the combatant command staffs emphasized that retaining a forward-deployable nuclear capability of some sort would be beneficial if it could be done at low cost, the commands do not appear to view forward-deployable nuclear forces as a central tool in the commanders' political-military or warfighting toolkits worthy of extensive investment.

In view of today's changed environment, two major recommendations concerning forward-deployable nuclear forces merit further review. First, characterizing U.S. nuclear forces as one part of a larger "strike spectrum" may facilitate greater clarity about the defining characteristics of nuclear systems in the U.S. arsenal and how they can best be used to support deterrence and warfighting efforts. Second, in light of the relatively modest contribution forward deployable nuclear weapons appear to make toward deterring adversaries, the United States should maintain a limited capability of this type as long such a capability can be maintained for minimal additional costs.

Shifting from a construct based on the division between theater and strategic nuclear forces to a comprehensive "strike spectrum" ranging from advanced conventional forces to forward-deployable nuclear forces (FDNF) to CONUS-based nuclear forces (CBNF) would focus military planners and senior leaders on the essential characteristics and strengths of the various military capabilities available for deterrence and warfighting (see Figure 4).



### The Strike Spectrum Concept

- **Finding:** TNF/SNF Dichotomy Is No Longer a Useful Construct
- **Recommendation:** Develop New "Strike Spectrum" Construct (ACF/FDNF/CBNF)
  - TNF/SNF dichotomy has always caused some confusion, and has been rendered obsolete by the New Triad and Global Strike concept
  - A new "strike spectrum" concept emphasizing capabilities ranging from advanced conventional forces to forward-deployable nuclear forces to CONUS-based nuclear forces better represents the different capabilities available to US decision makers

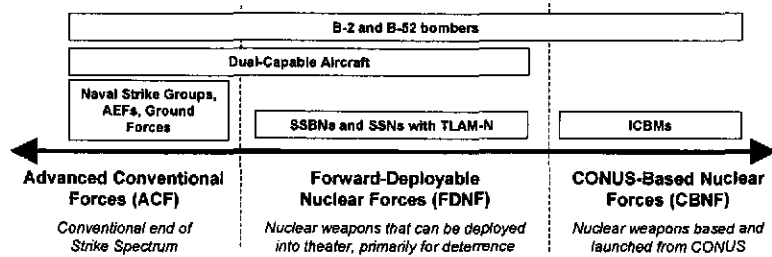


Figure 4

Shifting toward a "strike spectrum" would clearly differentiate between types of weapons and highlight their strengths, rather than create confusion over whether a particular system is a theater or strategic capability because it has a particular range or yield or could be used against a particular class of targets. For example, advanced conventional forces represent the "lower end" of this strike spectrum, in the sense that they offer U.S. leaders robust, but non-nuclear, military options to communicate U.S. intentions or ultimately to defeat adversary targets. Forward-deployable nuclear forces offer senior leaders a military option that many adversaries would perceive as a more serious demonstration of U.S. intent than advanced conventional forces alone. The term "forward-deployable" highlights the essential characteristic of systems in this class of weapons, i.e. their ability to be deployed into theater to communicate U.S. commitment to allies and friends, and signal the seriousness of U.S. deterrent threats against its adversaries. Because the threat posed by FDNF can be made visible and proximate to adversaries, they offer an escalation option that can be clearly differentiated from advanced conventional forces and is likely to be perceived by adversaries as more credible than a potential strike by nuclear forces based in CONUS, which may be "out of sight, out of mind" for many potential adversaries. At the opposite end of the spectrum from advanced conventional forces is the option of CONUS-based nuclear forces (CBNF). CONUS-based nuclear forces are those nuclear systems that are routinely based in the United States and launched from the United States. They include intercontinental ballistic missiles and nuclear-capable bombers such as the B-2 stealth aircraft. These

types of weapons offer senior leaders formidable military capabilities but are perhaps better suited for existential deterrence and actual operations than for crisis deterrence. This strike spectrum construct highlights the essential differences between the different capabilities available to U.S. leaders and focuses attention on how such capabilities might best be used while avoiding labels that create false distinctions about where such capabilities can be employed or against what kinds of targets.

