FINAL REPORT

From a Conference Organized by:
The Institute for Foreign Policy Analysis
The International Security Studies Program of
The Fletcher School, Tufts University

With the Cosponsorship of:
U.S. Strategic Command
The National Nuclear Security Administration of
The Department of Energy
The Office of the Secretary of Defense (Policy)
The Defense Threat Reduction Agency
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This report does not necessarily reflect the views of the cosponsors or organizers.

Photography by Jim Thomas
Implementing The New Triad

Nuclear & Non-Nuclear Forces in Twenty-First-Century Deterrence

Final Report

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On December 14-15, 2005, the Institute for Foreign Policy Analysis (IFPA), in association with the International Security Studies Program (ISSP) of The Fletcher School, Tufts University, convened the 36th IFPA-Fletcher Conference on National Security Strategy and Policy. In this, as in previous conferences in this series, our goal was to encourage open and candid in-depth discussion of key national security issues. For this purpose we brought together speakers and participants representing a broad spectrum of expertise, experience, perspectives, and knowledge.

In this conference, Nuclear and Non-Nuclear Forces in 21st-Century Deterrence: Implementing the New Triad, emphasis was placed on transformation and priorities for strategic force modernization; deterrence and dissuasion strategies for twenty-first-century challenges; operational planning for assuring the appropriate New Triad force mix; developing nuclear and non-nuclear forces in the New Triad; requirements for passive and active defense, including the role of missile defense and options for strengthening future capabilities; nuclear/non-nuclear forces to meet regional contingencies; maintaining/updating the nuclear stockpile as a hedge against
international uncertainty; and modernizing the science-technology/industry base, including future personnel needs, in order to create and sustain a responsive infrastructure. Throughout the conference our goal was to contribute to informed discussion of these crucially important topics.

Each of our many conferences in this series has been organized with official cosponsorship in order to bring together those who have formal responsibilities and outside participants who have unique perspectives and often prior experience as well as knowledge and expertise. Our cosponsors have included the military services or military commands as well as civilian U.S. agencies and offices. The U.S. Air Force, the Army, the Navy, the Marine Corps, the Coast Guard, U.S. Northern Command, and U.S. Special Operations Command have cosponsored IFPA-Fletcher national security conferences.

For this 36th IFPA-Fletcher Conference we were pleased to have the cosponsorship of U.S. Strategic Command, as well as the Office of the Secretary of Defense (Policy), the National Nuclear Security Administration of the U.S. Department of Energy, and the Defense Threat Reduction Agency. Because this Conference offered a unique and timely forum on post-9/11 security challenges, we publish this report which summarizes and synthesizes conference presentations and discussions in order to give broader dissemination to the proceedings. The report, together with transcripts from the presentations and other related information, can be accessed at our website, http://www.ifpa.org.

Much remains to be done to design and build strategic forces for a dynamic and changing security setting. This report is intended to help bridge the gap between the New Triad as a concept and its implementation as part of the transformation of U.S. forces to meet twenty-first-century defense needs.

Robert L. Pfaltzgraff, Jr.
President
The Institute for Foreign Policy Analysis
Introduction
In early 2002 the Department of Defense (DOD) unveiled the results of its latest Nuclear Posture Review (NPR). The NPR analyzed the changes in the post-Cold War security environment and the future role of U.S. nuclear forces, and it determined that the United States needed a “New Triad” consisting of (1) nuclear and non-nuclear offensive strike capabilities; (2) active and passive defenses; and (3) a flexible and responsive defense industrial infrastructure base in light of the multiple threats in the uncertain twenty-first-century security environment.

Another key feature of the NPR was the reduced emphasis to be placed on U.S. nuclear forces relative to non-nuclear capabilities and defensive measures. The key purpose of the Cold War nuclear triad, consisting of submarine-launched ballistic missiles (SLBMs), land-based intercontinental ballistic missiles (ICBMs), and long-range bombers, was to provide a credible nuclear deterrent against a massive Soviet nuclear attack. However, the high-yield nuclear warheads within this force structure are no longer appropriate for potential future nuclear missions, such as destroying deeply

Executive Summary
buried bunkers containing weapons of mass destruction (WMD) or possibly the leadership of rogue states and terrorist groups.

Future policymakers will hopefully be able to rely on the New Triad to devise a range of credible alternatives. The New Triad contains three interrelated elements. The offensive leg comprises nuclear and non-nuclear strike capabilities, and the latter consists of both kinetic and non-kinetic forces. Within this leg one can find the elements of the Cold War nuclear triad, precision-guided conventional weapons, as well as special operations forces and information operations. However, the nuclear strike component of this new leg should also contain weapons designed to increase the credibility of American assurance and deterrence.

The defensive leg will consist of active defenses against ballistic missiles and passive defenses designed to make American society and its information and infrastructure networks more resilient to attack. These include civil defense measures and efforts to harden infrastructure by reinforcing vulnerable nodes and disaster recovery plans that prioritize which networks should be revived first. The responsive infrastructure third leg consists of the manufacturing plants, research laboratories, and skilled science and technology (S&T) workforce that will design, develop, and build the offensive (nuclear and conventional) and defensive systems that will constitute the New Triad.

How much progress has the United States made so far in implementing the New Triad since unveiling the NPR? Has it developed effective and appropriate offensive nuclear and non-nuclear strike capabilities? Has it succeeded in developing effective missile defenses and passive defenses, and has it restructured its defense industrial base so that it is capable of building and deploying needed capabilities in a timely manner? Like the conference on which it is based, this report represents an initial attempt to gauge the progress made since early 2002 in implementing the New Triad.

So far, the record has been mixed. Much progress has been made in developing advanced conventional strike capabilities. Precision has revolutionized force structures, tactics, and doctrines. Commanders may no longer have to revisit targets or employ multiple
munitions if a single, precision-guided weapon can complete the task. Furthermore, a precision-guided conventional weapon may be able to substitute for a nuclear weapon, and in the process provide a deterrent that is both more credible and consistent with the concerns of the American public. Nevertheless, nuclear weapons have unique qualities that remain indispensable to U.S. twenty-first-century deterrence.

There is still much work to be done regarding each of the components of the New Triad. While the Reliable Replacement Warhead (RRW) program can potentially revolutionize warhead design and provide policymakers with a more credible nuclear deterrent, it will be a number of years before the United States sees tangible benefits from that program. Within the defensive leg, some progress has been made in developing land- and sea-based defenses, but the United States has so far forsaken space-based defenses, which represent the most effective means of developing a truly global and multi-layered defense against ballistic missiles. Finally, within the responsive infrastructure leg, the United States must fund the development of new systems, in order both to assure the private sector of the stability of funding and, most importantly, to provide incentives to talented S&T workers to enter or remain in the defense sector. A talented workforce comprises the key component of a responsive infrastructure, and highly skilled S&T personnel will gravitate to other sectors offering more exciting career opportunities if the United States does not sufficiently fund the development of the offensive and defensive systems that will constitute the New Triad.

This Executive Summary assesses the progress made in implementing the New Triad by comparing the stated objectives for each leg with efforts that both have already been undertaken and those which still need to be implemented if the New Triad is to be successfully realized.

The United States needs to transition to the New Triad in a global security environment vastly different from the one that existed during the Cold War. For nearly fifty years since the end of World War II, the American national security establishment was consumed by the challenge of deterring a monolithic superpower from unleashing a massive and crippling nuclear attack. The overriding objective was nuclear deterrence, which was implemented by the United States’ arsenal of high-yield nuclear weapons. Today’s security environment is much more complex and uncertain. Potential adversaries include near-peer powers, rogue states armed with WMD, and radical extremist groups seeking to acquire and use all types of WMD. An inventory of “massive retaliation” nuclear weapons does have some use in deterring strategic competition with near-peer competitors but is not adequate for deterring rogue states and the acquisition and use of WMD by extremist groups.

The foundation of the New Triad will be a command, control, communications, computer, intelligence, surveillance and reconnaissance (C4ISR) network that will tie together each of the three legs and which will provide policymakers with the timely information needed to calibrate each of the legs to develop tailored strategies and capabilities for a given contingency. Viewed from a macroscopic perspective, it is possible to determine important interrelationships between the legs of the New Triad. For instance, the systems that will be prioritized in the offensive and defensive legs will largely determine the type of infrastructure that will be needed. A decision to maintain the current stockpile by relying on life extension programs (LEPs) will generate a demand for one type of industrial R&D base, while a decision to proceed with a smaller and more versatile stockpile based on the RRW program will generate demands for a very different industrial base. Also, the development of effective active and passive defenses will better enable the United States to use the offensive leg to assure allies during a crisis, and it may also enable the United States to substitute non-nuclear strike options for nuclear weapons. For example, if there was a sufficiently high
probability that defenses would protect the U.S. homeland, U.S. forces stationed abroad and U.S. allies from a WMD attack, then this extra cushion of security may enable American policymakers to substitute conventional and non-kinetic strike options for nuclear weapons in attacks against enemy missile sites.

The New Triad will permit the United States to undertake four key defense policy goals within the new security environment. As laid out in the March 2005 *National Defense Strategy of the United States*, the United States seeks to assure allies that we will fulfill our alliance commitments and help protect common interests; dissuade potential adversaries from acquiring capabilities that could threaten our interests; deter adversaries who may have the capabilities and will to coerce us; and, if directed by the President, defeat our adversaries at a time, place and manner of our choosing.¹

While it is true that the international arena has witnessed profound structural changes with the demise of the Soviet Union and the rise of transnational terrorist groups intent on redistributing global power, it is also true that there are lasting features and that concepts from prior eras can potentially be updated for current usage. Specifically, key actors in international politics will still think in terms of the denial of benefits and the imposition of costs when considering potential deterrence strategies. For deterrence strategies to be effective today, they must be tailored to meet the challenges presented by specific adversaries, which can be accomplished by locating and targeting idiosyncratic “centers of gravity.” The nineteenth-century Prussian military theorist Carl von Clausewitz defined a center of gravity as the hub of all power and movement upon which all other activity depends, and its destruction would increase the probability that an adversary would conclude that the costs of initiating or continuing to prosecute a conflict was prohibitively expensive.

The concept of a center of gravity can potentially be applied today to deal with the variety of threats the United States is likely to face, such as that from rogue states. Regarding Iran, the destruction of the Iranian Revolutionary Guard Corps (IRGC) would leave

Iran vulnerable to outside attack and cripple Teheran’s efforts to export revolution. Furthermore, it would significantly diminish Iran’s capability to employ WMD. The IRGC is clearly a center of gravity, and unmistakably placing it at risk could deter unacceptable behavior by the Iranian government.

While Cold War concepts like deterrence can be updated and applied to present and future contingencies involving a variety of adversaries, it should be emphasized that under current conditions deterrence strategies will fail unless policymakers prioritize the specific goal and audience within a given scenario. Context will drive this determination, and the selection of the mix of nuclear and non-nuclear forces for threat or use in a given contingency will depend upon the determination of the type of force structure that is most conducive to achieving the desired goal and sending the appropriate signal to the prioritized audience.

For example, if a rogue state possessed WMD and the goal was pre-war deterrence, then a non-nuclear threat may be more credible than a nuclear one, since this opponent will correctly perceive U.S. concern for collateral damage and alliance cohesion. However, if the goal is intra-war deterrence and specifically deterring the second use of WMD, then a nuclear threat may be more effective to send a strong signal that WMD should not be used again, whether by the initial instigator or by a future adversary. The details of a particular contingency will strongly influence the prioritization of goal and audience, and failure to do so will consign deterrence strategies to failure.

The preceding analysis has demonstrated that the United States needs to transition to the New Triad in order to manage and overcome risks more effectively in an unstable and uncertain global security environment. Has the United States succeeded so far in implementing each of the legs of the New Triad? What other policies does the United States need to undertake to realize the New Triad successfully? Does the pace of transformation need to be expedited? We now turn to examining these questions.
The New Triad: Offensive Leg

The purpose of the offensive leg of the New Triad is to provide American policymakers with a credible range of alternatives for employment against the variety of adversaries the United States is likely to face in the emerging and uncertain security environment. Undoubtedly the most far-reaching advances achieved so far in implementing the New Triad can be found in the conventional component of the offensive leg. Advances in precision technology, such as the Joint Direct Attack Munition (JDAM), have revolutionized the tactics, inventory, and supporting infrastructure guiding the use of conventional munitions. For instance, prior to the conversion to “smart bombs,” one of the key measurements of effectiveness was the number of sorties needed to destroy a target. Today, planners need to determine the number of targets destroyed per sortie. Precision can also have a significant effect on the supporting infrastructure. With more precise munitions, planners will be freed to allocate fewer trucks within the logistics tail to carry a reduced number of required munitions, since targets will not have to be revisited. The inventory load can be reduced further if a precise 2000-pound bomb can achieve the same effects as a “dumb” 5000-pound bomb. Precision may also enable planners to substitute a precise conventional munition for a nuclear weapon if the former can achieve the same effect as the latter.

However, much work remains to be done within the nuclear deterrent component of the offensive leg. Specifically, there are two main drawbacks to our current nuclear stockpile. First, the weapons in the stockpile are too old. They are past their design lifetimes, and through life extension programs we may have introduced new problems whose potential consequences are latent given the moratorium on underground testing. Second, today’s stockpile is inadequate for dealing with a number of likely threats in the new security environment. High-yield weaponry can still deter strategic competition with near-peer competitors, but it cannot credibly deter rogue states or terrorist groups. The latter will correctly perceive that U.S. and allied public opinion will not tolerate excessive collateral damage, and thus the current stockpile may therefore
contribute more towards self-deterrence than towards the deterrence of adversaries.

Most of the current warheads within the stockpile were designed for maximum yield with minimum size and weight in order to fit as many warheads on a single delivery system. Today, the important criteria include ease of manufacture and maintenance, intrinsic security, and reduced yield. Intrinsic security measures within the warhead are vital if we are to prevent their unauthorized use by terrorist groups. Furthermore, reducing the yield will make our stockpile more credible in the eyes of rogue states and terrorist groups and thereby prevent unacceptable actions by either of these potential adversaries.

The American S&T defense establishment will face several difficult technical challenges in building more appropriate, lower-yield nuclear warheads. First, it must reduce the amount of long-lived radioactivity created by the nuclear fission process within the warhead. Significant progress in removing fission from nuclear explosive devices was made within the Plowshare program several decades ago, and these advances should be incorporated in future warhead designs. Second, the American S&T community should be challenged to demonstrate the ability to emplace deeply bunker-busting weaponry so that no explosive debris reaches the earth's surface following an explosion.

The need for a more appropriate stockpile for future deterrent purposes begs two fundamental questions: (1) Will a reduction in yield translate into greater usability of our stockpile for deterrence or even actual use of nuclear weapons? (2) What roles and missions are envisioned for a stockpile that contains a greater number of lower-yield warheads?

In answering the first question, it is necessary to make a distinction between deterrence and defense. Lower-yield weaponry may assist deterrence against rogue states and terrorist groups but is unlikely to affect the decision regarding the actual use of nuclear

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2 The purpose of the Plowshare program was to develop techniques to use nuclear explosives for peaceful nuclear explosions (PNE). From 1961 to 1973, the United States conducted 27 PNE tests.
weapons. The NPR noted that over 70 countries employ underground facilities for military purposes, and that there are over 1,400 such sites that house WMD, ballistic missiles, or leadership command and control bunkers. These totals are likely to have increased since early 2002. Lower-yield weaponry may more credibly place these facilities at risk, and in the process convince terrorist groups and leaders of rogue states that they will not be able to shield the most valuable weapons in their arsenal or escape the consequences of their actions by relying on deeply buried bunkers.

Are there other roles besides the destruction of deeply buried bunkers for which planners may employ nuclear weapons? U.S. nuclear weapons support the policy of extended deterrence, and non-proliferation goals are thereby advanced as a second-order effect. Countries such as Japan and South Korea could potentially exit the Nuclear Nonproliferation Treaty (NPT) and develop indigenous nuclear strike capabilities in the absence of the U.S. nuclear umbrella, leading to a potentially destabilizing and wasteful nuclear arms race in a region that already contains potential flashpoints. In general, U.S. nuclear forces underpin the nonproliferation regime, since in most cases they dissuade states protected by the United States from developing their own nuclear weapons. Assisted by the United Nations, which reinforces the nonproliferation regime by detecting nuclear cheating, the U.S. nuclear stockpile generates tangible security benefits for the non-nuclear states of the NPT and forms the foundation for international security.

The United States has several policy options regarding stockpile management. The option of transformation involves the implementation of the RRW program and the development of a responsive defense industrial base. The deployed stockpile will be smaller than what is currently planned for by 2012 and will include a greater percentage of low-yield weapons. The non-deployed stockpile will

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3 Excerpts of the Nuclear Posture Review can be found at the following website: http://www.globalsecurity.org/wmd/library/policy/dod/npr.htm.

4 The Strategic Offensive Reduction Treaty, also known as the Moscow Treaty, was signed by the United States and Russia in May 2002, and it obligates both signatories to reduce the level of operationally deployed strategic nuclear warheads to 1,700-2,200 by 2012.
be much smaller than it is today, and the hedge against geopolitical risks, technical surprises, and technological changes will be found in a responsive infrastructure and not in a massive stockpile of non-deployed warheads. Warheads will be much easier to manufacture, and we will be able to find and fix a problem within a warhead and return it to the stockpile within a year. Furthermore, our revitalized weapons design community will be able to adapt an existing weapon within eighteen months and design, develop, and begin production of a new warhead within three to four years.

Alternatively, the United States could also continue with the status quo based upon an unwillingness to take the risk of reducing life extension programs and spare warheads to free up resources for transformation. In pursuing this option, we will have to maintain our reliance on LEPs, and we may unknowingly introduce technical problems into the stockpile. Furthermore, since our infrastructure has not been revitalized nor made more responsive, we will have to keep a very large hedge of non-deployed weapons, which will have the same aging problems as the deployed systems. We would also have to continue to rely on costly, demanding, and manpower-intensive denial strategies to ensure the physical security of our warheads, since we did not take advantage of implementing intrinsic security measures. The administration has wisely selected the path of transformation.

Indeed, the combination of the RRW program and a responsive infrastructure can be truly revolutionary. The biggest impact of the RRW program will be on the development of new parameters for evaluating future warhead designs. The key optimization goal for the warheads in the current stockpile was to attain the largest possible explosion from a device that was as small as possible. In contrast, the design criteria for a successful weapon today are maximum safety, security, low yield, reliability, and ease of manufacture. However, before we design the RRW and develop the infrastructure that will sustain it, we need to answer several important questions: Do we want the RRW to replace one or many warheads? Do we want the RRW to be used on a variety of launch
platforms? Answers to these questions will be essential in the transition to the New Triad.

Defenses also constitute an important leg of the New Triad, and they can complement the offensive leg by making assurance and deterrence strategies more credible. Has the United States made much progress in developing active and passive defenses?

