The From the Archive section of this issue offers excerpts from the Executive Summary from the 1987 "Report to Congress on Stockpile Reliability, Weapon Remanufacture, and the Role of Nuclear Testing." The report discusses the importance of nuclear testing in the context of U.S. policy, including in resolving stockpile problems and maintaining a workforce capable of making judgments regarding the expected military performance of nuclear warheads. The second document is Chapter 7 on adapting U.S. strategic forces from Donald H. Rumsfeld's December 2002 *Annual Report to the President and the Congress*. The chapter explains the rationale behind the Bush Administration's nuclear force reductions and its movement toward the New Triad: nuclear and non-nuclear strike capabilities; active and passive defense; and a capable research and development infrastructure for developing, building, and maintaining offensive forces and defensive systems.

Document No. 1. George H. Miller, Paul S. Brown, Carol T. Alonso, "Report to Congress on Stockpile Reliability, Weapon Remanufacture, and the Role of Nuclear Testing," Lawrence Livermore National Laboratory, October 1987[1]

EXECUTIVE SUMMARY

[…] We address their questions of "whether past warhead reliability problems demonstrate that nuclear explosive testing is needed to identify or to correct stockpile reliability, or alternatively, whether a program of stockpile inspection, non-nuclear testing, and remanufacture would be sufficient to deal with stockpile reliability problems."

The answer to the first question is "yes." Past experience indicates that nuclear testing is necessary to identify and correct problems in the stockpile. Although we have learned from each case, some problems have been very recent. Therefore, we believe that for the foreseeable future, continued nuclear testing will be necessary to maintain stockpile reliability.

The answer to the second question is a qualified "yes" over the short term and a definite "no" over the longer term. Over the short term, experienced scientists and engineers would probably be able to deal with stockpile reliability concerns about as well as they do now; we currently have a high level of confidence in the stockpile, but some problems do arise. The "short term" is the time it takes for the scientific judgment and expert capabilities of weapon scientists and engineers to atrophy in the absence of nuclear test experience. This time may be as short as three to five years, as we found during the Nuclear Test Moratorium of 1958-1961 (Reference 1[2]). Measures taken to prepare for further test restrictions can slow the erosion of capability but they cannot stop it.

Before one can assess whether further nuclear test limitations are advisable, the technical and national security issues involved must be thoroughly addressed. Only then

[1] The report is available at https://www.osti.gov/servlets/purl/6032983.

[2] R. D. Woodruff, Testimony Before the Subcommittee on Arms Control and Disarmament, Armed Services Committee, U.S. House of Representatives (September 20, 1985); also, R. N. Thorn, testimony on same date.

can the risks and benefits of additional nuclear testing constraints be evaluated. In this report, we present our views on the technical issues, supported by historical and technical facts, many of which are presented for the first time in an unclassified publication.

Nuclear Testing in the Context of U.S. Policy

The debate about nuclear testing has focused mostly on the issue of stockpile reliability. The discussion should, in fact, be much broader and examine the role of nuclear testing in the context of the U.S. policy of deterrence. Current U.S. strategy is to deter nuclear and conventional war by maintaining a credible and effective retaliatory capability that can respond in a limited and proportional way to an act of aggression. Deterrence thus is a dynamic condition and, as such, must be responsive to military and technological developments.

Nuclear testing supports deterrence in four important ways. First, nuclear tests are required to maintain the proper functioning of the stockpile. Second, nuclear tests are needed to modernize the existing stockpile for enhanced safety, security, and effectiveness. The advance of Soviet technologies, most of which are nonnuclear, requires the modernization of U.S. weapon systems to ensure their survivability. [...] Third, nuclear tests are required to measure the effects of a nuclear weapon environment on U.S. weapon systems and on critical command, control, and communications systems. Finally, nuclear tests make it possible to identify future weapon concepts for U.S. decision-makers and to stay abreast of potential Soviet nuclear weapon developments, thus avoiding technological surprise. While these reasons for testing are all vitally important, in this report we focus on the issues related to stockpile reliability.

The Need for Nuclear Testing to Resolve Stockpile Problems

The reliability of U.S. nuclear weapons is currently very high because we have been able to sustain a balanced program of weapons physics tests, stockpile confidence tests, and production verification tests. At issue are the conditions for maintaining high confidence in this reliability. Experience has shown that testing is essential. One-third of all the weapon designs placed in the U.S. stockpile since 1958 have required and received post-deployment nuclear tests to resolve problems. In three-quarters of these cases, the problems were identified as a result of nuclear testing. The important point here is that in each case, the weapon was thought to be reliable and adequately tested when it entered the stockpile. Problems resulted from aging, from concerns about safety, from environmental effects, or from a later realization that our understanding of the weapon's physical behavior was incomplete.