In addition to rethinking how the United States differentiates between its nuclear forces, the Department of Defense may also want to weigh carefully the benefits FDNF offer relative to the costs of such a capability. While inherently difficult to quantify precisely, based on discussions with experts in the field and planning staffs at regional combatant commands, FDNF do appear to offer a potential contribution to deterring adversaries in a crisis. Essentially these forces may provide senior leaders a military tool that signals a more serious U.S. commitment to allies and a potentially more credible and compelling threat to adversaries than advanced conventional forces alone. As such, FDNF may represent an option U.S. leaders wish to preserve in their portfolio of flexible deterrent options if such a capability can be maintained at a cost commensurate with its apparent modest benefits.

There are numerous ways to maintain a FDNF capability, but only a handful of FDNF options are relatively low cost. For example, moving beyond the TLAM-N to a TACTOM-N or an even more advanced nuclear cruise missile would cost at least \$1-2 billion, and the costs of designing the Joint Strike Fighter as a dual-capable aircraft are also likely to be substantial. Both systems would require specially trained crews, storage sites and other specialized nuclear infrastructure. The Department of Defense could choose to continue to maintain the TLAM-N system in storage, but this particular submarine-based system offers limited utility due to the deployment limitations associated with the 1991 PNI.

In contrast to procuring a new FDNF system, or continuing to fund a FDNF system of limited utility, DoD should explore how it might employ existing systems such as the B-2 "stealth" bomber and routinely deployed SSBNs as TNF systems. The B-2 bomber is nuclear capable and could be deployed into theater if desired to signal U.S. commitment to allies and seriousness of intent to adversaries. Such deployments would require investments in theater nuclear infrastructure, but such investments would likely cost less than procurement of a new TNF system such as a dual-capable JSF or a new submarine-launched nuclear weapon. The B-2 is the only existing nuclear system that offers both a signaling capability and a stealthy capability to maintain operational surprise. For example, if U.S. policy makers wanted to signal the seriousness of national commitments to allies in a particular region, the B-2 could be deployed into theater as long as potential basing sites were upgraded to provide secure nuclear storage and appropriate shelter for the B-2

aircraft. Alternatively, if U.S. policymakers did not want to tip their hand in a conflict, a nuclear-armed B-2 could easily be deployed from CONUS without providing early warning to adversaries — unlike a more traditional dual-capable aircraft.

Similarly, DoD leaders could consider replacing the existing TLAM-N capability with SSBNs configured to re-target 1-2 ballistic missiles as needed to address potential regional contingencies. Unlike attack submarines armed with TLAM-Ns, the United States deploys a number of SSBNs regularly around the globe. If SSBNs were configured in such a way so that a small number of missiles on-board could be re-targeted from SIOP targets to potential regional targets, these missiles could be used to provide a forward-deployable nuclear capability that would ensure that DoD could provide senior leaders with a nuclear option relevant to a range of regional conflicts without levying a separate set of operational and fiscal requirements on the naval community.

Finally, using formerly strategic nuclear systems like the B-2 bomber and the SSBN in new ways to provide a forward-deployable nuclear capability would allow policy makers to free up resources in the current defense program for transformation priorities that may have much higher payoffs in terms of the overall effectiveness of the U.S. military without foreclosing the option of developing a new FDNF system should the strategic environment change in ways that increase the need for this kind of capability.

Ensuring the United States continues to have a forward-deployable nuclear capability remains an important component of U.S. nuclear policy and force structure. By moving away from the Cold War concept of theater and strategic nuclear forces to the concept of a “strike spectrum” with capabilities ranging from conventional to FDNF to CONUS-based nuclear forces, policy makers will increase their ability to develop effective U.S. nuclear policies and contingency plans. In addition to considering a new conceptual approach to nuclear forces, the United States could move to a more cost-effective and credible forward-deployable nuclear capability by phasing out the TLAM-N, foregoing designing the JSF to be dual-capable, and using existing systems such as the B-2 and reconfigured SSBNs to fulfill this role.