The New Triad: Defensive Leg

By providing greater security against adversary attacks, active and passive defenses can reduce vulnerabilities to coercion and thereby support the offensive and infrastructure legs in fulfilling the defense policy goals of assuring allies, and dissuading, deterring, and defeating all potential adversaries. Active defenses such as ballistic missile defense can provide a number of security benefits. By offering protection to the U.S. homeland, overseas forces, and key allies from a direct ballistic missile attack, missile defenses can help generate a more favorable cost-benefit calculation in a regional contingency and thereby help the United States assure its allies and deter potential adversaries. Missile defenses may also dissuade potential adversaries from engaging in strategic competition with the United States if they conclude that it would be too costly to develop forces to overcome a global, multi-layered system. Furthermore, missile defenses can also provide a defense against an electromagnetic pulse (EMP) attack by preventing a ballistic missile from entering American airspace. It should be emphasized that missile defenses do not have to be perfectly effective in order to complicate an adversary’s calculations. A global, layered missile defense system that is less than 100 percent effective can still generate security benefits by providing a greater capacity to assure allies, and dissuade, deter, and defeat all potential opponents.

Passive defenses such as warning systems, emergency shelters, medical countermeasures, defensive information operations, and the hardening of key nodes in vital infrastructure networks can complement “deterrence by punishment” through “deterrence by denial,” and in the process potentially deter fanatical terrorist groups
usually considered unresponsive to conventional cost-benefit calculations. Terrorist organizations typically maintain a hierarchically ordered set of values that place political goals and the completion of their asymmetric missions over life, liberty, and the pursuit of happiness. By frustrating the achievement of their political goals and missions, deterrence by denial is designed to produce both hopelessness within terrorist organizations and an aura of weakness in receptive foreign publics, who in turn may provide less support to the former. The combined effect of offensive operations and active/passive defenses could potentially cripple terrorist networks seeking to overthrow the current world order.

The United States has not taken sufficient measures to buttress its infrastructure and improve its passive defenses, especially with regard to an EMP attack. An EMP attack involves a nuclear explosion at an altitude of 40–400 km, and if one occurred over or near the United States it would have a devastating impact. An EMP attack would overload Supervisory Control and Data Acquisition (SCADA) systems, which are ubiquitous in our infrastructure. SCADA systems perform a number of key tasks, such as process control and environmental monitoring. Their disablement would cripple our infrastructure networks. However, the effect would not be limited to the network that was initially impacted. Our various national networks, such as the power, energy distribution, transportation, financial, communication, and medical care networks are highly coupled. For instance, the electric power network relies on the telecommunications network. It does not have its own telecommunications infrastructure. Our networks are designed to continue functioning if one other network fails. But an EMP attack could disable multiple networks simultaneously, and if successfully carried out American society would be disabled for many months and perhaps for many years.

The United States has already initiated efforts to prevent WMD from entering U.S. ports and cities, so a terrorist group may calculate that an EMP attack could have a greater likelihood of success.

Furthermore, a number of countries, including Russia, China, Iran, and North Korea, are familiar with the potential military utility of an EMP attack. Chinese military writings mention EMP as the key to victory and describe scenarios where an EMP attack is used against U.S. aircraft carriers in a conflict over Taiwan.

The threat from an EMP attack cannot be completely eliminated, but there are a number of steps that the United States can take to mitigate the risk and damage of an attack. First, we can attempt to prevent an EMP attack by relying on our intelligence agencies to help interdict it at either its planning or implementation stages, and we can discourage an EMP attack through deterrence. We can also rely on active defenses such as a missile defense system to destroy a nuclear warhead as close to its point of launch as possible. Lastly, the United States will need to implement a number of passive defense measures, such as hardening critical components of key networks and maintaining our ability to monitor the condition of our critical infrastructure. Most importantly, we need to develop disaster recovery plans before an EMP attack occurs. These plans should clearly define the authority relations between federal, state, and local agencies during an attack, and they should clearly detail the interconnections between various networks and prioritize which networks should be repaired first.

Active defenses such as missile defense also constitute an important component of the defensive leg of the New Triad. Many countries exploited the vulnerability imposed on the United States by the Anti-Ballistic Missile (ABM) Treaty by developing advanced ballistic missile capabilities. Since it withdrew from the ABM Treaty in December 2001, the United States has concentrated on fielding land-, air-, and sea-based systems to establish a global missile defense system. It will rely on the Airborne Laser (ABL) and the Kinetic Energy Interceptor (KEI) for a boost-phase capability, and for the midcourse phase it will rely on interceptors emplaced at Fort Greely, Alaska, and Vandenberg Air Force Base, California, as well as Aegis-equipped warships. For the terminal phase, the Missile Defense Agency (MDA) plans to rely on the Patriot and the Terminal High Altitude Area Defense (THAAD)
systems. Supporting these systems will be a family of land-, sea-, and space-based sensors integrated by a command and control system that will expand the detection and engagement capability of the entire system. The foundation of the overall missile defense system will be the Ground-based Midcourse Defense (GMD) element consisting of the interceptors in Alaska and California and the associated radars, sensors, and fire control and communication system.

The United States has made some progress in testing and fielding these systems. By the end of 2005 MDA had emplaced eight interceptors in Alaska and two in California, and by the end 2007 it intends to add another twelve interceptors to Alaska.\(^6\) Furthermore, by the end of 2005 MDA had fielded ten Aegis-equipped destroyers, and two Aegis engagement cruisers equipped with the Standard Missile (SM)-3.\(^7\) It hopes to have deployed fifteen Aegis surveillance ships and three ships equipped with the SM-3 by 2008.\(^8\) MDA has also successfully completed a number of important tests. In December 2005 it successfully tested an operationally configured ground-based interceptor missile, and in January 2006 it successfully completed the first in a series of static test firings for the KEI’s second-stage rocket motor. The program’s first booster flight test will occur in 2008.\(^9\)

A boost-phase defense should form the foundation of a global, multi-layered missile defense system, since there are a number of advantages to intercepting missiles shortly after launch. Missiles are most vulnerable during their boost phase, since they are relatively slow-moving as they rise against the Earth’s gravitational field, have a large infra-red signature and cross section, and still-attached fuel tanks. Destroying missiles in their boost-phase prevents the release

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\(^7\) Ibid, 6.


of countermeasures that would complicate interception in subsequent phases, and a boost-phase defense that is space-based could always be available on a world-wide basis, unencumbered by sovereignty issues of over-flight and operation on foreign territory. A space-based defense with an effective boost-phase intercept capability would provide the widest area of coverage and the greatest number of shots against enemy missiles, and it would be capable of destroying missiles launched from anywhere in the world.

The United States will not be able to field an effective missile defense system or other defenses without transforming its defense industrial sector. How much progress has the United States made in the last four years in revitalizing a sector that has atrophied since the end of the Cold War?

The New Triad: The Infrastructure Leg

One of the major insights of the NPR is that the defense R&D and manufacturing base plays a crucial role in assuring allies and dissuading potential adversaries. It is the capabilities of the defense industrial base, particularly its talented personnel, its ability to bring advanced defense technology to the field, and its ability to adapt to new threats, that engenders great respect among friend and foe. The defense R&D base has already played an influential role in the past. For example, the breadth and scope of the U.S. strategic modernization program of the early 1980s assured allies of the U.S. nuclear umbrella and, combined with the potential of the Strategic Defense Initiative, led the Soviet Union to conclude that security competition with the United States was pointless. More recently, the demonstration of advanced conventional capabilities and precision munitions during the wars in Bosnia, Afghanistan, Kosovo, and Iraq led Russia and China to conclude that the United States was far ahead of them in defense technology.

In the future, the defense infrastructure leg of the New Triad will be called upon to innovate and deliver adequate quantities of special purpose weapons to convince an adversary that its buildup could not occur faster than the United States could respond. Furthermore,
the infrastructure leg must be capable of responding rapidly to a technical problem in the nuclear stockpile, and assure stockpile safety, reliability and performance. To perform these tasks, a responsive infrastructure will need to possess a number of key elements, including an excellent, well-trained, and well-managed workforce; an enhanced science and technology base, including modern research facilities; efficient, modern, and “right-sized” manufacturing facilities; revamped business practices and technical processes that permit the rapid and flexible response to emerging needs; and the frequent exercise of key capabilities in order to remain highly responsive and to train the next generation of workers.

Much work remains to be done to implement the infrastructure leg of the New Triad. The nuclear strike sector is essentially in sustenance mode, which does not permit the maintenance of design, system engineering or production skills. For the foreseeable future the weapons within the stockpile will consist of legacy weapons from the Cold War, and maintenance and incremental changes to these weapons instituted through LEPs will be handled by the existing infrastructure. The RRW program can truly revolutionize warhead design, but this program is still in its initial stages. Once we determine the number of warheads the RRW will replace and the number of launch platforms from which it will be used, we will then be able to determine the type and location of infrastructure that we will need.

Given the progression of land- and sea-based defenses as well as improvements in precision strike, there are exciting developments in the active defense and non-nuclear strike sectors. But overall, rather than developing transformational capabilities for the offensive and defensive legs of the New Triad, our infrastructure is still largely being used to sustain legacy capabilities and determining how to apply them to new missions. We have not refashioned our infrastructure to provide combat commanders and national command authorities with a more robust and diverse tool set to meet the challenges of the twenty-first century.

The United States will face two major challenges in reorienting its defense infrastructure. First, unlike the Cold War era, the production
of future systems, especially nuclear weapons and delivery vehicles, will be limited. This limitation will make it very difficult to keep all of the contractors, suppliers, scientists, and engineers in the nuclear community actively involved in researching, designing, building, and sustaining new systems. Second, there are many institutional commitments to legacy systems. Many of these systems are relics of the Cold War and are not appropriate today given the threats we will face in the new security environment. If we are to develop a truly responsive infrastructure, then we will have to put aside our institutional constraints and decide which systems we will keep and where to direct funds for the development of transformational capabilities.

While the challenge of transformation is enormous, the task can be made manageable if we keep in mind a number of important concepts. We may need to rationalize and consolidate existing facilities. For example, the United States may not need more than one weapons design laboratory. During the Cold War competing laboratories were established in order to develop truly optimized weapons, and while our two national design laboratories do excellent work, today it may be more efficient to have one laboratory doing much more work than two laboratories doing limited work. Since 1989, moreover, we have produced no pits, or fissile core of a nuclear warhead. Whether we should outsource future production to a reliable ally such as the United Kingdom was discussed.

Second, to reach desired conditions of affordability, sustainability, and robustness, we should standardize products by developing a single, more robust common design for a group of weapons or components of strategic systems, such as rocket engines and missile boosters. We could then tailor weapons and their designs to the nature of the target and the effects to be maximized. We should also fund the development of new systems to convince talented personnel

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10 The fissile core of a nuclear warhead, a “pit,” creates a nuclear explosion that triggers a substantially larger thermonuclear explosion. All pits currently in the U.S. nuclear stockpile were made at the Rocky Flats Plant near Denver, Colorado, which opened in 1952. The Department of Energy halted pit production there in 1989. Since then, the United States has been unable to make stockpile-quality pits, and therefore complete nuclear weapons.
to remain in the defense sector and to attract new S&T workers. We do not need to sustain large production runs in order to maintain critical design and system engineering capabilities. Exploratory development programs will allow us to sustain these and other critical skills without developing large quantities of output. Failure to fund these types of programs will result in talented personnel making a different career choice, which will severely complicate efforts to develop a responsive infrastructure.

Third, since the output of a responsive infrastructure is the maintenance of a capacity to do something vital, we will have to devise new measurements of costs and effectiveness. For example, we should avoid relying too much on calculations of unit costs in making future decisions on whether to fund new systems. Production levels in the future will be relatively low, and unit costs will therefore be high. We must be willing to pay high fixed costs if we want to enhance our development and production capability.

Government oversight of the defense sector also requires transformation if the New Triad is to be implemented. The National Nuclear Security Administration has not yet succeeded in transforming its business practices to a system based on the best practices in the private sector, nor has it developed clear lines of authority and accountability. Furthermore, defense funding is still allocated in narrow stovepipes, and the discretionary funding of research is limited. Contractors are not permitted to adopt sufficiently flexible personnel practices to recruit and retain critical personnel in a competitive labor market. These problems are compounded by inadequate congressional understanding of the work done in the defense sector. Congress needs to adopt a more supportive role of the defense sector, and congressional support would be broader if authorizers and appropriators were more knowledgeable about program details and implementation. Managers could be given greater reprogramming authority if Congress had an in-depth understanding of a particular program.

In conjunction with the executive branch, Congress can also play an important role by providing the private sector with the confidence needed to make the long-term investments in the systems that
will constitute the offensive and defensive legs of the New Triad. Before assuming a multi-decade commitment to new systems, the private sector needs to perceive a political consensus in support of the New Triad, so that as program managers, key congressional officials, and secretaries of defense come and go, there will still be a commitment to implement the New Triad. Ultimately the private sector must justify its spending to the financial markets, and it will be unable to do so if there is uncertainty regarding future funding. Today, the private sector is concerned that the funding of science and technology has not kept pace with the requirement to implement the New Triad.

Despite the enormous challenges that lie ahead in implementing the infrastructure leg of the New Triad, DOD has made some progress in retaining and enhancing critical skills. The Department’s Science Mathematics and Research for Transformation (SMART) program is designed to increase the number of scientists and engineers within the defense workforce. The program provides educational funding for individuals interested in science and engineering, and recipients of funding must commit themselves to government service for a period of time after they have completed their education.

Other notable policies include the personnel programs instituted by the military services to maintain key capabilities in strategic strike systems. For example, Functional Area 52 within the Army provides a career path for officers who are experts in nuclear weapons effects. These officers constitute a tremendous base of nuclear expertise that is utilized throughout U.S. Strategic Command, the Office of the Secretary of Defense, and the Defense Threat Reduction Agency. Furthermore, the Air Force Nuclear General Officer Steering Group has a program to develop and sustain a pool of officers and non-commissioned officers to support the Air Force’s nuclear missions by ensuring sufficient training, education, and experience.

While these programs are useful, they cannot substitute for increased funding of S&T activities to develop the new systems that will comprise the offensive and defensive legs of the New Triad.
Many of our current systems are scheduled to be replaced in 2030 or 2040. We cannot expect talented personnel to wait that long to develop new and exciting systems. The Department of Defense and Congress must realize that we need a new business model. In the absence of sufficient funding for the enhancement of design and system engineering skills, we will not be able to retain the talented people needed to develop the capabilities that will permit the United States to effectively respond to the emerging threats of the twenty-first-century security environment.

Conclusion

Much work remains to be done to develop the three elements of the New Triad. Within the nuclear deterrent component of the offensive leg, the United States must transition to a stockpile that contains a greater percentage of lower-yield nuclear weaponry to credibly fulfill its assurance and deterrence requirements in the new security environment. The key challenges that the American S&T community will face in developing lower-yield weapons will be reducing the amount of long-lived radioactivity created by the nuclear fission process within the warhead and deeply emplacing bunker-busting weaponry so that no explosive debris reaches the surface following an explosion.

To implement the defensive leg effectively, the United States must improve its passive defenses to make U.S. society more resilient to attack, primarily by instituting effective civil defense measures, hardening vulnerable nodes of key infrastructure, and developing (before an attack) recovery plans that prioritize which networks should be restored first and which clearly state the authority relations between local, state, and federal officials. Furthermore, the United States must improve its active defenses by developing a missile defense system whose space component will serve as the foundation of a global, multi-layered system possessing a robust boost-phase intercept capability. The current GMD system provides only limited intercept capabilities, and absent an effective space-based boost-phase defense, the United States will be dangerously
vulnerable as WMD and ballistic missiles spread to a variety of potential adversaries within the emerging security environment.

The United States will have to revitalize its defense industrial base to implement the responsive infrastructure leg of the New Triad. It must boost defense S&T spending, both to fund the R&D that will ultimately result in the systems that will constitute the New Triad and to attract talented S&T personnel to the defense sector while retaining existing workers. The United States must also fully implement the RRW program. Once it is determined how many warheads the RRW will replace and the number of launch platforms from which it will be used, we will then be able to determine the type, quantity, and location of the infrastructure we will need in the twenty-first-century security environment.
Day One
In March 2005, the Department of Defense (DOD) released the National Defense Strategy of the United States of America. The goals as laid out in this document include protecting the United States from external attack, securing access to vital areas abroad, working with partners to secure both U.S. and allied interests, and creating a more stable world. There are several ways we will implement this strategy.

- We will **assure** our allies that we will look after both our and their interests, and that the United States can be relied upon.
- We will **dissuade** potential adversaries from acquiring capabilities that may hold our interests at risk.
- We will **deter** those who have the capabilities and perhaps the will to coerce us.
- If directed by the President, we will **defeat** our adversaries at a time, place and manner of our choosing.

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There has been a significant shift in the international security environment. In the future, the United States is more likely to face irregular and catastrophic threats from terrorist groups and rogue/failing states rather than traditional threats from state actors.

- DOD has become very successful in planning for and overcoming traditional threats where states field large armies for major combat operations. The United States dominates this form of warfare, and thus adversaries will no longer challenge the United States through traditional means.

- The United States is more likely to be confronted by irregular forms of combat, such as terrorism, insurgencies, and unrestricted warfare. These are the types of challenges we face in Afghanistan and Iraq, and if we do not develop effective capabilities and responses, we may see an erosion of U.S. power as we confront these threats. As a response to these challenges, DOD has raised the importance of post-war stability operations to the level of a core competency that must be mastered.

- The likelihood of a future catastrophic event is also increasing. Traditionally, these threats came from states, and deterrence was an effective means of mitigating the risk of a catastrophic event. In the future, a catastrophic event may be a terrorist operation, but it may also result from devastating natural disasters such as hurricanes, earthquakes, and tsunamis. The military can play a vital role in providing humanitarian relief.

- We may also face a disruptive threat, where an adversary employs technology and other methods to thwart military operations. For instance, a competitor might launch a cyber attack against our space assets. We want to ensure that we do not confront a competitor with a disruptive capability.

- DOD was the lead federal agency responsible for mitigating traditional threats. Other federal agencies may lead the government’s response to future challenges, such as those from a catastrophic natural event.
The new security environment offers many new challenges. Fortunately, DOD is a learning organization, and it is trying to apply the lessons of Cold War deterrence to the deterrence challenges of the future. An examination of Cold War history leads us to ask three key questions.

- Which assets of an adversary do we want to hold at risk?
- How do we balance nuclear and non-nuclear forces for twenty-first-century deterrence, and how should we integrate non-kinetic capabilities with these forces?
- How do we credibly communicate deterrent messages to our adversaries?

Deterrence is still viable in the post-9/11 world. It is still necessary to think in terms of denial of benefits and imposition of costs with respect to our adversaries. We will need to tailor our deterrence strategies to effectively overcome the challenges presented by violent extremists, rogue states, and near-peer competitors. We need three capabilities to implement tailored deterrence.

- The ability to identify and understand our adversary’s “value chain,” specifically those assets that the adversary values most. We must also understand both how our adversary assesses its security situation, and its decision-making processes.
- The capabilities that can most effectively intercept our adversary’s value chain to impose unacceptable costs or deny benefits.
- The ability to communicate effectively with the adversary, to make him aware that we have the capabilities and resolve to impose unacceptable costs on him.

Dissuasion is also an important element of our strategy.