Let us emphasize that although a number of weapons in the stockpile have required nuclear tests to evaluate or correct problems, most of the problems encountered with the stockpile have been fixed without nuclear tests to certify the changes. This has been possible only because the designers and engineers involved could make informed

judgments about the problem—judgments that drew on years of experience in actual nuclear testing. Nuclear testing, thus, has a vital role in assuring confidence in all U.S. nuclear weapons.

Some have claimed that many of the stockpile problems were the result of deploying weapons that were not "thoroughly tested." There is no such thing as a "thoroughly tested" weapon. Budgetary limitations make it impossible to test nuclear weapon designs under all possible conditions (e.g., delivery environments, defensive threat levels, target requirements, storage histories, safety and security requirements). When a weapon is developed, we test it as thoroughly as we judge to be appropriate to define the boundaries of reliable operation. We conservatively balance factors affecting reliability against those affecting cost. However, not all of the important factors may be known or assessable ahead of time. We test to the level of performance required to meet the military characteristics (MCs) specified by the Department of Defense (DOD).

The military characteristics are prepared by the DOD to specify the requirements for each nuclear warhead. These requirements include, in order of priority, nuclear safety, size and weight, plutonium dispersal safety, operational reliability, yield, conservative use of nuclear materials, and operational simplicity. In the event that compliance with the MCs leads to a design conflict, priorities are to be observed in the order listed, with tradeoffs that allow high-priority MCs to be met while minimizing the degradation of the competing, lower-priority MCs. In 1982, the DOD established an unprioritized MC for stockpile endurance and replicability; these are stated to be desirable goals to be achieved to the extent possible while meeting the other MCs.

Claims have been made that the success with which we predict the yield of new nuclear devices in their first nuclear tests indicates the reliability and surety of weapon performance. It would, however, be misleading to judge stockpile reliability on this basis. Our success with first-time predictions is indeed high. There are reasons for this. First, the designers making the predictions either have extensive test experience themselves or their work is reviewed by senior designers with extensive experience. Second, most new designs are based on fairly conservative, previously established technology. For the first test of a variation of this technology, our designers build safe margins into the design. It is later, when the designers begin to optimize a device for its intended weapon application, to study it at environmental extremes, or to incorporate structural, safety, or security features, that margins are reduced and performance sometimes falls short of prediction.

Weapon Remanufacture and the Need for Nuclear Testing

The difficulties involved in "replica" remanufacture have been faced by all major U.S. industries—aerospace, automobile, chemical and materials, and engineering, as well as nuclear weapon design and fabrication. Experience with attempts at remanufacturing in all these industries can be summarized in three important conclusions.

First, exact replication, especially of older systems, is impossible. Material batches are never the same; some materials become unavailable; equivalent materials are never exactly

equivalent; "improved" parts often have new failure modes; different people (not those who did the initial work) are involved in the remanufacturing; vendors go out of business or stop producing some products; new health and safety regulations prohibit the use of certain materials or processes.

Second, documentation has never been sufficiently exact to ensure replication. A perfect specification has never yet been written. We have never known enough about every detail to specify everything that may be important. Individuals in the production plants learn to bridge the gaps in the specifications and to make things work. Even the most complete specifications must leave some things to the individual's common knowledge; it would be an infinite task to attempt to specify all products, processes, and everything involved in their manufacture and use. Experts believe that it would be extremely difficult to improve documentation enough to ensure replication by inexperienced personnel.

Third, testing is the most important step in product certification; it provides the data for valid certification. A nuclear test provides our only data on the performance of the whole nuclear warhead package. Tests, even with the limitations of small numbers and possibly equivocal interpretation, are the final arbiters of the tradeoffs and judgments that have been made. They force people to ask the right questions.

Today, design physicists and engineers with extensive nuclear test experience at the relevant yield levels could undertake a weapon remanufacture with confidence that the weapon would perform about as well as the original version. However, even such a group has had difficulty predicting the behavior of some weapons recently manufactured for the stockpile—in particular the W68 Poseidon warhead and the W84 warhead for the ground-launched cruise missile. (The W68 was a remanufactured weapon.) In both cases, measured yields fell short of the predictions made by test-experienced weapon designers on the basis of production specifications. Even in retrospect and taking into account the minor changes known to exist between the development and stockpile hardware, we have not yet been able to explain the causes of these yield degradations. The nuclear tests uncovered gaps in our knowledge and revealed that important and as-yet-unidentified production details should have been specified.