- Dissuasion refers to the range of tasks used prior to an adversary either developing the capabilities or the will to threaten us or our interests, to convince him that there is a more effective way to achieve his national interests.
- Dissuasive actions typically occur before deterrence, and in some cases they may overlap. For instance, we may try to...
dissuade an adversary from expanding, improving, or transferring a capability while also deterring him from using it.

- Different forces are involved in deterrent and dissuasive strategies, but as we develop our future capabilities, we need to consider how both of these strategies, and the forces required to implement them, can be effectively integrated.

In the future, we must tailor our deterrent and dissuasive strategies to deal with the three types of potential adversaries we may face.

- Terrorists place a higher value on the completion of their mission than on their own lives. A potential deterrent strategy is to convince them that they will not successfully accomplish their task. We must spend more time understanding a terrorist network’s “value chain,” to determine those assets and capabilities it needs to successfully complete its mission. We also want to dissuade elements of foreign populations from supporting or engaging in violent extremism. To do both of these tasks, we must understand an alien culture and value system.

- Rogue powers value regime stability, and some of them value their international influence. Our development of advanced conventional capabilities will help put these values at risk. We must also dissuade them from developing and modernizing capabilities that pose a significant challenge to the United States and its allies and from taking actions hostile to U.S. interests.

- We have the capabilities and doctrine to deter near-peer competitors. However, their development of advanced conventional and non-conventional capabilities makes this task more difficult. We must dissuade them from modernizing their capabilities and from undertaking hostile actions.
DOD, U.S. Strategic Command (STRATCOM), and other elements of the U.S. government are focusing their efforts to better understand our adversaries and develop tailored deterrence and dissuasion strategies. It is necessary to reinvigorate the intellectual debate on deterrence and dissuasion to update these two concepts to deal with the security challenges of the twenty-first century. Key to this will be expanding our knowledge of the world views, goals, and strategic orientation of potential adversaries in the twenty-first century.
Session 1

The Post-9/11 World and the New Triad

MODERATOR

Dr. Robert L. Pfaltzgraff, Jr.

SPEAKERS

Mr. Brian Green, Deputy Assistant Secretary for Forces Policy, International Security Policy, U.S. Department of Defense

Dr. William R. Graham, Chairman of the Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack and former Chairman and Chief Executive Officer, National Security Research, Inc.
Mr. Brian Green

The global security environment has changed dramatically since the end of the Cold War.

- Russia is no longer an adversary, but it is also not yet an ally. We are trying to establish a more cooperative relationship with Russia, but this task has been more difficult than we had anticipated.

- China’s future global role is uncertain at this point, and there are several potential flashpoints in our relationship with that country.

- Rogue states potentially armed with weapons of mass destruction (WMD) and effective delivery systems are another concern, especially since we do not fully understand how most effectively to deter them.

- Violent extremists are trying to acquire WMD.

- In the new security environment, we have a broader range of adversaries than we did during the Cold War. Then, we focused entirely on nuclear deterrence. Now, with a broader range of adversaries, we must successfully carry out a larger set of tasks, including assuring allies, dissuading potential competitors, deterring immediate threats, and defeating an adversary if deterrence fails.

In the new security environment, the United States needs a broader range of strategic capabilities to include a mix of nuclear and non-nuclear strike capabilities as well as defenses in order to overcome the diverse set of adversaries we will face.

- The 2001 Nuclear Posture Review (NPR) recommended profound changes in our strategic posture to support the defense policy goals of assuring allies and dissuading, deterring, and defeating potential adversaries.²

² The Nuclear Posture Review represents the nuclear analog to the Bottom-Up Review of conventional forces, undertaken in 1993 to address the significant changes in the security environment following the end of the Cold War and the military consequences of those changes. The NPR was the first review of nuclear policy in the post-Cold War era. It was submitted to Congress on December 31, 2001.
The results of the NPR were approved in National Security Presidential Directive 10, which also mandated that U.S. strategic nuclear forces be reduced to 1,700 – 2,200 operationally deployed nuclear warheads by 2012.

The NPR also introduced the New Triad, which is intended to provide a broad range of capabilities as well as enhanced flexibility to overcome a larger set of adversaries in a very dynamic security environment.

Fielding all elements of the New Triad will help mitigate some of the risks associated with very deep reductions in our stockpile, while also providing a diverse set of options to the President.

The NPR calls for integrating nuclear and non-nuclear strike capabilities, both kinetic and non-kinetic, into one leg of the New Triad. This will provide a deterrent posture more appropriate for the twenty-first century.

- We intend to modernize our nuclear arsenal, and as the capabilities of existing conventional weapons are improved, we intend to exploit the capabilities of non-nuclear strike systems.
- We are also improving our non-kinetic capabilities, including information operations, electronic warfare, psychological operations, directed energy weapons, and special operations forces.
- These capabilities will be integrated and will provide a broader range of operational capabilities so that the United States is not limited solely to threatening nuclear retaliation.
- We will still rely on nuclear capabilities to assure our allies and deter known or suspected threats from countries that possess WMD and to provide a hedge against surprising military developments.

We are also improving our integrated defense capabilities.

- We are focused on fielding an effective missile defense. The early emphasis was on the ground-based midcourse defense
system, but we are also focused on improving our sea-based interceptor capability.

- We are continuing to develop and deploy the PAC-3 system, and we are attempting to expand our cooperation with allies in developing missile defense capabilities.\(^3\)

- Our offensive and defensive systems will be integrated on the battlefield through our command and control battle management and communications systems.

- Through the combination of integrated strike capabilities and integrated defenses, we will field a more credible and capable force that will help deter aggression and deny an adversary the achievement of his goals. It will also reduce our vulnerability to coercion, thereby enabling us to better assure our allies and dissuade our adversaries.

The NPR also calls for the integration of a responsive infrastructure with the offensive and defensive elements of the New Triad.

- A responsive infrastructure must be able to adapt in a timely manner to meet emerging needs. Specifically, it must demonstrate advanced technical capabilities and the rapid fielding of limited quantities of new systems in response to unexpected threats.

- The nuclear portion of the infrastructure will continue to play a critical role in maintaining the credibility of our deterrent capability.

U.S. Strategic Command will implement the New Triad. It will be responsible for a number of missions, including global strike; the integration of global missile defenses; space operations; the integration of command, control, communications and intelligence; DOD information operations, and combating WMD. It will not be easy to transition to the New Triad. We have to manage the reduction of our nuclear stockpile, and we have to develop and deploy the capabilities that will comprise the New Triad. At the

\(^{3}\) The Patriot Advanced Capability-3 (PAC-3) is a surface-to-air guided missile defense system that builds upon the existing Patriot air defense infrastructure. The new fully operational PAC-3 provides advanced capability against enemy cruise missiles, aircraft, and unlike previous systems, tactical ballistic missiles.
same time, we need to monitor the strategic environment for surprises and new developments. When fully implemented, the New Triad will result not only in a broad array of capabilities, but it will also raise the nuclear threshold and further reduce our reliance on nuclear weapons.

**Dr. William R. Graham**

The threat from a high altitude nuclear explosion is simultaneously unconventional, disruptive, and catastrophic.

- A nuclear explosion within the atmosphere creates a number of electromagnetic effects which can have a devastating impact on large areas of the United States and leave only modest regions unaffected through which to bring help and start the recovery process.

- In the early 1960s the Soviets resumed nuclear testing following a moratorium that we both maintained from 1958 to 1961. In the mid 1990s, we held discussions with Russian scientists and military personnel. They indicated that they had problems with their power, communications, and other networks following high altitude nuclear tests. These results confirmed the effects that we had observed following a series of high altitude nuclear tests in the 1960s.

- This phenomenon, known as an electromagnetic pulse (EMP), could disable communications networks and strategic systems.

During the Cold War, we were concerned that the Soviet Union would disable our networks and strategic systems with an EMP attack and follow up with a devastating nuclear attack to eliminate our deterrent capability. Today, we are worried that terrorists will launch an EMP attack to cause substantial damage to our society.

- A terrorist may prefer to launch an EMP attack rather than detonate a nuclear weapon in a city because we already have defenses designed to prevent WMD from entering our ports and cities. We do not have a similar level of defense
to prevent the surprise detonation of a nuclear weapon in our airspace.

- Today, non-state actors are not the only ones who may one day launch an EMP attack. A number of countries, including Russia, China, India, Pakistan, Taiwan, Israel, Iran, and North Korea are familiar with EMP and its potential military utility. Chinese military writings describe EMP as the key to victory, and develop scenarios where an EMP attack is used against U.S. aircraft carriers in a conflict over Taiwan.

The Commission to Assess the Threat to the United States from Electromagnetic Pulse Attack examined the EMP threat, and one of the first things we discovered was that our military and civilian networks are highly coupled.

- The U.S. military depends to a large extent on various national networks, including the power, energy distribution, transportation, financial, communication, and medical care networks.

- These networks are very reliable because they are highly coupled. For instance, the electric power network does not have its own telecommunications infrastructure, and the latter does not have its own electric power network.

- Our networks are designed to continue functioning if one other network fails. This is called the “N-1” configuration. But they are not designed to operate if multiple networks fail simultaneously.

- An EMP attack would overload Supervisory Control and Data Acquisition (SCADA) systems, which are ubiquitous in our infrastructure and perform a number of tasks, such as process control and environmental monitoring/control, that ensure that our networks run smoothly. Their disablement would cause multiple networks to stop functioning.

The biggest challenge that we face is responding to an EMP attack that disrupts multiple networks across a very wide area. By utilizing modeling and simulation techniques, the Commission found that it

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is not very difficult to derive scenarios where our infrastructure and networks are initially partially disabled, with even greater damage occurring from second-order effects. For instance, once the electrical power network is disabled, the telecommunications network can run on backup generators and systems, but once those fail, the telecommunication system fails. It could take weeks or months before we are able to recover our infrastructure, and in the meantime the livelihood of millions will be severely disrupted.

The threat from EMP cannot be completely eliminated, but there are a number of steps that we can take to mitigate the risk of an attack.

- We can use our intelligence capabilities to interdict an EMP attack, and we can discourage an EMP attack through deterrence.
- We can also protect critical components of key networks, especially components that would take a long time to replace, and we should maintain our ability to monitor the condition of our critical infrastructure.
- We should also clearly define the authority relations between federal, state, and local agencies during an EMP attack and coordinate efforts with non-governmental entities and associations.
- The most important point is that we must develop comprehensive disaster recovery plans before an EMP attack occurs. As we saw in the response to hurricane Katrina, the worst time to devise a disaster recovery plan is after the disaster has occurred.
- Among other things, the disaster recovery plan should clearly detail the various interconnections between different networks, and it should also prioritize which networks should be repaired first.
SESSION 2

Operational Planning for the New Triad

MODERATOR

Dr. Jacquelyn K. Davis

SPEAKERS

Dr. Keith B. Payne, President, National Institute for Public Policy, and former Deputy Assistant Secretary of Defense for Forces Policy

Dr. William Schneider, Jr., President, International Planning Services, Inc., and Chairman, Defense Science Board, U.S. Department of Defense

Ambassador Henry Cooper, Chairman, High Frontier; former Director, Strategic Defense Initiative Organization; and former Chief Negotiator, Geneva Defense and Space Talks (Reagan Administration)

Major General Richard Y. Newton III, USAF, Director, J-5, U.S. Strategic Command

The Honorable R. James Woolsey, Vice President, Booz Allen Hamilton; co-chairman, Committee on the Present Danger, and former Director of the CIA
Dr. Keith B. Payne

In the current security environment, there are a number of different audiences that we seek to influence and several national policy goals that we want to achieve with respect to these audiences.

- The different audiences include allies, emerging peers, rogue states, and violent extremist groups. Each existed in the past, but now some of them are receiving more attention from us in the current security environment.

- Our national policy goals include assuring allies, and deterring, dissuading and, if necessary, defeating adversaries.

- During the Cold War, deterrence was the number one priority. It remains important today, but the other goals of assuring, dissuading, and defeating are also very important.

- Today's security environment is unprecedented. We have multiple national goals whose relative priority is context-specific, and we would like to influence multiple audiences, many of whom we do not understand very well and who must be addressed simultaneously.

- A set of forces that may be useful in achieving one particular goal with respect to one audience may not be useful in a different context involving different goals and groups.

In the current security environment, we must prioritize the goal and audience within a specific contingency. If we fail to do this, we will not be able to determine reliable measurements of effectiveness for different weapon systems and policies.

- Context will drive the prioritization of goal and audience. In some cases, such as the defense of Japan, we may need to make nuclear threats to support extended deterrence. In another contingency, we may need to rely on non-nuclear forces in order to maintain alliance cohesion and because non-nuclear threats may be more credible.

- If a rogue state possessed WMD, and the goal is pre-war deterrence, then a non-nuclear threat may be more credible than a nuclear one since an opponent will perceive U.S. concern for collateral damage and alliance cohesion. However,
if the goal is intra-war deterrence, specifically deterring the second use of WMD, a nuclear threat may be more effective to send a strong signal that WMD should not be used again, whether by the initial instigator or by a future adversary.

- The details of a particular contingency will strongly influence the prioritization of audience and goal, which in turn will affect the choices and tradeoffs regarding the weapons and policies to rely upon.

In thinking about the appropriate roles of nuclear and non-nuclear forces, the decisive factor regarding the most applicable force structure is the prioritization of the goal and audience, and the signal that we wish to send to one or multiple audiences.

- This insight is not really new. But traditionally we have emphasized targeting efficiency in determining whether a conventional or nuclear weapon is more appropriate in a given situation. The key question was: does a particular target require the threat or use of a conventional or nuclear weapon?

- Targeting efficiency will remain the key criterion when the top priority is the destruction of a target. But in other cases, an overemphasis on targeting efficiency is short-sighted. In most contingencies, the political leadership will choose a target and weapon based upon the desire to achieve broad political goals. If the political leadership seeks to send a strong signal, a target will be chosen that is suitable to the weapon that sends the necessary signal.

- The selection of the mix of nuclear and conventional forces for threat or use in a particular contingency will depend upon the determination of the type of force structure that is most conducive to sending the desired signal.

Some observers have noted that we do not need nuclear weapons because we will never use them. But these observers fail to realize that the key criterion used to analyze the utility of nuclear weapons is the political signal sent by a nuclear threat, not targeting efficiency. Furthermore, in the past we faced adversaries that could only have been deterred by nuclear weapons. We will likely face similar adver-
saries in the future. We will need both conventional and nuclear forces for achieving the goals of assuring allies, and dissuading, deterring, and defeating adversaries.

Dr. William Schneider, Jr.

A positive outcome of the effort to transform the U.S. military is the recognition that we cannot rely upon threat-based planning in the twenty-first century.

- It is unlikely that we will be able to predict in a timely manner who our adversaries will be. Thus, in devising the optimum mix of weapon systems, we must shift from a threat-based planning paradigm to one that is based on capabilities. This shift will better ensure that we will have the capabilities to deal with a currently unforeseen adversary.

- We are currently emphasizing C4ISR capabilities, since they are highly flexible and adaptive and can be modified to deal with changes in threat perceptions.\(^5\)

- A capability-based planning paradigm will shift the focus to “outputs” rather than “inputs.” Specifically, this shift will enable us to focus on achieving desired effects, rather than on developing a massive force generated and supported by a specific level of resources.

The adoption of a capability-based planning paradigm will enable us to integrate nuclear with non-nuclear forces more effectively.

- By focusing on effects, we can then begin to ask the following question: what effect(s) needs to be delivered to achieve the desired political aspiration? By asking this question, we can better understand the unique effects that nuclear weapons

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\(^5\) C4ISR refers to command, control, communications, computers, intelligence, surveillance and reconnaissance.
offer, which are extraordinary energy density and thermal and ionizing radiation.

- This new planning paradigm will also force us to determine if there are other weapons that provide similar effects.
- While these questions are useful, we should note that we will have less need to rely on nuclear weapons given the new threats we will face and given improvements in the speed (of transaction), precision, and stealth of non-nuclear forces.

Enhancing our C4ISR capabilities will be critical in terms of shifting to an effects-based planning paradigm.

- Coupling various platforms to the C4ISR system will provide policymakers with a much clearer understanding of what their policy options are in responding to particular threats.
- To provide a greater level of options and flexibility, we need a top-notch intelligence system, and this will require our C4ISR system to shift its focus from the order of battle to individuals, objects, and activities.

As nuclear weapons become more effectively integrated with non-nuclear capabilities, we will have a greater need for dual-use systems since nuclear weapons will have a more limited scope of application in the future. We will be able to derive greater value in our investments in different platforms if the latter are capable of delivering both nuclear and non-nuclear weapons.

An optimal mix of nuclear and non-nuclear forces in the twenty-first century will include fewer but more appropriate nuclear weapons.

- The current stockpile was designed to deter the Soviet Union. It is not appropriate to the threats that we will face in the twenty-first century.
- Future weapon designs should emphasize low maintenance costs and enable us to manipulate effects from weapons so that they can be tailored to different situations.
- Our future warheads should also be able to operate on different platforms and achieve higher levels of safety and reliability.
• We will also need a more flexible defense industrial base that can rapidly evolve as threats emerge.
• By effectively integrating our nuclear and non-nuclear forces, we will contribute substantially to the underlying aims of assuring allies and deterring, dissuading, and defeating adversaries where necessary, and also more effectively deal with the growing levels of proliferation in WMD and ballistic missiles.

**Ambassador Henry Cooper**

I am very happy that missile defense is a component of one of the legs of the triad.

• For over thirty years, the Anti-Ballistic Missile (ABM) Treaty imposed vulnerability on the United States, and I am happy that President Bush withdrew from it so that we can begin to develop truly effective defenses.⁶
• The ABM Treaty precluded the testing of effective missile defenses and related capabilities.

Fifteen years ago, I was asked by then-Secretary of Defense Cheney to do an independent review of the Strategic Defense Initiative (SDI) program as the Berlin Wall fell and defense budgets shrank.⁷

• While having a truly effective defense was the long-term goal, by that time we refocused on destroying half of several thousand reentry vehicles that might have been launched at us by the Soviet Union. The emphasis then was still on deterrence, and the primary role of missile defense was to introduce uncertainty into the enemy’s calculations.

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⁶ The United States and the Soviet Union signed the ABM Treaty in May 1972. The ABM Treaty permitted each signatory to have only two ABM deployment areas (later reduced to one), so restricted and located to prevent them from developing a nationwide ABM defense. Each party also agreed to limit qualitative improvements to ABM technology.

⁷ SDI was a program proposed by President Reagan on March 23, 1983 to use space-based defenses to protect the United States from attack by strategic nuclear missiles. It was never implemented, and research in space-based defenses languished after the end of the Cold War.
Once the possibility of a large nuclear exchange seemed less likely, I indicated to the Russians that we should cooperate on common threats, such as unauthorized launches.

Another concern we had was the proliferation of ballistic missiles and the resulting increased uncertainty in defending our troops and overseas allies. As a result, we began developing theater missile defenses, which became a popular alternative to the SDI program.

We eventually concluded that we did not have to be concerned with defending against thousands of reentry vehicles. Instead, in the 1990s the threat resulted from the possibility of limited strikes originating from uncertain locations.

- Ballistic missiles may be launched at us from North Korea or Iran, they may be launched from mobile platforms, and they may be launched at our troops and allies.