The W68 and W84 are relatively recent weapons. The documentation and specifications for older weapon systems are less complete. Although documentation has improved since the MC for replicability was established in 1982, our experience with the W68 and W84 demonstrates that the specifications are still insufficiently complete to prevent subtle but apparently significant variations from taking place. Improved documentation will be helpful in remanufacturing the newer weapon systems. However, confidence in their performance would be lacking if they are placed in the stockpile without relevant nuclear testing and without certification by test-experienced physicists and engineers.

It is important to emphasize that in the manufacture of nuclear weapons, we are dealing with practical problems. Idealized proposals about what we should be able to do, without a proper experience base, are prescriptions for failure.

The Importance of Scientific Judgment and Continuity of Experience

Nuclear weapons are extremely complicated, and they operate at conditions that are virtually unique—at material velocities of millions of miles per hour, under temperatures and pressures that are hotter and denser than the center of the sun, in time scales as short as a few billionths of a second. Because of the complexity of nuclear weapons and the limited rate at which they are tested, nuclear weapon design is largely an empirical science. Thus assessments of weapon performance—whether for stockpile inspection, new design, or remanufacture—depend primarily on scientific judgment.

It takes years for designers to gain the experience on which they base their scientific judgment. This judgment must be continually cultivated by the application of theory and experiment to device design and refined with data from nuclear tests. We strive to maintain a continuous line of experienced designers, as senior designers pass on their knowledge to younger designers. This continuity of experience is of paramount importance.

We expect, in the event of very restrictive test limits, that in only a few years we would start to lose the test-experienced people. After a while, the people whose judgment has been honed by the realities of nuclear testing would no longer be available—they would have retired or moved on to other fields. We would then be faced with the prospect of asking scientists without nuclear testing experience to make judgments about the inevitable changes that will occur in remanufactured or stockpile weapons. This is a script for failure. If today, test-experienced personnel have difficulty explaining unexpected behaviors in the nuclear weapons they themselves have designed, how in the future will personnel without test experience be able to establish confidence in weapons designed by people long since gone?

Preparing for Further Nuclear Test Limitations

We are continually studying ways to prepare for further nuclear test limitations so that we can maximize our ability to meet our responsibilities for ensuring the reliability and effectiveness of U.S. nuclear weapons. A number of measures could help alleviate the impact of additional test limitations, if they are vigorously pursued before such restrictions are imposed. However, it is important to emphasize that, irrespective of any amount of preparation, further test restrictions will adversely affect confidence in the U.S. nuclear weapon stockpile. In addition, there is no way to ensure that the effect will be symmetric between the U.S. and the Soviet Union. The risk of such a loss in confidence needs to be carefully weighed against the potential political gains of new testing limitations.

Nuclear tests have played a necessary role in helping us meet our responsibilities to ensure the reliability and effectiveness of the stockpile. The need for increased nuclear testing to prepare for new test limits was most recently recognized in 1980 as part of the Augmented Test Program (ATP), planned at the request of the Office of Science and Technology Policy and in response to a memorandum from the National Security Council. The underlying purpose of the ATP was to prepare for a Comprehensive Test Ban (CTB) by

placing "early emphasis on those areas of science and technology that contribute most to reliability and confidence of the stockpile."

President Carter approved the ATP in principle, but he did not submit it to Congress for explicit approval and funding. Although in the years since then, there has been some additional funding for nuclear testing, most of this increased funding at LLNL has been earmarked for nuclear-driven directed-energy programs for the Strategic Defense Initiative (SDI); we cannot simultaneously sustain high levels of research on both SDI and weapon physics with the current level of funding. We believe that it would be advisable to consider the equivalent of an ATP at this time. If such a test program is to be successful and avoid the fate of the 1980 ATP, it requires Congressional endorsement, and sustained support will be imperative.

Measures to prepare for more restrictive limits and to help mitigate the problems caused by more restrictive limits include nuclear tests to provide assurance about the reliability of the current stockpile, verify the production of new weapons, and improve our understanding of weapon physics. Expanded nonnuclear experimental facilities, such as expanded hydrodynamic capabilities and a High-Gain Test Facility for fusion research, and advanced computing and numerical modeling capabilities would provide valuable supplements to nuclear test data. Also helpful would be programs to investigate means of certifying nuclear components at reduced yields as well as nonnuclear projects that use some of the same skills as the current nuclear weapon programs. In addition, nuclear weapons might be designed to reduce the likelihood of material degradation with age or to permit modification with less uncertainty about their resulting performance. We are pursuing all of these measures to the extent that funding and the DOD's military characteristics allow.

With the optimized stockpile that we presently possess, nuclear testing has played a key role in maintaining confidence in reliability. It should be mentioned here that with direction, support, and a sustained testing and production program, the stockpile could be reconfigured to be less reliant on (but not totally free from) nuclear testing to maintain reliability. Such an effort would deal only with the testing issues associated with reliability and would not address issues of future modernization. Such a decision would have a significant impact on the cost and capability of the weapon delivery systems since the reconfigured stockpile would generally consist of larger, heavier nuclear systems.

Let us emphasize, however, that in preparing for future, more restrictive test limits, these measures have only limited value. Nonnuclear and low-yield nuclear experiments can maintain some weapon skills but they cannot be used to solve weapon problems. Computer calculations have yet to (and may never) reach the stage where they can replace nuclear tests. These measures provide little guarantee that we will be able to fix future stockpile problems or address new military requirements. They can help slow the erosion of scientific expertise and judgment. They cannot stop it. […]

Conclusion

We believe that if further nuclear test limits are determined to be desirable, then a detailed study of the feasibility and impact of reducing our reliance on underground nuclear testing is needed. Such a study should be done in the context of the overall arms control environment. The study would investigate the changes in nuclear design that might have to be made and the military capabilities that might have to be relinquished in order to develop more robust warheads. These issues must be addressed to determine what could or could not be accomplished under more restrictive test limits.

We are not ready today for significantly reduced nuclear test limits. Until we can find ways to meet our responsibilities for ensuring the reliability and effectiveness of U.S. nuclear weapons and ways to prevent the erosion of nuclear weapon expertise and judgment under restrictive nuclear test limits, it would be imprudent to commit this country to a regime of further nuclear test limitations.

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Document No. 2. Donald H. Rumsfeld, *Annual Report to the President and the Congress* (Washington, D.C.: Department of Defense, 2002), pp. 83-92.[3]

CHAPTER 7
ADAPTING U.S. STRATEGIC FORCES

The Department of Defense has completed a comprehensive review of the U.S. nuclear posture. This chapter summarizes the conclusions of that review.

Nuclear forces continue to play a critical role in the defense of the United States, its allies and friends. They provide credible capabilities to deter a wide range of threats, including weapons of mass destruction and large-scale conventional military force. Nuclear capabilities possess unique properties that give the United States options to hold at risk classes of targets important to achieve strategic and political objectives.

The transformation of the nation's nuclear posture complements the transformation of America's conventional forces and capabilities. President Bush directed the Department of Defense to transform America's military forces to meet the challenges of the new century. In response to his direction, the Department of Defense used the Congressionally-mandated Quadrennial Defense Review to develop a new defense strategy and program for transforming U.S. conventional forces. Building on the strategic premises of the QDR report, the Nuclear Posture Review (NPR) offers a blueprint for transforming our strategic posture and signifies a major departure in our approach for managing strategic issues. Indeed, the

[3] The report is available at https://history.defense.gov/Portals/70/Documents/annual_reports/2002_DoD_AR.pdf?ver=2014-06-24-153732-117.

findings of the NPR form the foundation for the Moscow Treaty signed by President Bush and Russian President Putin and awaiting ratification by the Senate.

The Nuclear Posture Review began with the recognition that the security situation at the start of the 21st century differs substantially from that of the early 1990s when the last Nuclear Posture Review was conducted. The end of the Cold War can no longer be considered a recent phenomenon. Russia is no longer an enemy and the collapse of the Soviet Union is now more than a decade past. At the same time, new dangers have emerged that are both less familiar and less predictable, including terrorists and rogue states intent on acquiring and using weapons of mass destruction. Unlike the former Soviet Union, their leaders are subject to few institutional restraints on using such weapons. Their decision-making processes are obscure and behavior at times unpredictable. Their actions increase the complexity of managing international security. In this environment, the probability of surprise and ubiquity of uncertainty are dominant strategic considerations for the U.S.