- The role of defenses shifted from intercepting a significant percentage of reentry vehicles to destroying all of a relatively small number of missiles. For planning purposes, the goal we set for missile defenses was the destruction of 200 reentry vehicles. The emphasis shifted from deterrence to protection.

- Since 9/11, we also have to worry about the terrorist use of ballistic missiles, especially launches from sea-based platforms. In 1998 the Rumsfeld Commission highlighted this threat, and it is amazing how little we have done to mitigate it.\(^8\) Missile defenses can be an effective tool in limiting proliferation.

\(^8\) The Commission to Assess the Ballistic Missile Threat to the United States (the “Rumsfeld Commission”) was established in the National Defense Authorization Act for FY1997 (P.L. 104-201), Section 1321. The mandate of the
Today, we need layered defenses that have global coverage. We should not limit ourselves to solely homeland or theater defenses.

- Our defenses should have a boost-phase component, since that is the stage in which threats are most vulnerable. Destroying a missile in its boost phase prevents the deployment of countermeasures which becomes a very difficult problem in the midcourse phase.

- Placing defenses in space provides the best way to achieve global coverage. Space-based defenses will enable us to intercept missiles in all phases of their flight, from the boost to the reentry phase. They also offer the most cost-effective means to achieve this level of security. We can have a limited spaced-based capability in five years for approximately $5 billion. Unfortunately, for the last twelve years we have not had a serious effort to develop space-based defenses.

- I am pleased to see the emphasis placed on sea-based defenses. The U.S. Navy has achieved impressive results in recent tests, and they are approaching an operational status.

- Ground-based defenses are the most expensive way to achieve effective global defenses, if they ever attain that capability.

**Major General Richard Y. Newton III, USAF**

Military planning has changed drastically in the interval between the two wars with Iraq. During Desert Storm, the U.S. military employed a threat-based planning paradigm. In Operation Iraqi Freedom, we employed a capability-based paradigm.

- Today, we are emphasizing effects-based operations.

- During Desert Storm, we relied extensively on overseas bases. Today, our military “footprint” is much smaller, as planners are relying more on expeditionary forces.

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Commission was to assess the nature and magnitude of the existing and emerging ballistic missile threat to the United States. It submitted its report to Congress in July 1998. The report can be accessed at http://www.fas.org/irp/threat/missile/rumsfeld/.
• We are also building new relationships today, including those between services, with allies, and between different agencies.

• Today STRATCOM is developing the concepts, relationships, and capabilities to implement effective global deterrence across a range of actors and situations.

The New Triad embraces a flexible mix of offensive and defensive capabilities sustained by a responsive infrastructure.

• The key enablers of the New Triad will be agile planning, effective intelligence, and a robust command and control system.

• Both nuclear and non-nuclear forces will be an important part of the New Triad. We must also integrate kinetic and non-kinetic forces.

• Another key element of the New Triad is a responsive infrastructure that maintains our capacity to respond quickly to strategic surprise, regardless of whether the latter results from a failure of U.S. capabilities or a technical breakthrough by an adversary.

• We should plan for surprise, since we will then be better able to respond to a variety of contingencies.

To operationalize the New Triad, we will have to overcome a few problems.

• Deterrence must be continuously adapted to an ever-changing global security environment. The Cold War was dominated by our confrontation with the Soviet Union. Today, our
adversaries could include peer competitors, rogue states, and non-state actors.

- Global deterrence requires that we continually assess actors, their decision-making processes, and the effectiveness of ongoing deterrent actions.

- Deterrence plans should be tailored to the particular adversary and scenario.

- Globalization increasingly requires that we consider the second- and third-order effects of our deterrent actions. Every action necessary to raise costs and deny benefits to our adversaries will create effects across a broad set of actors, including both allies and adversaries. We have not fully examined the impact of these effects.

STRATCOM has evolved from an organization focused largely on nuclear deterrence to one that is committed to implementing all of the activities necessary to deliver capabilities needed for effective global deterrence.

- STRATCOM is managing a variety of missions associated with global deterrence, including global strike, network warfare, information operations, surveillance and reconnaissance, interdicting and eliminating WMD, and building integrated missile defenses.

- Many senior-level personnel have multiple command responsibilities. For example, Lieutenant General Kevin P. Chilton is currently the commander of the 8th Air Force as well as Joint Functional Component Commander for Space and Global Strike at STRATCOM. We also have separate joint functional component commands for integrated missile defense, intelligence, surveillance and reconnaissance, and network warfare.

- We are also developing a center within STRATCOM for combating WMD.

STRATCOM is developing new organizational structures and processes to implement global deterrent activities successfully and to insure that DOD deterrent actions are highly responsive and
tailed to the specific adversary and scenario. We are maintain-
ing a global perspective as we work with other combat commands
and organizations to employ and redeploy our forces effectively as
required.

The Honorable R. James Woolsey
The ABM Treaty was not a bad idea for
the security environment of the early
1970s.

- At that time, we were worried
that a Soviet nationwide ABM
defense, if unconstrained, would
convince Soviet leaders that they
possessed a credible first strike
capability. Under these circum-
stances our allies would have
been less confident in our deter-
rent capability.

- An ABM treaty that eliminated the possibility of a Soviet
nationwide ABM defense, combined with our capable offensive
force and the increasing accuracy of our sea-based, land-based,
and bomber forces was a reasonably stable outcome.

- At that time, countries that were interested in nuclear weap-
os were either American allies or Soviet clients. Thus,
the two superpowers could rely on diplomacy to prevent
proliferation.

Today’s security environment is vastly different from that of the
early 1970s.

- During the Cold War, we did a good job of collecting strate-
gic and tactical intelligence on the Soviet Union. For instance,
we could determine the stage of development of Soviet ABM
radars, and we could determine whether the ammunition used
by Soviet divisions in Germany was intended for training
purposes.

- Today, our intelligence agencies will probably not be able
to penetrate the top leadership of al Qaeda and learn their
day one
operational plans. We simply will not have the same level of understanding of our adversaries’ strategy and tactics.

- Currently there is no effective constraint within the non-proliferation regime to prevent countries from developing enrichment or reprocessing capabilities. Once a country develops those two capabilities, it is very close to developing a nuclear weapon. The designs of the atomic bombs that we used in World War II are readily available.

In today’s security environment, there are three key priorities for our national security policy.

- First, we must develop munitions that have lower yield and deep penetration capability. This type of weapon will be able to deter Iran and North Korea from undertaking a number of activities.

- We need to develop a truly effective missile defense. This means developing a boost-phase capability to shoot down warheads while they are still in their boosters. Initially, we should develop our sea-based defenses to provide us with this capability, but ultimately we should develop and deploy space-based defenses.

- Third, we need to make our infrastructure resilient to outside shocks to prevent it from being used as a weapon against us. Terrorists can create a lot of damage by disabling the SCADA systems within our infrastructure. Our infrastructure has been built to maximize openness, ease of access, ease of maintenance, and transparency, and in recent years it has been stripped of redundancy and resilience. We must prevent our adversaries from taking advantage of the vulnerabilities of our infrastructure. Recently, an advisor to the president of Iran noted that there were thirty critical nodes in the United States and Western Europe, and their destruction would cripple western civilization. He also noted that Iran’s friends, possibly Hezbollah, have already conducted reconnaissance on these vital points.
• We are currently in a very troubling strategic environment, and we must be very candid with one another in determining how to mitigate our vulnerabilities and overcome the threats we face.

Today, we spend about 4 percent of GDP on defense. This figure is about one-third of the amount we were spending (as a percentage of GDP) on defense in the early 1960s. Stated differently, we would have to spend nearly $1.5 trillion today for defense spending to reach a similar share of GDP. We can afford each of these initiatives, which will make us more secure in the twenty-first-century security environment.
It has been over four years since war came to the United States on a bright September morning. Much has changed since then.

- Under the President’s leadership, we have expelled al Qaeda from its base in Afghanistan and toppled Saddam Hussein’s regime. In doing so, we have liberated the Afghan and Iraqi people.

- We have captured a large number of terrorists and operatives, and we have forged strong links with the militaries and security services of other nations at risk from attack.

- The President and Congress have adopted many of the recommendations made by the 9/11 Commission, and the administration is also implementing many of the proposals put forward by the Silberman-Robb Commission.9

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• Ambassador Negroponte, the Director of National Intelligence (DNI), has been given the task of reforming the intelligence community to meet the challenges posed by terrorism, the proliferation of WMD, as well as other national security issues.

The DNI has been provided with authority over budgets, programs, personnel, information systems, and the operational priorities of the intelligence community. Ambassador Negroponte is the President’s principal intelligence advisor and the undisputed leader of the intelligence community. Within DOD we have welcomed his appointment. The entities of the intelligence community that reside within DOD are directly subject to the DNI’s guidance, priorities, and decisions. DOD has been working hard to align the department’s intelligence activities with the goals of the broader intelligence community.

The New Triad is based on the premise that intelligence will be good enough to permit the United States government the time and opportunity to shift the configuration of the triad.

• Reliable intelligence will enable us to prioritize certain legs of the New Triad, as well as the composition of each leg, to address whatever risks and challenges emerge.

• The shifts in emphasis within the triad are intended to support the policy goals of assuring allies and dissuading, deterring, and defeating adversaries.

• Intelligence reform is part of a broader transformational effort within DOD designed to better plan, prepare for, and execute military operations to include any post-war or stability activities.

• Government moves very slowly, which makes it even more important to have reliable intelligence to tailor the New Triad to emerging threats.

• Reforming defense intelligence will enable DOD to undertake its primary mission, which is deterrence, as well as other missions, including counter-terrorism, force protection, and humanitarian relief. It will also more effectively permit DOD
to contribute to broader national intelligence efforts that support national security goals and activities.

Our adversaries will search for the most effective means to attack our and our allies’ economy, society, and military power.

- They may attack us directly or indirectly by draining credibility from an operation or by increasing doubt in American credibility.
- Our allies will also possess a range of lethal weaponry, ranging from truck bombs and improved explosive devices, to cyber attacks and attacks on our space assets. They may also rely on chemical and nuclear weapons, as well as genetically altered biological weapons.
- Effective intelligence will enable us to prepare better for these threats and to apply appropriate force at the right time to defeat an adversary.

One of our key advantages over our adversaries is an intelligence enterprise comprised of the very best people and technology. Our intelligence capability provides our leadership with the information to inform its decisions on war and peace, and it helps inform how and when our instruments of national power should be applied. This capability figures prominently in the judgments made by national leaders in assuring our allies and friends and dissuading, deterring, and decisively defeating our adversaries.

However, DOD needs to revise its defense intelligence capabilities for a variety of reasons.

- Investments in collection systems were made a generation ago and need to be refocused on the difficult military problems that we can identify today, as well as made adaptable to deal with challenges that emerge over time.
- The intelligence challenges of today and tomorrow will not resemble those of the past. Our adversaries today will not array in large formations in known locations, preparing for large-scale force-on-force engagements. Rather, we must collect intelligence on terrorist cells, and also on state actors, since they may act differently today than they did in the past.
• We also need to make personnel and organizational changes. We do not have enough people in the intelligence community with the appropriate skills to address the threats that we will likely face. Furthermore, the organization and doctrine for intelligence activities, whether in support of political or military authorities, have not been systematically revised for over two generations. It will take much effort to overcome the government’s negligence of the intelligence community during the 1990s.

• We also need to think differently about the problems we are trying to solve.

Our intelligence reform efforts are designed to achieve a number of goals.

• We need to know something about everything, everywhere, at all times. Furthermore, given the rapid pace of change today, being able to distinguish a significant event from background “noise” is a skill that we need to improve.

• We need reliable strategic warning, not only of potential threats, but across the full spectrum of reporting. For DOD, such warning is essential to reposition our forces in a timely manner. For other agencies, warning is vital in terms of shaping diplomatic, economic, commercial, and regulatory responses. Averting crises is usually preferable to managing them.

• We need an agile and adaptable collection capability that is far less dependent on its current operations than today’s systems. We also need to reform the way we download and process information for end-users.
• We need an intelligence capability that supports a strategy of forward deterrence. The best defense is one that has an overseas presence.

• With respect to military operations, we need an intelligence capability that allows us to act quickly, secretly, and effectively and which anticipates the war-fighter’s needs and provides predictive intelligence that is ahead of the battle.

• We need to insure that knowledgeable adversaries do not compromise our secrets. We must obtain robust capabilities that enable us to acquire an adversary’s secrets, even as we ensure that our own capabilities are not vulnerable.
Session 3

Perspectives on Nuclear/Non-Nuclear Requirements for Regional Contingencies

MODERATOR
Dr. James Tegnelia

SPEAKERS
Dr. Fred Iklé, Distinguished Scholar, Center for Strategic and International Studies, and former Under Secretary of Defense for Policy and Director of the Arms Control and Disarmament Agency

The Honorable Paula A. DeSutter, Assistant Secretary for Verification and Compliance, U.S. Department of State

Lieutenant General Henry “Trey” Obering III, USAF, Director, Missile Defense Agency

The Honorable Ronald F. Lehman II, Director, Center for Global Security Research, Lawrence Livermore National Laboratory
Deterrence was a problematic concept during the Cold War.

- During the Cold War we attributed to deterrence a degree of concreteness which it did not possess and continue to do so today.
- We discuss and hypothesize on deterrence as if it was a phenomenon that was empirically observable, which often it is not. This intellectual exercise led to abstract concepts such as “perfect deterrence” and “partial deterrence.”

Deterrence arose from the unhappy realization that we could not rely solely upon defense against a massive Soviet nuclear attack. The scientists who developed the atom bomb predicted that, absent an effective global ban on nuclear weapons, the Soviet Union would eventually develop a large nuclear force. They also concluded that our best air defense could not shoot down all incoming warheads. Thus, we had to rely on deterrence in addition to defense.

Deterrence contributed to the one stellar achievement of the Cold War: the non-use of nuclear weapons.

- The publics and governments of most countries have become accustomed to nuclear non-use. We are not prepared to live in a world characterized by the use of nuclear weapons.
- It is in the interest of all nations, even a global caliphate, to preserve the norm of nuclear non-use. Were one established, a caliphate would provide a target for retaliation, and at that stage even terrorists would place greater value on deterring, rather than using, nuclear weapons.

However, nuclear deterrence does not prevent all forms of warfare.

- Nuclear deterrence may not prevent a conventional attack. In 1950, Kim Il-Sung was not deterred by American atomic weapons from attacking South Korea, and neither was China deterred when it entered the war. And despite the United States’ overwhelming nuclear superiority over the Soviet Union at that time, Stalin was not deterred from providing material assistance to North Korea.
• The Vietnamese were not deterred by American nuclear capabilities, and it is doubtful that the Soviets seriously considered using nuclear weapons in Afghanistan.

Another limitation of deterrence is that it does not prevent accidental launches of nuclear weapons.

• In the past fifty years we had several near-accidents involving nuclear weapons. They were averted by precautionary measures designed to prevent mistakes or miscalculations, not by deterrence.

• We need to reduce the risk of accidents and mindless decisions to as low as possible, considering that at times we may need to escalate to deter our enemies.

We should be wary of escalating to nuclear use following a terrorist use of nuclear weapons.

• A troubling analogy is the escalation in 1914 that led to World War I. A terrorist act by a Serb nationalist resulted in a suicidal war involving three of the main empires at that time: the Austro-Hungarian, German, and Russian empires. Each was destroyed by the ensuing war.

• We should not allow the terrorist use of nuclear weapons to result in a nuclear exchange between the United States, Russia, and China.

• We need to be conscious of the possibility of accidents and self-defeating escalation, and the resulting restraint will serve as a counterbalance to deterrence.

The Honorable Paula A. DeSutter

When I worked in the old Arms Control and Disarmament Agency, I was assigned for a brief period at the National Defense University. I conducted a study that examined how the United States can deter the use of WMD by regional states, especially Iran. I examined several key questions.

• Can current deterrence concepts and U.S. forces adequately deter WMD use by regional states?
• If not, why are current concepts and forces inadequate, and how can they be strengthened?
• Why are certain regional states hard to deter?

My analysis indicated that it was not sufficient to simply base deterrence strategies on the overwhelming U.S. conventional superiority and the implied threat of nuclear retaliation. Rather, in-depth strategic profiles are also needed to develop tailored deterrence strategies that impact idiosyncratic cost-benefit calculations.

• A deterrence strategy would include denial strategies that consist of active and passive defenses, as well as counterforce attacks to diminish an enemy’s offensive capabilities. However, a determined foe will mitigate the effectiveness of these measures by employing countermeasures, such as mobility and concealment tactics and by trying to evade our active and passive defenses.

• Denial and counterforce strategies must be supplemented with efforts to identify and place at risk those elements whose destruction would most severely affect an opponent’s cost-benefit calculation.

The elements that should be put at risk resemble the “centers of gravity” described by Prussian military theorist Carl von Clausewitz.11

• Clausewitz defined centers of gravity as the hub of all power and movement on which everything depends, the point against which all energies should be directed. The destruction of centers of gravity will increase the probability that the cost to the enemy of initiating war or continuing its execution will be deemed unacceptable.

• Putting centers of gravity at risk, in combination with denial and counterforce strategies, will increase the probability that deterrence will be successful.

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• If we do not develop tailored deterrence strategies that place at risk nation-specific centers of gravity, then deterrence of regional adversaries is unlikely to succeed.

In the case of Iran, we must unmistakably hold the Iranian Revolutionary Guard Corps (IRGC) at risk. Leadership survival is important, but the loss of the IRGC would leave Iran vulnerable to outside attack and would cripple Teheran’s efforts to export the Iranian revolution. Furthermore, the destruction of the IRGC would significantly reduce the likelihood of WMD use by Iran.

**Lieutenant General Henry “Trey” Obering III, USAF**

Over the last thirty years, the proliferation of ballistic missiles has become a significant national security problem for the United States.

• In 1972 there were approximately eight countries that had ballistic missiles or the technology to develop them, and many of them were friendly to the United States.
• Today, over twenty countries have these capabilities, and many of them are unfriendly to the United States.
• The ABM Treaty was useful in constraining Soviet missile defenses, but it has allowed other countries to take advantage of our vulnerability by developing ballistic missiles.
• Other countries are interested in acquiring ballistic missiles and WMD to counterbalance the United States’ superior conventional capability.

By virtue of the National Missile Defense Act of 1999, the United States is legally required to deploy a national missile defense system as soon as technologically possible. Our strategy is to deploy an initial capability that will provide protection against the North Korean threat and to provide protection for our deployed forces with terminal defenses like the Patriot missile system. In

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12 The IRGC was established by Ayatollah Rouhollah Khomeini in May 1979 to safeguard Iran’s revolution and enforce the government’s Islamic codes and morality. It is believed to be in charge of Iran’s WMD programs, its operational chemical and biological weapons inventories, and missile forces.
2006-07, we will address the threat from the Middle East and expand our coverage to include our friends and allies. Ultimately, the Missile Defense Agency will field a global, layered, and integrated system that can protect our homeland, our deployed forces, and our allies from ballistic missiles of all ranges and in all phases of flight.

- The Airborne Laser (ABL) and Kinetic Energy Interceptor (KEI) will provide a boost-phase intercept capability.\(^\text{13}\)
- The ground-based midcourse system, Aegis-equipped warships, and the multiple kill vehicle will provide a defense for the midcourse phase.\(^\text{14}\)
- The Patriot and the THAAD system will provide terminal defenses.\(^\text{15}\)
- Supporting these systems will be a family of land-, sea- and space-based sensors, and a command and control system will integrate both sensors and interceptors and thereby increase the detection and engagement capability of the entire system.
- Today, our Aegis-equipped ships are integrated with our ground-based midcourse system, and in the future we will integrate forward-deployed radars with land-based and ship-based interceptors.

\(^\text{13}\) The ABL is designed to locate and track missiles in the boost phase of their flight, then accurately point and fire a high-energy laser (from the nose of a modified Boeing 747-400 aircraft) to destroy enemy missiles. The KEI is a missile defense program whose goal is to design, develop, and deploy kinetic energy-based mobile, ground- and sea-based missiles that can intercept and destroy enemy ballistic missiles during their boost phase. The KEI element consists of an interceptor component, mobile launcher component, and a command, control, battle management, and communications component.

\(^\text{14}\) Each Aegis cruiser and destroyer is outfitted with the Aegis Weapon System, the heart of which is the AN/SPY-1 radar system. AN/SPY-1 sends out beams of electromagnetic energy in all directions, allowing Aegis ships to track up to 100 targets simultaneously.

\(^\text{15}\) The Terminal High Altitude Area Defense (THAAD) missile system will provide protection against hostile incoming threats such as tactical and theater ballistic missiles at ranges of 200km and at altitudes up to 150km.
• Our integrated, layered system will provide an adaptable defense against the evolving ballistic missile threat. Recently, we have had a very successful testing record.

• We successfully tested a forward-deployable radar that we will deploy in early 2006 against ICBMs that we can track from Europe.

• We successfully tested the Cobra Dane radar and the sea-based X-band radar.

• We have added more Aegis destroyers with the SM-3 missile, and we had a successful Aegis intercept test in November.

• Based on these and other successful tests, it is clear that our missile defense system is maturing.

Missile defenses will provide multiple security benefits.

• Vulnerability invites attack. The key lesson of 9/11 was not the method of attack, but rather that terrorists exploited a vulnerability to kill as many people as possible.

• Vulnerability will determine the method of attack, and if we do not develop missile defenses, then we could be faced with a ballistic missile attack.

• Missile defenses reduce the opportunities for coercion or blackmail by introducing complications into an attacker's decision-making calculus. We have seen terrorist groups take hostages in Iraq. The geopolitical balance would be severely affected if state and non-state actors could hold entire cities hostage.

The Honorable Ronald F. Lehman II

We have yet to undertake capability-based planning effectively.

• Under capability-based planning, one tries to develop a general capability applicable in an uncertain world. However, our doctrine, goals, and guidance often emphasize the application of these capabilities to particular scenarios.

• As a result, for some analysts capability-based planning means that we need to develop every type of capability in
an uncertain world, whereas for others it signifies that we cannot commit ourselves to any capability.

- The answer to this dilemma is to focus capability-based planning on developing solutions to particular problems. Furthermore, if we maintain general capabilities rather than dedicated forces, we will need to undertake more planning, not less, to understand better how fungible assets can be repackaged and applied to new situations.

- We cannot rely on ad hoc planning. We need to do advance planning so that capabilities can be quickly tailored to surprises and emerging threats.

Integrating nuclear, conventional, and non-kinetic capabilities will be very difficult.

- One of the difficulties will be developing measurements of effectiveness for different capabilities that are complementary given the effects one would like to achieve.

- The integration of disparate capabilities is made even more difficult because the NPR established four key missions: assuring allies and dissuading, deterring, and defeating adversaries. It will be difficult to determine whether measurements of effectiveness for different kinetic and non-kinetic capabilities contribute the right amount of, for example, deterrence or assurance.

- Another challenge is the proper integration of dual-use capabilities within integrated war plans. For example, today our bombers are primarily intended for conventional missions, but they can also perform nuclear roles. Within a war plan that integrates both conventional and nuclear forces, should the bombers be fitted with conventional munitions, and should we plan on reloading them with nuclear munitions if a crisis involving vital interests escalates?

- A further obstacle to integration is the cultural gap that exists between the nuclear and conventional communities. This results from the different career paths for personnel in these two communities and from the pressure to keep budget decisions for these categories separate.
However, we forget that there has always been a relationship between conventional and nuclear forces.

- During the Cold War, there were numerous small wars in the Third World, but there was never a “hot” war between the two superpowers.
- We also forget that the fundamental driver for the strategy of flexible response was the relationship between nuclear and conventional forces.\textsuperscript{16}
- The nuclear threshold is often determined by the circumstances surrounding a particular conventional conflict.
- Today, if a vital interest of the United States or its allies is at risk in a contingency, we can expect that war plans will integrate nuclear with conventional weapons.

STRATCOM can serve as a useful vehicle for integrating the nuclear and non-nuclear communities.

- During the Cold War, military organizations developed principally a nuclear or conventional focus. During the 1950s, for example, Strategic Air Command focused largely on nuclear missions, while the services became conventional organizations. Nevertheless, each of the Services – the Army, Navy, and Air Force – had nuclear roles and missions. In recent decades, the Army has abandoned all nuclear roles, while the Navy and the Air Force have greatly reduced their nuclear roles.
- Successfully integrating nuclear, conventional and non-kinetic capabilities within STRATCOM offers an opportunity to bridge the different cultures that exist within each of these communities.

\textsuperscript{16} According to the strategy adopted officially by NATO in 1967 of flexible response, NATO, and specifically the President of the United States, should be able to rely upon a range of tools, and not simply nuclear weapons, when responding to a contingency. It replaced the doctrine of massive retaliation, which, as its name suggests, was intended to deter the Soviet Union with the threat of an overwhelming nuclear response. By raising the nuclear threshold, flexible response placed increased emphasis on the role of conventional forces. Such capabilities would have been used against invading Soviet–Warsaw Pact forces, in all likelihood before escalation to the nuclear level.
Nonproliferation/Counterproliferation:

Does the New Triad Strengthen or Weaken Nonproliferation?

MODERATOR

Dr. Robert L. Pfaltzgraff, Jr.

SPEAKERS

Dr. Barry M. Blechman, Founder, President, and CEO, DFI International, and Member, Defense Policy Board

Dr. Ashton B. Carter, Ford Foundation Professor of Science and International Affairs, John F. Kennedy School of Government, Harvard University

Mr. Frank Miller, Vice President, The Cohen Group, and former Senior Director for Defense Policy and Arms Control, National Security Council

Ms. Elaine Bunn, Director, Future Strategic Concepts Program, Institute for National Strategic Studies, National Defense University

Mr. Henry Sokolski, Executive Director, Nonproliferation Policy Education Center

Congressman Adam Schiff, 29th District of California, Member of the House International Relations Committee
Dr. Barry M. Blechman

When considering the impact of the New Triad on nonproliferation, we should remember that WMD are the weapons of the weak.

- WMD are pursued and relied upon by nations in a weak strategic position.
- The United States relied on WMD to deter an overwhelming Soviet conventional attack on Western Europe.
- Given the United States’ conventional military superiority, it is in our interest to reduce as much as possible the role of nuclear weapons in world affairs and the reliance on them for security.

The New Triad promotes efforts to limit proliferation.

- By reducing the size of its stockpile, the United States is taking a major step in fulfilling its Nuclear Nonproliferation Treaty (NPT) obligations, thereby placing us in a stronger diplomatic position when we ask other nations to forgo or deemphasize nuclear weapons.
- By elevating the role of conventional global strike and defenses in the New Triad, the NPR both reduces the importance of nuclear weapons in U.S. security policy while also more effectively dissuading potential proliferators by emphasizing a more credible deterrent capability.
- Strangely, the administration has said very little to publicize these very significant changes in American policy.

It is very difficult to conceive the President ordering a preemptive nuclear strike, even to prevent a perceived terrorist attack.

- We need a range of capabilities for preemptive scenarios, but a preemptive nuclear strike against a nation-state is unimaginable, and only slightly more conceivable than one against a terrorist group.
- The first use of a nuclear weapon, regardless of yield, will be an extremely difficult decision, especially since intelligence will be very uncertain.
• Decisions on first use are made on the basis of fundamental core principles, not on the technical qualities of a weapon.

• However, nuclear forces can play a deterrent role. They may be able to deter countries from providing WMD support and training to terrorist groups.

It is in the United States’ interest to reduce the role of WMD in world affairs.

• We should emphasize the goal of eliminating all WMD from all nations. This will not occur in the near future, but efforts to achieve this goal will strengthen our nonproliferation and counterproliferation policies.

• We often emphasize the importance of nonproliferation goals, but other objectives sometimes assume a higher priority. Pakistan offers an instructive example. Although the United States has opposed Pakistan’s nuclear program, including the illicit export activities of its chief architect, A.Q. Khan, we have been prepared to work with Islamabad especially after 9/11 to drive the Taliban out of neighboring Afghanistan.

• Nuclear weapons do play a role in defining our security relationships with China and Russia, and they potentially play a deterrent role in some contingencies. Overall, however, we should deemphasize their importance in world affairs, while also building alternative capabilities so that other nations see that the United States does not depend upon them and that they do not guarantee security.

Dr. Ashton B. Carter

Our nuclear posture does not have a large impact in either causing or solving proliferation problems.

• Neither Iranian nor North Korean decisions regarding their nuclear weapons programs are significantly affected by the size or shape of the United States’ nuclear forces. Our decisions regarding the stockpile may impact allied support for global U.S. policies designed to stem proliferation, but they do not impact adversaries’ decisions on whether or not to
build nuclear weapons. The latter are based more on regional security concerns.

- At the same time, our current stockpile is not an effective tool in preventing proliferation to terrorists or in deterring rogue states and near-peer competitors. Furthermore, the most serious threat we face is a nuclear detonation on American soil by terrorists, and it is not clear how a modernized stockpile can prevent this scenario.

One factor that does impact our counterproliferation policy is the inability of our intelligence agencies to develop a clear understanding of the challenges and risks presented by the proliferation of WMD.

- Uncertainty often leads policymakers to demand greater levels of security. The Rumsfeld Commission concluded that it was rational to develop missile defenses as a hedge against the uncertainty surrounding the spread of ballistic missiles. In the case of Iraq, we managed uncertainty by invading the country to mitigate the threat from what we believed were its WMD munitions and programs. As we now know, relying on an invasion to eliminate this threat was unnecessary, and in the future we cannot repeat this example.

- There are other examples of uncertainty generating threat inflation. In the 1950s we believed that the Soviet Union possessed superior numbers of ballistic missiles. It was only after much effort and analysis by the government that the notion of a “missile gap” was dispelled.

- Today, we need a similar effort to develop a better understanding of the proliferation of WMD. In the past, we were able to rely on remote technology to gather military information on the Soviet Union. In the future, we will have to rely on close-in techniques and forensic technology to penetrate terrorist cells, and currently this field is experiencing a technological revolution.

There are several actions that the intelligence community can take to better inform policymakers of the WMD threat.
• Everyone who has ever developed weapons-related expertise should be treated as a potential threat, and our intelligence community should track the careers of these individuals.

• The intelligence community should improve its technical expertise in weapons of mass destruction. This will enhance its ability to collect WMD intelligence.

• In a post-9/11 world, the set of customers for WMD intelligence is much larger. The intelligence community should therefore develop the capability to serve numerous customers, including DOD, the Department of Homeland Security, the Department of Health and Human Services, law enforcement, and the diplomatic corps.

• Counterproliferation intelligence must become more operational, so that there is a stronger link between intelligence and action.

As we consider strategies for deterring rogue states, we should avoid being placed in a situation where the United States is deterred by them.

• The expansion of the North Korean nuclear weapons program is the biggest national security setback for the United States in the last half-decade. Before, we stated that North Korea with nuclear weapons was intolerable. Now, the expansion of their plutonium program signifies that there will be fissile material in that country long after the current regime has left power.

• The current diplomatic process has not been able to convince the North Koreans to completely and irrevocably abandon their nuclear program. We should seriously consider developing coercive alternatives for achieving these goals.

• Even if the diplomatic option fails, we should pursue it until its unhappy conclusion, to “prepare the battlefield” by winning Chinese and South Korean support for more coercive measures.

The United States should lead efforts to establish a ban on further enrichment and reprocessing activities. As nuclear power has spread,
many countries have developed these capabilities. Unfortunately, many of these same countries, such as Russia and China, have experienced periods of profound social upheaval. This combination is dangerous. In the future, the world will increase its reliance on nuclear power. At the same time, we have to find a way to prevent the increase in the global capacity to enrich and reprocess fissile material.

**Mr. Frank Miller**

U.S. and British nuclear weapons provide security benefits by deterring attacks on our vital interests and those of our allies.

- The end of the Cold War did not eliminate potential military threats, nor did it end the need for technical knowledge to build nuclear weapons. As a result, U.S. and British nuclear weapons guarantee the security of these two nations, support extended deterrence, and provide the foundation for international security and alliance cohesion.

- These security benefits can be provided with a stockpile smaller than that which is called for in the Moscow Treaty. However, we must recognize that U.S. nuclear weapons do play an important role in safeguarding international security.

- Nuclear weapons are not an all-purpose deterrent. The United States needs advanced conventional forces and modern intelligence, surveillance, and reconnaissance assets. But these capabilities can never fully assume the role played by U.S. nuclear forces.

The contribution of U.S. nuclear forces to nonproliferation objectives is often overlooked.

- Without the U.S. nuclear umbrella, some U.S. allies could be subject to nuclear blackmail and would feel compelled to develop their own nuclear weapons. Some have the material and technical capabilities, but they are prevented from doing so only because of the policy of extended nuclear deterrence.

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17 The Strategic Offensive Reduction Treaty, also known as the Moscow Treaty, was signed by the United States and Russia in May 2002, and it obligates both signatories to reduce the level of operationally deployed strategic nuclear warheads to 1,200-2,200 by 2012.
• The United States is also partially fulfilling its Article VI commitments. Article VI imposes three obligations on nuclear weapons states. First, they must end the nuclear arms race, and this occurred fifteen years ago. Second, they must make positive efforts towards achieving nuclear disarmament. A comparison of the American nuclear stockpile during the Cold War with its projected level in 2012 offers proof that the United States has actively taken measures to reduce the number of its nuclear weapons. Third, Article VI requires diplomatic efforts for a treaty on complete nuclear disarmament. The United States has signed with Russia the Moscow Treaty, which goes far toward reducing strategic nuclear weapons levels.

U.S. policies and nuclear capabilities have not caused the nuclear proliferation that has occurred in the last few decades.

• Decisions by regional countries to build nuclear weapons are made on the basis of regional security concerns. They are not influenced by the number of nuclear weapons in the U.S. stockpile. U.S. power may influence decisions by potential proliferators, but the precise composition of the U.S. nuclear stockpile does not.

• We should realize that many non-nuclear weapons states benefit from the NPT. This regime enhances security by dissuading regional states from building nuclear weapons and engaging in unnecessary security competition with neighbors. Furthermore, the United Nations plays an oversight role to prevent cheating. Thus, adherence to the nonproliferation regime is in the interest of regional states, and it is simply false to argue that other states will be encouraged to build nuclear weapons unless the United States completely eliminates its nuclear stockpile.

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18 Article VI of the NPT addresses the nuclear disarmament obligations of the five designated nuclear weapons states. It states: “Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a Treaty on general and complete disarmament under strict and effective international control.”
Asking whether the modernization of the U.S. nuclear stockpile will hinder or promote proliferation is a misleading question. Instead, we should consider whether there is a role for nuclear deterrence in the future. Many believe the answer is “yes,” and that we should therefore ensure that we have an effective deterrent. We cannot achieve credible nuclear deterrence with a nuclear stockpile whose newest weapon is twenty years old.

Reducing the collateral damage associated with a particular nuclear weapon will not necessarily make it more usable. The key variable is the decision to cross the nuclear threshold. If a crisis is sufficiently serious, the President will use nuclear weapons. The notion that a nuclear weapon is more usable simply because it produces less collateral damage is inconsistent with how political decisions are actually made. Nuclear use would depend, for example, on how serious the threat to a vital national interest is deemed to be.

Ms. Elaine Bunn
The New Triad can play an important role in assuring allies, but by itself provides little guidance on the required size and composition of the U.S. nuclear stockpile.

- Most of the time, our allies are not overly concerned with the precise present composition of our nuclear stockpile, and there is no evidence that our nuclear arsenal insufficiently reassures them.

- The assurance of allies is a secondary effect, not an independent variable. If we implement the Reliable Replacement Warhead (RRW) program, we will do so because we desire our stockpile to become safer, more reliable, and more effective.19 Our allies will then become more assured as we are more confident of our stockpile.

19 Congress created the RRW program in the FY2005 Consolidated Appropriations Act (P.L. 108-447) to study a new approach (rather than relying solely on the life extension program) to maintain warheads over the long term. The program will examine the possibility of replacing warhead features important in the Cold War, such as high yield and low weight, with features that are more valuable.
• We do undermine our assurance and deterrence capabilities by continually noting that our current stockpile is inadequate for these purposes. If we are confident about our stockpile, our allies will be as well.

Our ability to assure allies rests not solely with our nuclear weapons and the New Triad. It is also based on our forward deployments, our ability to quickly project power, and, most importantly, on our security relationships with individual allies. The latter is illustrated by a comparison of our security partnerships with Japan and Taiwan.

The Japanese government is not in favor of developing its own nuclear or conventional strike capability.

• Despite the threat from North Korea and from China's conventional and nuclear strike capabilities, Japanese experts have expressed considerable confidence in U.S. security guarantees.

• The presence of our troops and the strength of the bilateral alliance are more significant factors in assuring Japan than in the precise composition of our nuclear stockpile.

• Japan does not seem interested in developing even a limited strike capability. Most Japanese experts support a division of labor, where the United States contributes conventional and nuclear strike capabilities, and Japan contributes other capabilities, such as missile defense.

There is a greater interest in Taiwan for developing conventional strike capabilities.

• Our security relationship with Taiwan is much more ambiguous. The United States maintains a “one-China” policy, and it is opposed to unilateral changes to the status quo, particularly by force. Whether the United States intervenes in a cross-Strait conflict will depend on the specific nature of the contingency.

• The United States does not have a formal defense treaty with Taiwan. We have certain commitments to Taiwan based on the Taiwan Relations Act of 1979, which the United States
Congress passed following the U.S. recognition of the People’s Republic of China (PRC).\textsuperscript{20} We also have responsibilities to China, represented by the commitments made within the three joint communiqués.\textsuperscript{21} The United States has to balance these competing demands.

- Since our relationship with Taiwan is more ambiguous, the United States cannot offer it greater levels of assurance. As a result, there is greater support in Taiwan for developing a conventional strike capability.

The key measurement of effectiveness for evaluating American assurance capability is the absence of allies developing their own WMD.

- One difficulty is establishing cause-effect relationships. It is difficult to establish whether an ally’s decision to abstain from WMD is due to American reassurance or to other factors such as economic/opportunity costs, international opprobrium, or the potential damage to relations with the United States.

- The inability to determine cause-effect relationships is one aspect that assurance shares with deterrence. As in the case of assurance, the absence of action is the key measurement of effectiveness for deterrence, and it is very difficult to establish the cause(s) for this outcome. Another similarity is the imprecise use of each term. Numerous government documents often mention deterrence, but the authors often have different conceptions of the actions that need to be deterred. Similarly, we usually are not very precise regarding the actions

\textsuperscript{20} The Taiwan Relations Act of 1979 (Public Law 96-8) requires the United States to provide Taiwan with defensive arms and to maintain the capacity to resist the use of force or other forms of coercion intended to jeopardize the security of Taiwan.

\textsuperscript{21} The first communiqué was signed in 1972 following President Nixon’s historic trip to China. The 1972 Shanghai Communiqué affirmed each side’s respect for the sovereignty and territorial integrity of the other. The second was signed in 1979 following the U.S. switch of recognition from Taiwan to the PRC, and it required the United States to end formal relations with Taiwan. The third communiqué was signed in 1982. It required the United States to reduce gradually its sales of arms to Taiwan.
against which we would like to provide assurance, nor in terms of how we will do so.

- Like deterrence, we need to tailor assurance to allies’ specific needs. We should ask our allies which actions and capabilities would reassure them and prevent them from developing WMD.

Mr. Henry Sokolski

We should do everything we can to prevent a world with many nuclear powers.

- This future presents numerous challenges. In a world with rampant nuclear proliferation, it will be difficult to predict allies’ actions during a crisis, or accurately determine the capabilities of adversaries. Such an environment is not amenable to alliance cohesion, but to unilateral security measures.

- Unfortunately, it will be difficult to prevent further proliferation. Future proliferation will be opaque, as is the case with Iran today, and like Iran countries will refrain from actually developing nuclear weapons, but instead will hedge by developing the capability to rapidly build them.

- It is difficult to argue that the failure of the nuclear weapons states to completely fulfill their Article VI requirements has and will continue to spur proliferation. Rather, one could argue that the U.S. nuclear stockpile and the policy of extended deterrence have contributed more to nonproliferation than the nonproliferation regime itself.

We need to amend the NPT to halt the spread of nuclear weapons. One reform is to limit the International Atomic Energy Agency (IAEA) to undertaking those tasks that it can effectively carry out.

- The IAEA cannot confidently detect the diversion of nuclear materials, and as a result it has difficulty providing accurate and timely warnings of proliferation. It failed to do so in Iraq in 1991, and it failed to detect a twenty-year history of covert Iranian nuclear activity. We cannot rely on the IAEA to function as a de facto nuclear spy agency.
• The IAEA should be limited to performing material accountancy to establish the quantities of nuclear material present in a nuclear facility and the changes in these quantities that take place.

We must also refrain from interpreting the NPT as giving all countries the right to develop the entire nuclear fuel cycle.

• Treaty negotiators never intended to give all countries the unquestioned right to conduct reprocessing and enrichment activities. Spanish and Mexican negotiators tried to insert into the Treaty an explicit reference regarding the permissibility of interstate trade in all components and technologies of the nuclear fuel cycle. However, this attempt failed, and access to enrichment and reprocessing technologies is not mentioned in the Treaty.

• The right to sensitive nuclear technology is contingent, as it depends on two key criteria: (1) how risky is the spread of sensitive nuclear technology to the requesting nation? (2) how economically feasible and necessary is the development of the entire nuclear fuel cycle by the requesting nation?

• Reinterpreting the right to nuclear fuel technologies in this manner will allow us to be more objective in the application of NPT rules. Today, we are more willing to refer an NPT violation to the Security Council if it is committed by a rogue state, such as Iran, than if it were committed by a U.S. ally, such as South Korea or Egypt. In the future, a country may adhere to the NPT and still develop the capabilities to manufacture a nuclear weapon. It will be very difficult to prevent such action by referring the country to the Security Council.

• If we fail to adopt a more stringent interpretation of the NPT, we will find ourselves in a world with many more nuclear powers.

**Congressman Adam Schiff**

Because nuclear terrorism is the most immediate threat the United States faces, our spending on national security should reflect the prioritization of this threat.
• A nuclear detonation by a terrorist group in one of our cities is the single most important act that must be prevented at all costs. They have the intention to carry out this act, and it is not too difficult to assemble a crude nuclear weapon. The only obstacle that terrorists face is acquiring the requisite nuclear materials.

• In the short term, the threats posed by Iran and North Korea result from the possibility that they may proliferate nuclear materials, not from the possibility that they will launch a nuclear missile at the United States.

• If nuclear terrorism by al Qaeda is indeed the most significant threat, we should bolster the Cooperative Threat Reduction program, and we should sequester all of the highly enriched uranium from the most vulnerable sites around the world. As we try to determine the composition of the nuclear stockpile that maximizes our security, we should keep in mind that our nuclear policies do impact the decisions made by others, particularly our allies.

• Ideally, we would like to have a reduced and more versatile nuclear arsenal, in combination with a reduced Russian arsenal where nuclear weapons are not on hair-trigger alert, and with North Korea and Iran back within a stronger and more verifiable NPT.

• Our decisions on the composition of our stockpile and on international treaties such as the ABM Treaty or the Comprehensive Test Ban Treaty may not impact the decisions of our adversaries on whether or not to build nuclear weapons. But they do impact the decisions of our allies and other countries on whether to support American diplomatic initiatives designed to halt the Iranian and North Korean nuclear programs. The policies the current administration has advanced with regards to the New Triad and the non-

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22 The Cooperative Threat Reduction Program assists the states of the former Soviet Union in controlling and protecting their nuclear weapons, weapons-useable materials, and delivery systems. The program also contributes to the dismantling and destruction of nuclear weapons and their delivery vehicles.
proliferation regime have had a mixed impact on advancing nonproliferation and making America more secure.

- The Proliferation Security Initiative and the Global Threat Reduction Initiative have been very successful. However, we are potentially undermining the NPT with our recent nuclear agreement with India, where we have essentially supported proliferation to that country.

Furthermore, we did not fully utilize the May 2005 NPT review conference to promote the goal of a more vigorous and verifiable NPT.

- Implementing the New Triad may give us a more versatile and credible nuclear force. At the same time, it may alienate the allies and other countries whose diplomatic support we may need to curb proliferation by rogue states.

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23 The Proliferation Security Initiative is a global effort led by the United States to stop the spread of WMD and their delivery systems. It consists of international agreements and partnerships that allow the United States and its allies to search planes and ships carrying suspect cargo and seize illegal weapons or missile technologies. The Global Threat Reduction Initiative (GTRI) aims to minimize as quickly as possible the amount of nuclear material available that could be used for nuclear weapons. It also seeks to put into place mechanisms to ensure that nuclear and radiological materials and related equipment, wherever they may be in the world, are not used for malicious purposes. GTRI is managed by the Department of Energy, in close cooperation with the IAEA and other foreign partners.

24 In July 2005, the United States and India reached an agreement calling for more extensive nuclear cooperation between the two countries. This will require legislative changes for the United States, in particular the Atomic Energy Act of 1954 as amended by the 1978 Nonproliferation Act, which bars civilian nuclear cooperation with non-nuclear weapons states (as defined by the NPT) that do not allow full-scope IAEA safeguards, such as India. This agreement was signed during President Bush’s visit to India in March 2006.
• We also spend a majority of our time and resources focused on nuclear threats that are not the most immediate but whose consequences would be most devastating.

No other country can lead on the issue of proliferation, and the type of leadership that we bring to this issue will determine whether we can build a powerful global consensus against the proliferation of nuclear material. Our nuclear decisions are not made within a vacuum. They impact our allies and our ability to mobilize a global consensus against further nuclear proliferation. So far, the New Triad has had a mixed impact on our efforts to stem future proliferation.
Implementing the New Triad is not the only significant challenge that the administration currently faces. The administration is also actively engaged in waging the war on terror, especially in Iraq, its central battlefield.

- On December 15, 2005, the Iraqi people elected a permanent national assembly, in what was only their third fair and free vote in the last fifty years. The other two occurred in January and October 2005.

- This event was not inevitable. The President could have chosen to define the war on terror in very narrow terms and hope that Saddam’s hegemonic ambitions could be deterred and contained.

- If we had not entered Iraq, the Iraqi people would not be voting for a new government. Instead, Iraqis would be standing in line to receive their meager allotment of food doled out by the Baathist regime. Instead of expressing their political views in new media outlets, Iraqis would be cowering in fear, afraid of being suspected of disloyalty and subjected to cruel torture. Iraq’s oil revenues would be spent on Saddam’s
palaces and weapons, not on schools and hospitals. And, rather than being a partner in the war on terror, Iraq would still be a state sponsor of terror, destabilizing this very critical region.

The President has clearly indicated that we face many challenges in Iraq. The enemy is a combination of rejectionists, Saddamists, and terrorists.

- The rejectionists consist largely of Sunni Arabs who miss their privileged status under Saddam's regime and who reject an Iraq under which they no longer are the dominant group. Many of them can be persuaded to support a democratic Iraq led by a federal government that protects minority rights.

- The Saddamists are former regime loyalists who want to return to power, and they are trying to foment anti-democratic sentiment among the larger Sunni population. They lack popular support and will eventually be marginalized and defeated by Iraq's security forces.

- The terrorists are affiliated with al Qaeda. They are the smallest but deadliest group. Many are foreigners who share al Qaeda's hateful ideology. They are led by Abu Musab al-Zarqawi, and they wish to use Iraq as a base to establish an Islamic caliphate from Indonesia to Spain, and from there use their empire to launch attacks against the United States.

Our strategy for victory in Iraq encompasses three parallel elements.

- Politically, we seek to isolate the hardened insurgents and terrorists who do not want to see a democratic Iraq, while encouraging others outside the political process to join in the effort to build a stable, pluralistic government and institutions that represent all Iraqis.

- Our security strategy consists of clearing areas of enemy control, securing those areas with Iraqi forces, and building effective local institutions to deliver vital services and advance the rule of law.
Our economic strategy involves restoring neglected infrastructure, reforming Iraq’s stifling command economy, and improving government capacity and human capital to allow Iraq to reach its full economic potential.

Our strategy is designed to put Iraqis at the forefront of this effort, and we are making significant progress in each of these areas together with our Iraqi and coalition partners.

While there is reason to be optimistic about Iraq’s political and economic development, Iraqis, with the help of the coalition, must improve their performance in carrying out key tasks.

- The Iraqis need to do a better job of providing basic services such as electricity and water.
- Iraqi civil society must heal its divisions and wounds after thirty years of tyranny.
- The Iraqis, working with coalition forces, must do more to stop the violence.

We fervently believe that the Iraqi people have joined the fight against the insurgents. A year ago, Iraq had only five battalions and no operational brigade headquarters. Today, those figures are ninety-seven and thirty-one, respectively. We have trained and equipped over 214,000 Iraqi security forces, and, whereas in June 2004 no Iraqi security units controlled any territory, today much of Baghdad province is under the control of Iraqi forces, as are the cities of Najaf and Karbala. Furthermore, the number of tips received from Iraqis about terrorists has risen from 442 in February to more than 4,700 in September.

A consensus has formed around the President’s strategy for victory. In the past, critics have made five major arguments: the United States must do more to include Sunnis in the political process; the Iraqi constitution must be altered to facilitate a national consensus; there must be more training of Iraqi security forces to include them more quickly in the fight against the insurgency; the international community must do more to assist Iraq’s reconstruction; and coalition reconstruction and economic plans must be altered. Each of these elements constitutes a core feature of our strategy.
However, the President will not withdraw and redeploy forces to either Kuwait or back to the United States under the assumption that victory in Iraq is unattainable, or that the United States and the world would be better off by an immediate abandonment of Iraq.

- Proponents of withdrawal note that our leaving would incentivize Iraqis to provide for their security. But they fail to note how our exit would speed the training and deployment of additional Iraqi forces, nor do they realize that Iraqis are already fighting and dying for their freedom.

- Whether or not one supported the liberation of Iraq, Iraq is now the central front in the war on terrorism. Al Qaeda’s senior leadership have noted Iraq’s centrality to their efforts to wage a global jihad, and surrendering Iraq to the terrorists does not make strategic sense, especially given Iraq’s vast resources and strategic location.

- Abandoning Iraq would only further embolden terrorists in their belief that the United States cannot stand and fight in the face of adversity. We know from statements by al Qaeda’s leadership that the 9/11 attacks were encouraged by American withdrawal from Vietnam, Beirut, and Somalia, as well as our feeble responses to the first World Trade Center bombing and to the attack on the U.S.S. Cole.

- While Iraqis would like to eventually be fully responsible for their security, they do not want the United States to withdraw immediately. Leaving now would abandon the Iraqi people to the Saddamists and terrorists.

- An immediate withdrawal will send the wrong message to the troops. It would indicate to them that America is abandoning the mission for which they have risked their lives, and that their fallen comrades have died in vain. The men and women of the armed forces believe that victory is achievable and that we have the correct strategy for winning.
Day Two
We are at a key decision point in implementing the New Triad.

- When we were devising the NPR in 2000, the key question was: what capabilities do we want to have in 2012?
- We have reached a key decision point regarding whether we are transforming the Triad at an appropriate pace. Our strategy regarding transformation was correct, but we need to increase the pace of transformation to take account of the rapid change of capabilities in the information age.
- Today, the key concern is whether we are adjusting the New Triad at a pace that keeps the United States secure in a rapidly evolving security environment. We need to examine this question from a broad perspective, since our national power is based not solely on our military power, but also on our political, economic, and cultural power. We must therefore also determine whether the implementation of the New Triad is proceeding in a manner and pace that effectively complements all facets of our national power.
U.S. Strategic Command has increasingly adopted a global perspective as globalization has radically changed the international security environment.

- STRATCOM is now involved in information and space operations, C4ISR, and combating the spread of weapons of mass destruction.

- The idea behind this evolution is to develop the capabilities needed to ensure that the United States operates as a global actor, rather than as just a regional power.

- Unlike our adversaries, we respect territorial and geographical boundaries and would only cross them if necessary as a last resort. As STRATCOM expands its mission and capabilities, we must ask the following question: What are the proper capabilities and organizational arrangements needed to cross these boundaries at the appropriate time, to create the effects that will protect the United States? As we search for these answers, one fact is clear: transformation must proceed at a quicker pace to give us this capability.

We have already seen significant advances in the New Triad. Within the offensive leg, advances in precision have had a major impact on tactics, inventory, and infrastructure.

- Our measurements of effectiveness have radically changed with the use of more precise conventional munitions. Before, we had to determine the number of sorties needed to destroy a target. Today, we are examining the number of targets destroyed per sortie.

- Increased precision has also had a large impact on the infrastructure needed to support operations. For example, when we were using less precise munitions, nearly 70 percent of the trucks within the logistics tail between the rear and the front were carrying the 155 artillery round. With enhanced precision, only 20 percent of the trucks were needed for this purpose.

- With more precise munitions we do not need to revisit targets, which reduce the number of weapons needed in the
inventory. We can also reduce the size of the weapon. We do not need a 5,000-pound weapon if a precise 2,000-pound bomb can achieve the same effect.

- Precision will also enable us to reduce our reliance on nuclear weapons. We do not need to hold a target at risk with a nuclear weapon if a precise conventional weapon can produce the same effect.

There are other significant qualitative improvements in our conventional capabilities. For instance, the JDAM has allowed us to operate more effectively at night and in bad weather. We are fielding the next-generation Tomahawk missile, and we have introduced a new air-launched cruise missile. These enhanced capabilities enable a B52 bomber to carry out new missions, such as close-air support, thereby increasing the number of available options for appropriate scenarios.

STRATCOM needs to develop tactics that effectively exploit non-kinetic capabilities.

- Non-kinetic capabilities allow us to have a global impact in milliseconds. The challenge is to integrate effectively these capabilities into tactical operations.
- Much of our focus at STRATCOM is on developing options for ensuring that potential crises remain in the pre-combat phase, and non-kinetic capabilities can provide a richer set of options at this stage.
- We must understand how we can most effectively leverage non-kinetic capabilities, and we cannot cede the advantage in this type of warfare to our adversaries.

Within the defense leg of the New Triad, we have made significant progress in developing effective missile defenses.

25 The Joint Direct Attack Munition (JDAM) is a guidance kit that converts unguided “dumb” bombs into accurately guided “smart” weapons. The JDAM kit consists of a new tail section that contains an Inertial Navigation System/Global Positioning System that guides weapons to their targets.

26 A kinetic attack is one using weapons that rely on energy (blast, heat, and fragmentation) to cause their damage. A non-kinetic attack may involve information operations, such as disabling an enemy’s computers and communications equipment.
• Recently, we successfully concluded tests for the SM-3 missile, the THAAD missile, and the Airborne Laser.

• We need to ensure that our missile defense system can be adapted for other purposes, such as defense against cruise missiles.

• The systems within the missile defense architecture must be effectively integrated. For instance, the sensors within the system can be used for four or five different functions, and we cannot have four or five different command and control systems operating the sensors. Furthermore, each of the different combat commanders will want to have the option of utilizing missile defenses. Our systems must be capable of operating effectively as functional requirements and command authorities change.

• We can most leverage the amount spent on security by developing defenses with fungible assets and integrated systems. We must find a more effective way to manage our infrastructure and inventory.

• Traditionally, we dealt with uncertainty by building a larger and more diverse stockpile. This also served as a hedge against a technical problem with a particular weapon, by ensuring the plentiful supply of other options. But we do not want the stockpile to be so large that the cost of maintaining it crowds out the investment needed to develop systems for new threats.

• A large inventory may eliminate the need to forecast accurately the future, but it also prevents the rapid adjustment to unforeseen threats.

• We need to more effectively manage our inventory so that we are not managing by the inventory. This requires an understanding of how our infrastructure can be resilient and stay ahead of changes, such as technical problems in the stockpile or the emergence of new threats and technologies.

We also need less hierarchical command organizations to reduce decision lead-times.
Our current command and control system is a highly institutionalized, vertical bureaucracy designed to eliminate ambiguity once information and analysis are presented to the combat commander. However, perceptions on the battlefield may not be fully correct, and there is the danger that half-truths and incorrect information will reach the combatant commander.

It takes too long to reach decisions with our current organizational structure, and too few people are involved in providing information and making decisions, all of which have a negative impact on combat operations. Part of the problem is cultural. We have become too accustomed with only senior-level officials having the necessary information and decision-making authority. We must accustom ourselves to permit empowering individuals at lower levels of the bureaucracy. Otherwise, we will not be able to react quickly and effectively to the enemy.

Our organizations must have a more nimble decision-making process. Within STRATCOM, we have created joint functional component commands for integrated missile defense (JFCC-IMD), intelligence, surveillance and reconnaissance (JFCC-ISR), network warfare (JFCC-NW), and space and global strike (JFCC-SGS). These commands are responsible for the daily planning and execution of these primary missions.

Some of our adversaries have more flexible decision-making processes. Ideally, our adoption of a flatter command structure and the effective integration of non-kinetic capabilities will increase their decision cycles.

Intelligence is an enabler for STRATCOM, but we need a better understanding of what the “fusion” of intelligence information entails.

“Fusion” does not consist of providing end-users with another computer monitor to provide more raw data.
• We should provide end-users, such as commanders and front-line soldiers, with actionable intelligence. This will require analysts and systems to add value in the form of knowledge and analysis to raw data.
Session 5

Nuclear Weapons and the New Triad

(left to right) Mr. Steve Henry; The Honorable Linton F. Brooks; Vice Admiral Robert R. Monroe, USN (Ret.); Dr. John S. Foster, Jr.; and Dr. Charles M. Perry

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The Honorable Linton F. Brooks, Under Secretary of Nuclear Security and Administrator of the National Nuclear Security Administration (NNSA), Department of Energy (DOE)

Mr. Steve Henry, Deputy Assistant to the Secretary of Defense (Nuclear Matters)
Dr. John S. Foster, Jr.

The present U.S. nuclear stockpile exists to perform four key tasks: assure allies through extended deterrence; dissuade potential nuclear proliferators; deter WMD-armed adversaries; and defeat any adversary.

- Unlike its peer competitors, the United States has renounced biological and chemical weapons. Thus, as long as other nations possess WMD of any kind, and certainly nuclear weapons, we have no choice but to maintain nuclear warheads and their delivery vehicles.
- However, the United States is leading the effort in nuclear stockpile reductions through the 2002 Moscow Treaty.
- The key factor guiding U.S. stockpile evolution is the maintenance of the ability to respond in a truly convincing manner to all potential adversaries regardless of time, place, and circumstances, to make clear beyond any doubt that strategic confrontation with the United States would be a catastrophic mistake.

Over the last decade we have done a good job maintaining our stockpile by fixing problems as they arose. Some defects have been detected and fixed through surveillance, analysis, and laboratory testing, while others by nuclear testing prior to the 1992 cessation of testing.27 At the same time, there are three major areas of concern regarding the U.S. stockpile.

First, the warheads in the stockpile are old.

- We are relying on many warheads that are past their design lifetimes, and the national infrastructure for refurbishing them

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27 The United States has maintained a nuclear testing moratorium since October 1992, when President Bush signed the FY1993 Energy and Water Development Appropriations Act (P.L. 102-377). Section 507 of this act restricted U.S. nuclear testing.
has deteriorated significantly. We can no longer serially produce many crucial components of our nuclear weaponry.

- Through life extension programs (LEPs), we have introduced changes in the stockpile, but this has occurred in the absence of testing. As a result, we may by accident have introduced new problems whose consequences are not yet known.
- The RRW may address many of these issues, but at present it is so broadly defined that it is difficult to examine either its virtues or shortcomings with any real confidence.

Second, our stockpile does not have the capabilities needed to credibly deter the new set of potential adversaries.

- The stockpile was developed to deter a Soviet attack, and it can still deter attacks by peer competitors.
- However, the emphasis within the stockpile on high-yield, “dirty” weaponry is not well suited to deterring rogue states and terrorist groups. As a result, the U.S. deterrent posture lacks credibility to the majority of America’s present and potential future adversaries.
- Third, the stockpile may no longer be representative of American values, since in too many instances the weaponry would impose a type and level of collateral damage that would be unacceptable to U.S. and allied public opinion, and it would contravene international agreements that America is proud to be a party of.

The goal of the U.S. nuclear stockpile in the twenty-first century is to hold directly and immediately at risk the leadership elites of potential adversaries, and not to threaten their populations and perhaps not even their armed forces.

- Enduring international stability and perhaps a just and lasting peace may depend on our ability to convince foreign leaders that they will not be able to escape the consequences of their acts by escaping to deeply buried bunkers.
- The challenge is to place nuclear or non-nuclear explosive charges in locations that will hold at risk deep underground
facilities without imposing unacceptable collateral damage near the surface if these munitions were actually used.

- There are three technical factors to consider regarding the minimization of collateral damage. First, with precision guidance and with improving surveillance and situational awareness technology, we do not need a large proportion of high-yield weapons within the stockpile. Second, unnecessary damage arises in the use of nuclear weaponry from long-lived radioactivity created by the nuclear fission process within the weapon itself. Significant advances in removing fission from nuclear explosive devices were made within the Plowshare program several decades ago, and we should incorporate these advances in our future stockpile. Third, the American technical community should be challenged to demonstrate the ability to deeply emplace bunker-busting weaponry so that no explosive debris would reach the earth’s surface following an explosion.

The U.S. stockpile should also be able to deter EMP attacks against the United States and its armed forces.

- The use of EMP against U.S. forces has been extensively discussed by potential adversaries, who may decide to acquire a small number of such weapons to use against the U.S. fleet and, more generally, to reduce the effectiveness of non-hardened conventional military forces.

- We can harden our assets, but the protection will never be completely effective, and economic damage resulting from an EMP attack may nevertheless reach into the billions of dollars.

- It is essential that we have a layered defense against EMP attacks. Threatening retaliation with nuclear weaponry may not be credible, since EMP does not harm people directly, thereby making nuclear retaliation innately disproportionate. Threatening retaliation in kind is one deterrent option,

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28 The purpose of the Plowshare program was to develop techniques to use nuclear explosives for peaceful nuclear explosions (PNE). From 1961 to 1973, the United States conducted 27 PNE tests.
and developing effective missile defenses to keep ballistic missiles out of our airspace is another defensive layer.

Wars generally occur due to misperceptions regarding the capabilities of adversaries. It is crucial that no potential adversary believes that it has an advantage over the United States at the ultimate level of violence.

- Only if the U.S. nuclear deterrent is completely credible can there be solid assurance that it will never be questioned on its reliability, performance, or military effectiveness. And under these circumstances the deterrent will never be wielded in anger.

- No credible alternatives exist for weaponry-based deterrents in either deterring attacks or deterring utterly unacceptable behavior. Unlike our potential adversaries, we have no other WMD to serve as alternate modes of deterrence. Thus, it is obligatory that the United States modernize its nuclear stockpile.

- The Secretary of Defense, the Chairman of the Joint Chiefs of Staff, and the Commander of STRATCOM must ensure that the President can always wield nuclear weaponry so convincingly in any geopolitical context to ensure that such weaponry never needs to be actually employed in combat.

- Prior to taking responsive measures to some future wakeup call, it is only prudent to enact some low-cost hedging policies, such as executing the RRW program, repairing the most crucial aspects of our nuclear infrastructure, demonstrating deep penetration and emplacement capabilities, and developing methods to reduce collateral damage.

Vice Admiral Robert R. Monroe, USN (Ret.)

There are two basic fundamental truths that are often lost in discussions on the New Triad.

- First, nuclear weapons exist, and they will never be fully eliminated. More states are capable of possessing nuclear weapons than ever before, and terrorist groups are determined to acquire and use them.
• Second, U.S. actions to shape our nuclear strategy and weapons for the future must be pursued with great urgency! Nuclear weapons will likely be used in the future, and new threats can emerge on short notice. But it will take approximately twenty years to make any significant changes in our stockpile, and we are already fifteen years behind schedule.

“Deterrence” is a highly misunderstood concept.

• Deterrence is about fear. We deter someone from taking action against us by instilling fear of its consequences.

• Credibility is the most critical element of deterrence. For deterrence to be effective, our adversary must have no doubt that we will destroy his most valued assets rapidly and irrevocably if he proceeds with his actions.

• Nuclear deterrence worked during the Cold War. The Soviet Union threatened to destroy the United States with its nuclear weapons. We deterred them through the poised readiness of U.S. nuclear weapons targeted on those assets the Soviets valued most, including their military forces, nuclear weapons, and the leadership itself.

Our current adversaries are not monolithic superpowers, but rogue states, failed and failing states, and terrorist groups in sanctuary states. The principal action we must deter is not the launching of nuclear weapons but the acquisition and possession of WMD. U.S. nuclear weapons can be just as effective in deterring today’s adversaries from acquiring WMD as they were in deterring the Soviet Union from using nuclear weapons. But successful deterrence today will require an entirely different nuclear strategy and nuclear weapons. A deteriorating Cold War stockpile of “massive retaliation” nuclear weapons lacks credibility for deterring the acquisition of WMD by today’s adversaries. By vastly reducing collateral damage, new nuclear weapons will transform our currently non-credible deterrent force into a credible one based on far fewer nuclear weapons than in the Cold War era.

New nuclear weapons should have four general characteristics:
• These include greatly increased accuracy, very low yield, greatly reduced residual radiation, and extremely high intrinsic security, to prevent their use by terrorists.

• We will also need other specialized capabilities, including an improved earth-penetrating ability to defeat deeply buried targets and an ability to neutralize biological and chemical agents.

• These new weapons, which achieve new capabilities through new designs, will probably require underground nuclear testing.

• Each specially tailored capability would be needed only in small numbers.

“Nonproliferation” is also a highly misunderstood term.

• Unfortunately, the global nonproliferation regime is focused less on preventing proliferation than achieving the nuclear disarmament of the nuclear powers, notably the United States. Therefore, this regime is generally contrary to U.S. national interests.

• The NPT explicitly recognizes the United States and four other states as “nuclear weapons states.” The NPT places no restrictions on these states’ continued designing, testing, and producing new nuclear weapons.

• There is no evidence that U.S. nuclear testing and development of new nuclear weapons contributes to proliferation.

• The United States has two clear choices on North Korea and Iran: either accept their acquisition of nuclear weapons or take military action to prevent them from becoming nuclear states. The former would lead to future proliferation, while the success of the latter would be greatly strengthened by a credible nuclear deterrent.

• The United States has led the world in compliance with Article VI of the NPT. Developing a smaller stockpile with vastly reduced total yield continues that compliance.
The United States should take a number of actions to modernize its stockpile to prevent further proliferation of WMD.

- Terminate our unilateral underground nuclear test moratorium;
- Establish a robust R&D program for advanced nuclear weapons technology;
- Design, test, and produce new nuclear weapons to deter current adversaries;
- Prevent proliferation primarily through coalitions of the willing;
- Start discussions with the other four nuclear weapons states on forming a five-nation “policing” coalition to prevent proliferation.

DOD must initiate the change. They must convince the President of the need to reestablish America’s nuclear deterrent, and the President must persuasively explain to the American people why a new nuclear strategy is essential, and why it will require newly designed nuclear weapons.

The Honorable Linton F. Brooks

Questions associated with our “stockpile” and our “infrastructure” are not separate issues, but rather a single topic. Because it will take a long time to transform our infrastructure, our ability to transform our stockpile will be affected.

- If the RRW will require a remanufactured pit, as many assume, then we may be able to produce forty pits a year by early next decade. To produce greater quantities, we will need to build a modern pit facility, which will not be available for at least fifteen years. Thus, fully implementing the responsive infrastructure portion of the New Triad will take a while.

29 A “pit” is the fissile core of a nuclear warhead, and it creates a nuclear explosion that triggers a substantially larger thermonuclear explosion. All pits currently in the U.S. nuclear stockpile were made at the Rocky Flats Plant near Denver, which opened in 1952. The Department of Energy halted pit production there in 1989. Since then, the United States has been unable to make stockpile-quality pits, and therefore complete nuclear weapons.
• The responsive stockpile will not be relevant to the challenges we currently face with Iran, North Korea, or with transnational terrorism.

• Over the long run, a responsive infrastructure may be the most important element of the New Triad. The combination of the RRW with a responsive infrastructure may be truly transformational.

If we were starting to build a nuclear stockpile today, we would not rebuild the current version.

• Most of our current warheads were designed for maximum yield with minimum size and weight, in order to fit as many warheads as possible within a single delivery system. Today, the important criteria are ease of manufacture, ease of maintenance, and security.

• Our current stockpile was not designed for longevity. During the Cold War, we replaced the stockpile every fifteen to twenty years. If we do not follow that policy, then we must continuously refurbish aging weapons in LEPs that are difficult and costly. Furthermore, Cold War decisions to use certain hazardous materials to achieve lower weight and volume, combined with today’s safety and environmental standards, mean that our warheads are much more costly to re-manufacture than they would be if we were starting over and building a new stockpile.

• Many people believe that our stockpile, especially the component that is not deployed but kept as a hedge, is too large even after taking into consideration the reductions associated with the 2002 Moscow Treaty.
• Today’s stockpile is not the one we would build if we were worried about physical security. Today, we are most worried about suicide terrorists obtaining a warhead and detonating it. If we were designing the stockpile today, we would use new technologies and processes in warhead design to prevent that scenario by building security within the warhead.

We have a long-term vision for the stockpile over the next twenty to twenty-five years, and we are confident of succeeding in implementing that vision. This future is one where we have a smaller, safer, more secure, more reliable, and more adaptable stockpile backed up by a robust capability to respond to changing technical, geopolitical, and military conditions.

• The deployed stockpile will be smaller than what is currently planned for by 2012.

• The RRW will have relaxed the design constraints imposed on Cold War systems. They will be more easily manufactured with environmentally benign materials, and they will have been redesigned for reliability, security, and ease of maintenance.

• The non-deployed stockpile in that time period will be much smaller than it is today.

• We will have met the responsive infrastructure goal of being able to find and fix a problem within a warhead and have it back in the stockpile within a year.

• Our hedge against geopolitical changes is no longer found in hundreds of aging, obsolete spare warheads, but in the infrastructure.

• Because the weapons design community will have been revitalized by the RRW program, it will be able to adapt an existing weapon within eighteen months and design, develop, and begin production of a new warhead within three to four years.

Alternatively, we may opt for a different future, where we decide to maintain the current stockpile based upon an unwillingness to
take the risk of reducing life extension programs and spare warheads to free up the resources for transformation.

- Over the projected time period, the accumulation of small uncertainties leads to reduced confidence and reliability in individual warheads. We compensate by relying on redundancy. For instance, we will have to aim three weapons instead of one, and we will have to keep deployed levels high.

- Since we have no ability to respond to geopolitical changes or technical problems, we keep a very large hedge of non-deployed weapons, which have the same aging problems as the deployed systems.

- In this scenario, we will continue to rely upon costly, demanding, and manpower-intensive denial strategies to ensure the physical security of our warheads, since we did not take advantage of implementing intrinsic security measures.

- This second future essentially increases risks and entails a number of lost opportunities.

The administration is committed to the transformation of the stockpile. While we should not underestimate the challenges of transforming our infrastructure and stockpile, transformation is clearly the right path. Once we establish a responsive infrastructure and demonstrate that we can produce new or replacement warheads on the same time scale in which geopolitical threats emerge, then we can go much farther in meeting the President’s vision of maintaining the smallest possible stockpile consistent with our security needs.

**Mr. Steve Henry**

Our stockpile planning needs have changed since the end of the Cold War. Rather than maintaining a large stockpile to deter the Soviet Union, the President today is committed to achieving the deterrence we need but with the lowest possible number of nuclear weapons consistent with our security needs. However, the current approach for stockpile management does not adequately provide a path forward that meets the President’s guidance.
• We started a life extension program a few years ago, but we soon realized that it would be quite costly and difficult to meet its objectives, since a number of plants had been closed down and processes discontinued, and some of the components in the weapons we were maintaining relied on older technology that could no longer be procured.

• We also realized that we understood our targets better through our improving C4I assets. Thus, we do not need high-yield weapons. As a result, our engineers have more flexibility in how they design weapons, which allows us to use less hazardous, toxic materials.

A new approach to stockpile management should have a number of important goals.

• Initiate an immediate change from the current path of maintaining complex Cold War-era designs indefinitely;
• Provide flexibility in the stockpile and the ability to adapt to changing needs;
• Sustain critical skills to design, certify, and produce nuclear warheads;
• Free up capacity and resources to enable transformation to a responsive, sustainable infrastructure.

A new approach to stockpile planning based upon the RRW will enable a broad change to our nuclear infrastructure.

• It will demonstrate our ability to design, build, certify, and field weapons systems without nuclear testing.
• It will enhance the safety and security of the warheads in the stockpile.
• It will allow us to reduce the size and cost of our nuclear infrastructure. The infrastructure that we have is the same one that produced thousands of weapons a year during the Cold War. The RRW will allow us to maintain a smaller complex that is more efficient and cost-effective.
• The RRW will permit us to reduce the number of warheads in the stockpile which, in turn, will signify that we are basing
deterrence and risk management less on numbers and more on capability.

- Finally, the new approach based on the RRW will support the defense policy goals of assuring allies, dissuading potential aggressors, and deterring and defeating adversaries, while at the same time allowing us to comply with our nonproliferation obligations through stockpile reductions.

The RRW is a change agent. It will allow us to make transformational changes within our infrastructure and our stockpile, and its implementation will ensure that we have the scientific and technical capacity to respond to new threats that emerge in a changing geopolitical environment.
Session 6


MODERATOR

Dr. Dale Klein, Assistant to the Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs

SPEAKERS

Dr. John Harvey, Director, Policy Planning Staff of the National Nuclear Security Administration, Department of Energy

Admiral Henry G. Chiles, Jr., USN (Ret.), former Commander, U.S. Strategic Command

Mr. Steven Cortese, Vice President of Programs and Budgets, Lockheed Martin Corporation – Washington Operations, and former Chief of Staff, Senate Appropriations Committee

Mr. Frank Moore, Sector Vice President & General Manager, Missile Defense Division, Northrop Grumman Mission Systems

Dr. Robert B. Barker, former Assistant to the Secretary of Defense for Atomic Energy
Dr. John Harvey

A major insight of the NPR is that the defense R&D and manufacturing base is crucial for achieving the defense policy goals of assuring allies, and dissuading, deterring, and defeating adversaries. We assure allies by demonstrating American steadiness of purpose and capability to fulfill military requirements. We dissuade adversaries by discouraging them from undertaking military programs and other activities contrary to U.S. and allied interests. A key question we should ask ourselves is the following: how can the defense industrial base help us better achieve these goals, and especially the goals of assuring allies and dissuading potential adversaries?

• It is the capabilities of the defense industrial base, particularly its talented personnel, its ability to bring advanced defense technology to the field, and its ability to adapt to new threats, that engenders great respect among friend and foe.

• The defense industrial base has already successfully played this role. The breadth and scope of the U.S. strategic modernization program of the early 1980s assured allies of the U.S. nuclear umbrella, and combined with the potential of the Strategic Defense Initiative, led the Soviet Union to conclude that security competition with the United States was pointless. More recently, the demonstration of advanced conventional capabilities and precision munitions during the wars in Bosnia, Afghanistan, Kosovo, and the two wars with Iraq led Russia and China to conclude that the United States was far ahead of them in defense technology.

• With the Cold War over, a future competitor will be forced, given U.S. capabilities, to conclude that its buildup could not occur faster than the United States could respond.

• Also, an ability to innovate and produce small numbers of special-purpose weapons could act to convince an adversary that it could not expect to negate the United States' nuclear weapons capability.
A responsive nuclear weapons infrastructure has a number of key elements.

- An excellent, trained, and well-managed workforce;
- An enhanced science and technology base, including modern research facilities;
- Efficient, modern, “right-sized” manufacturing facilities;
- Revamped business practices and technical processes that permit the rapid and flexible response to emerging needs;
- The frequent, end-to-end exercise of key capabilities in order both to remain highly responsive and to train the next generation of workers.
- Our nuclear weapons infrastructure is not responsive today, but we hope that it will be more responsive in the future.

A responsive infrastructure will have a number of goals.

- Assure stockpile safety, reliability, and performance;
- Respond rapidly to stockpile “surprise,” such as a technical problem in the stockpile;
- Respond “in time” to changes in the international security environment;
- Reinforce assurance and dissuasion by conveying our capabilities to friends and potential adversaries.

Strategic communications can allow us to utilize the defense industrial base to assure friends and dissuade potential adversaries.

- We should convey to outside audiences that we are paying attention to sustaining our deterrent, and that if necessary we will modernize our capabilities to ensure that we can continue to hold high value targets at risk.
- The messages sent should be context-specific, targeted towards influencing key decisions of specific governments.
- However, our approach must be consistent with U.S. laws and values. The information that we communicate will also reach the U.S. public. The objective is not to undertake a disinformation campaign, but rather to introduce enhanced
transparency into certain ongoing programs, particularly those in national laboratories and production facilities.

A strategic communications program could involve a number of activities.

- Conveying the excellence of our scientific and technical personnel, as well as our commitment to developing the tools for stockpile stewardship.

- Efforts to restore the capability and capacity of our manufacturing base, and a commitment to the warhead LEP and advanced development work.30

- We can also increase transparency in our nuclear posture and programs through congressional testimony and associated debate, through public presentations to diverse domestic and foreign audiences, and through the selected declassification of information.

- For example, if the goal is to dissuade rogue states from transferring nuclear warheads to terrorist groups, a dissuasive strategy could consist of providing selected insights into our laboratory forensics capabilities, to convey our ability to attribute a nuclear weapon to a particular adversary. This would be combined with a declaratory policy indicating that retaliation will be directed at the source of nuclear proliferation.

A strategic communications program does have its downsides.

- Information is a blunt instrument that is not easily directed. It could wind up stimulating what we seek to dissuade.

- It could compromise sensitive information.

- It may lead to accusations of “managing the news.”

- Those who consistently give the United States a failing grade in its Article VI commitments would criticize a strategic

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30 The purpose of the Stockpile Life Extension Program, which is managed by NNSA, is to refurbish warheads in the stockpile, thereby eliminating the need to produce new warheads. The first refurbishment program was for the W87 nuclear warhead. The W87 LEP was authorized by Congress in 1994, and the first rebuilt warhead was delivered back to DOD in 1999. The last W87 warhead to be refurbished occurred in 2004.
communications program on the grounds that it impedes nonproliferation efforts.

- It could lead to the targeting of programs and personnel by foreign counterintelligence officials.

We need to determine the feasibility of a strategic communications program.

- Perhaps we should consider establishing teams within nuclear labs and production facilities that would convey messages of assurance and dissuasion to specific foreign audiences. The assigned personnel could interact with the policy community in Washington to tailor the message.

- One challenge will be getting the scientists and engineers at NNSA labs and plants to be sensitive to the broader defense policy implications of their day to day activities.

- Another challenge is finding the right balance between transparency and operational/information security.

Admiral Henry G. Chiles, Jr., USN (Ret.)

For the time being, our nuclear weapons stockpile will consist of legacy weapons from the Cold War.

- The changes to those weapons will depend upon the quality of our existing infrastructure.

- It is unlikely that we will fully remanufacture our legacy weapons.

- Since many of the components of existing weapons have limited lives, we will have to replace them through the LEP. But the LEP will keep the essential features of these weapons. It will not lead to modifications that are transformational.

The RRW is the one key transformational program.

- The RRW will take time to design, build, and introduce into our stockpile.

- The biggest impact of the RRW has been the new thinking on the appropriate parameters for evaluating future warhead designs. The key goal for the current weapons in the
stockpile was to attain the largest possible explosion from a
device that was as light as possible.

- In contrast, the design criteria for a successful weapon today
are maximum safety, security, reliability, and ease of manu-
facture. Furthermore, we must satisfy these criteria without
conducting nuclear tests.

- The RRW offers an opportunity for a broad-based trans-
formation in the design, research, and building of future
warheads.

Before we design the RRW and build the infrastructure that will
sustain it, we need to ask ourselves several questions.

- Do we want the RRW to replace one or many warheads?
- Do we want the RRW to be used on a variety of launch plat-
forms?
- What capabilities do we need to sustain it within the stock-
pile?
- Where do we want to locate these capabilities?
- Once the design of the RRW is understood, we can then
consider infrastructure and site-selection issues.

We will probably not build new plants to handle the requirements
of sustaining the existing stockpile for the rest of its life and build-
ing the RRW and other systems. This option has been ruled out in
the past due to budgetary considerations. We should disperse the
facilities that undertake nuclear weapons infrastructure design and
manufacturing activities. If these facilities were located in a single
site, that location would offer an attractive target to an adversary,
who would then be able to cripple our capability for maintaining
our present and future stockpile.

The RRW offers the opportunity for doing meaningful design work
that has been absent for many years.

- We will need to recruit new personnel for design work, and
they will have to be involved in all aspects of the RRW before
we lose older employees.
• We should make a strenuous effort to recruit a younger generation of scientists and engineers who may be inspired by the opportunity to develop the RRW.

Both NNSA and DOD require real transformation if we are to modernize our stockpile.

• The management issues highlighted by the 1995 Galvin Report, and specifically the issue of excessive oversight of government-owned, contractor-operated laboratories (the “GOCO” model), have not been remedied.\textsuperscript{31}

• Programmatic mismanagement remains a problem, since headquarters allocates funding in narrow stovepipes and restricts the discretionary funding of research.

• Contractors should have greater flexibility to recruit and retain critical personnel in a competitive labor market.

• Most of the capability of our nuclear weapons complex is in managing the paperwork and the other fixed costs that dominate the budget and is self-sustaining without building anything. In short, the GOCO model appears severely strained, if not broken.

Congressional oversight also requires a significant transformation.

• Congress needs to take a stronger role in supporting our work.

• Congressional support would be broader if the authorizers and appropriators were more knowledgeable about program details and implementation.

• The Nuclear Weapons Council, DOD, and the Department of Energy should meet congressional representatives together to demonstrate a united front regarding what the Nuclear Weapons Council wants to do.\textsuperscript{32}


\textsuperscript{32} The Nuclear Weapons Council is comprised of three members: the Under Secretary of Defense for Acquisition, Technology and Logistics; the Vice Chairman of the Joint Chiefs of Staff; and the Under Secretary for Nuclear Security at the Department of Energy. The Secretary of Defense and the
• If Congress had a deep understanding of a program, it may be more flexible in permitting managers greater reprogramming ability.

Mr. Steven Cortese

The private sector believes that the intellectual foundation for the New Triad is well established through the NPR and the *Quadrennial Defense Review* (QDR).³³

• Industry has a clear picture of the government’s intentions as well as the direction in which stockpile transformation needs to go.

• However, industry is unsure how the government will execute the vision laid out in the NPR and QDR, especially in terms of aligning the technical capabilities, systems, and munitions to realize the government’s vision for the New Triad.

• Rather than developing transformational capabilities, we have been mostly sustaining capabilities that we were committed to in the late 1980s and early 1990s and applying them to new missions.

• As the stockpile has decreased, the sense of urgency in renewing our capabilities has lagged, given the perception that we can still rely on that stockpile to sustain necessary capabilities. We can no longer rely on this strategy.

• It is critical that we allocate the resources needed not just to sustain those legacy capabilities that have been redirected to new missions, but to provide combat commanders and national command authorities with a more robust and diverse tool set to meet the challenges of the twenty-first century.

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³³ Congress mandates that the Pentagon conduct a Quadrennial Defense Review every four years. This exercise is meant to define a 20-year road map that addresses the Pentagon’s strategy toward force structure, force modernization, infrastructure, and budget. The first QDR was released in 1997.
Industry must deliver and deploy systems based on the vision articulated by the Secretary of Defense to meet our needs in the new nuclear security environment.

- The private sector has struggled to deliver the systems that will support these new capabilities, and we realize that we have to improve our performance.
- Industry is focused on ensuring that the billions spent in the past five years begin to produce new capabilities that assist the warfighter.
- Industry is concerned that DOD funding of science and technology (S&T) has not kept pace with the need for transformation. The buying power of S&T funds has declined, and this is partly due to Congress not directing funds to projects that robustly contribute to our technological capability and keep our workforce well trained.

To successfully implement the New Triad, industry recognizes that multiple systems and capabilities must be integrated within a larger framework that harmonizes each of these different elements.

- Developing systems and capabilities in isolation undermines the vision laid out by DOD and the White House.
- Trying to do just one portion of a mission will not be technically sustainable in the future.
- Furthermore, Congress will be less likely to fund systems that support only stand-alone missions.

The executive and legislative branches must adopt a long-term perspective in implementing the New Triad to give industry the confidence to invest in new systems that will have to be sustained for two or three decades.

- We will derive little value from our investments if funding is sporadic.
- There must be a political consensus in support of new systems, so that as program managers, key congressional officials, and secretaries of defense come and go, there will be a commitment towards implementing the New Triad. This will enable
industry to make the long-term commitment in infrastructure and human capital needed to realize the New Triad.

- However, the amount of funds allocated to support new systems has not kept pace with the requirement to implement the New Triad.

Sooner or later we will have to build new platforms, new launch vehicles, and new munitions, and each of these elements will have to be integrated. It will be critical for industry to align itself with the government’s expectations of how it wants to implement the New Triad, and to see where the opportunities lie. At the end of the day, the private sector must be able to convince the financial markets that it can profitably develop the systems and capabilities that will implement the New Triad.

**Mr. Frank Moore**

Nearly four years after it was announced, the New Triad remains a highly useful framework linking our offensive and defensive nuclear forces with our conventional warfighting capabilities.

- Without these linkages and the New Triad’s larger framework, there would be an even greater danger that our nuclear capabilities and infrastructure, and especially our military industrial production base and our nuclear workforce with its specialized skills, would atrophy over time.

- Without the holistic structure that the New Triad provides, our emerging missile defense capabilities might seem a specialized adjunct rather than an integral part of our national security posture.

- We have made significant progress in turning the concept of the New Triad into a reality. Our nuclear and conventional power projection forces already exist, and now the New Triad helps link all of these capabilities in operational and planning terms.

Implementing the infrastructure leg of the New Triad will be a real challenge.
• There are several different facets that comprise a responsive infrastructure. There is an industrial and governmental component, and there are also manpower and sustainability components.

• At the same time, there are multiple demands that need to be met to achieve the objective of a truly responsive and effective infrastructure. Our infrastructure must be robust, renewable, sustainable, and affordable.

• One inherent challenge is that our production of future nuclear weapons and delivery systems will be limited. This makes it very difficult to keep contractors, suppliers, scientists, and engineers in the nuclear community actively involved in researching, designing, building, and sustaining new systems. During the Cold War, the number of systems in development and the number of fielded units requiring support was sufficient to keep a large number of defense suppliers fully employed. That is not the case today. The defense industrial base has already contracted and will contract more in the future.

• There are many institutional commitments to legacy systems. Many of them are relics of the Cold War and have persisted beyond the point where they are truly justified. If we are to achieve a truly responsive infrastructure, then we will have to put aside our institutional constraints and make some difficult decisions regarding which systems to keep and where to direct funds for developing new systems.

I will offer five key concepts for implementing the infrastructure leg of the New Triad. The first involves “critical mass,” or maintaining a critical level of activity. Without this, we will not be able to retain our skilled workforce, which is the most important element of our responsive infrastructure.

• We must decide whether it is necessary to maintain full end-to-end research and production capabilities for nuclear weapons and their components within the United States.
• We could have a more responsive infrastructure if we outsource certain tasks to reliable allies. For instance, the United Kingdom has a pit-production capability for nuclear weapons. We debate the merits of developing a new pit-production capability with the knowledge that production numbers will be limited in the future. Whether it may be better to rely on our closest ally for this key component of our nuclear weapons inventory is an issue that will need to be addressed.

Second, we must consolidate and rationalize existing facilities to achieve a critical level of activity. For example, do we really need more than one weapons design laboratory in the United States?

• These laboratories were established for an era when we needed competitive approaches to design in order to develop truly optimized weapons. The idea then was to develop elegant, miniaturized nuclear weapons for the Cold War. This is not the case today.

• Both of our national design laboratories do excellent work, but it is not clear that two labs doing excellent but limited work is better than one lab doing much more work.

• Concentration of activity is vital as we approach the challenge of sustaining the ability to do very demanding and specialized activities at dramatically reduced rates.

Third, to satisfy conditions of affordability, sustainability and robustness, we should standardize products by attempting to develop a single, more robust common design for a group of weapons. We can therefore build variants if and as necessary.

• Ideally, weapons and their designs can be easily tailored to the characteristics of the delivery vehicle, the nature of the target, and the weapons effects to be maximized upon delivery.

• We can also adopt a similar approach to the development of other components of strategic weapons systems, such as rocket engines and missile boosters.

• We should also develop dual-use systems. For example, we could develop dual-use boosters for military and civilian applications.
• We could also keep up with the cutting edge of technology by using more commercial-off-the-shelf technology (COTS). An increased reliance on COTS could make a significant contribution towards achieving greater affordability, robustness and sustainability in our infrastructure.

Fourth, some have indicated that we do not actually have to build weapons to actually sustain our capability to do so. But we forget that our maintenance of this capability is dependent upon the individual career decisions made by skilled personnel. Our industry must operate in ways that maintain a committed and experienced workforce. The only way to sustain a capacity to develop and build systems over the long term is to develop and build systems.

• It is not enough simply to have everyone preparing to do design and development work. They must actually do it. If they cannot, then talented personnel will make a different career choice, and we will not have a responsive infrastructure.

• A responsive infrastructure requires us to conceive, develop, and fund long-term programs for the small-scale development, production, and testing of at least components, sub-systems, and eventually the RRW.

The fifth and final point is that the primary output of a responsive infrastructure is the sustenance of a capacity to do something vital.

• A new way of thinking is required when this capability, rather than hardware or software, is the deliverable.

• We should avoid relying so much on calculations of unit costs in making future decisions on new systems. Traditionally, we approached a decision on whether to proceed with a given system by dividing the total development and production costs by the total number of units produced. For future systems, we will not be producing many units, so unit costs will be very high.

• In practice, having as the deliverable a sustainable and renewable development and production capacity will mean that each product off the production line will have a higher fixed cost.
The willingness to pay a higher fixed cost will reflect the conscious decision to maintain our defense industrial capacity.

Dr. Robert B. Barker

In the fifty years since World War II, we continuously modernized our strategic strike systems. As a result, we have a cadre of people with the necessary skills for the research, development, testing, and production of these systems. Today, we are in a very different world.

• The infrastructure and personnel that developed and maintained these systems were paid for by existing major programs. Congress did not write a check simply to pay for infrastructure. Rather, the infrastructure was an integral piece of ongoing programs.

• If one examines the modernization or replacement program for existing systems, one will see that the predicted replacement time for these systems is in 2030 or 2040. That is a long time to expect talented personnel to wait for a new, exciting system to develop. Our infrastructure is useless without competent personnel, and unless DOD and Congress realize that we need a new business model, we will not be able to retain talented people to develop new capabilities that effectively respond to yet unidentified threats.

• One way to sustain this capability is through exploratory development programs. These programs will allow us to maintain our production, testing, and systems engineering capabilities without developing large quantities of output.

• Unfortunately, Congress views these programs as an example of white-collar welfare. A major failing of the defense establishment has been its inability to educate Congress of the utility of these programs, which enable us to explore potential capabilities that we may or may not be interested in. They also allow us to maintain a critical capacity to respond quickly to unanticipated threats.

Skilled personnel are the foundation of the defense industrial establishment. Unfortunately, over the past few decades, Americans
have shown less interest in science and engineering. DOD’s Science, Mathematics and Research for Transformation (SMART) program is designed to reverse this trend and increase the numbers of scientists and engineers in the defense workforce.

- The SMART program provides educational funding for individuals interested in science and engineering. Those who receive funding must commit themselves for a period of time to government service after they have completed their education.

- Participants in this program are able to work within the different military services, the Office of the Secretary of Defense (OSD), and within the services’ laboratories.

- The 2006 authorization bill allocated $10 million in FY2006 for this program.

- The authorization bill also requires DOD to develop a human capital management strategy for its civilian employees, and the department is required to report to Congress its progress in meeting certain requirements, including: developing strategic and operating plans that include knowledge management; defining the critical skills required for the workforce; assessing the critical skills, risk of departure, and technical agility development needs of its personnel; and developing individual knowledge transfer plans, executing those plans, and monitoring their implementation.

Each of the three services has instituted personnel programs designed to maintain their respective capabilities in strategic strike systems.

- Under the Navy’s Strategic Systems Program (SSP), contractors are permitted to establish an employee mentoring program within production facilities, and the costs are included within the project’s overhead costs. Through the SSP program, employees are able to hone their skills and advance into senior management.

- Within the Army, Functional Area 52 provides a career path for officers who are experts in nuclear weapons effects. These officers constitute a tremendous base of nuclear expertise
that is utilized throughout STRATCOM, OSD, and the Defense Threat Reduction Agency.

- The Air Force Nuclear General Officer Steering Group has a program to develop and sustain a pool of officers and non-commissioned officers to support the Air Force’s nuclear mission by ensuring sufficient training, education, and experience.

- The men and women who have operational responsibilities for nuclear weapons continue to be very well trained. There was a concern that we would lose our expertise in this area after the end of the Cold War and the reduced emphasis given to nuclear weapons. So I was very pleased to learn about these programs.

The vitality of the skill level within industry is dependent upon the stability of future funding and on DOD’s long-term vision regarding strategic air and ballistic missile capabilities.

- While the private sector has little difficulty recruiting from universities, it is difficult to retain personnel when the latter do not know when the next system or program will be funded. Industry can only retain personnel by offering exciting work on new programs and technologies.

- Within the ballistic missile sector, there is a concern that vital capabilities in re-entry technology, propulsion, and guidance will be lost without sufficient funding. In this sector, the average age of personnel is relatively high, and firms are finding it difficult to recruit younger workers since they cannot offer them exciting new projects.

- Within the re-entry systems sector, there is much work in
sustaining systems, but these projects do not involve design or systems engineering, which are the two critical skills that will help us maintain our ability to respond to unanticipated threats.

- If industry loses a capability, it will take five to seven years to get it back, and once a capability is reacquired, there will probably be cost overruns and mistakes during initial production runs.

DOD needs to be made aware of the challenges in sustaining our defense industrial base. In particular, they need to conduct a tradeoff analysis, where the cost of maintaining an exploratory development program is compared with the cost of rebuilding a capability over a five- to seven-year timeframe after it had been allowed to decay. Furthermore, the risks associated with not having an effective capability would have to enter into these calculations.

- Unfortunately, while each of the three services has initiated programs to maintain key capabilities, there is no one at the Pentagon examining this issue from a broader perspective spanning the totality of our required strategic strike capabilities.

- People are doing exciting work in the active defense and non-nuclear strike sectors. But nuclear strike is in sustenance mode, which does not preserve design, system engineering, or production skills. We need to fund exploratory development programs to sustain these core competencies.