Meeting the challenges of surprise and uncertainty requires a new approach to deterrence. While nuclear forces made an indispensable contribution to deterring Warsaw Pact aggression during the Cold War, a strategic posture that relies solely on offensive nuclear weapons is insufficient to support the nation's defense policy goals. The Nuclear Posture Review concluded that deterrence should not be limited to the threat of retaliation, nor rely exclusively on nuclear forces. The U.S. will need a broader range of capabilities to assure friends and foe alike of its resolve. Nuclear forces, moreover, are unsuited to many of the contingencies for which the U.S. prepares. A mix of capabilities, offensive and defensive, nuclear, and conventional is required. Such a mix will provide additional military options that are credible to enemies, reassuring to allies, and appropriate to Americans.

Following the direction laid down for U.S. defense planning in the QDR, the Nuclear Posture Review shifts the basis for strategic forces planning from specific threats to emerging capabilities that could exploit U.S. vulnerabilities or confer advantages on adversaries.

This capabilities-based approach is the foundation for transforming the U.S. nuclear posture:

- Replace the Strategic Triad of the Cold War with a New Triad that integrates conventional and nuclear offensive strategic strike capabilities, active and passive defenses, and a responsive infrastructure to provide a more diverse portfolio of capabilities against immediate, potential and unforeseen contingencies; and
- Adopt a new approach to strategic nuclear force reductions that provides the flexibility to respond to changes in the security environment and to technological surprise.

The New Triad

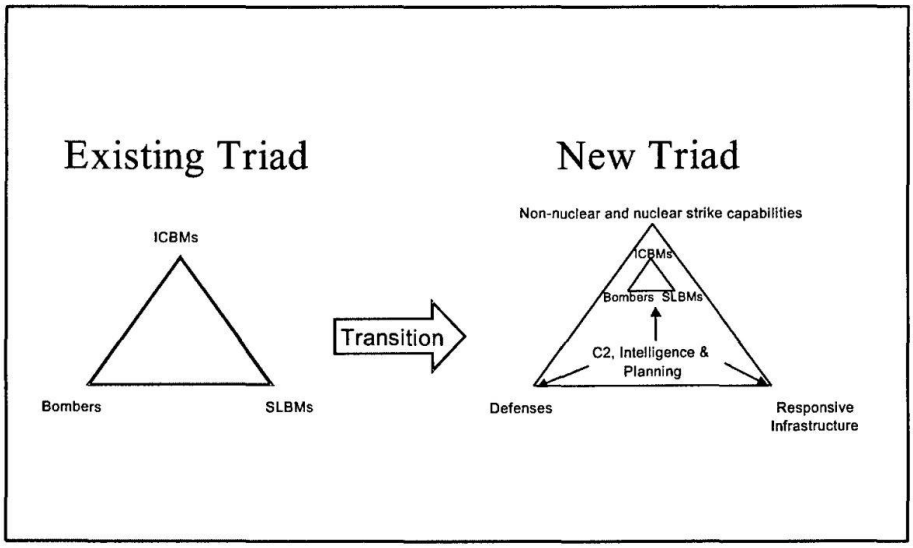
The application of a capabilities-based approach to U.S. nuclear forces has resulted in a decision to transform the existing triad of U.S strategic nuclear forces-intercontinental

ballistic missiles (ICBMs), heavy bombers, and submarine-launched ballistic missiles (SLBMs) – into a New Triad composed of a diverse portfolio of offensive and defensive, nuclear, and conventional systems. The New Triad is designed to give the President and the Secretary of Defense a broad array of options to address a wide range of possible contingencies.

The elements of the New Triad are depicted in Figure 7.1 and summarized below:

- Strike capabilities, both non-nuclear and nuclear, and their associated command and control;
- Active and passive defenses, including the command and control for air and missile defenses; and
- Research and development (R&D) and industrial infrastructure for developing, building, and maintaining offensive forces and defensive systems.

Figure 7.1 The New Triad



The efficiency and military potential of the individual elements of the New Triad are maximized by timely and accurate intelligence, adaptive planning, and enhanced command and control. Enhancing these capabilities is critical to realizing the potential inherent in the New Triad concept.

With respect to nuclear forces, once the planned warhead reductions are completed, the New Triad will include about one-third of the operationally deployed warheads of the current strategic nuclear force. It will retain a vital role in deterring Weapons of Mass Destruction (WMD) threats, assuring allies of U.S. security commitments, holding at risk an adversary's assets and capabilities that cannot be countered through non-nuclear means, and dissuading potential adversaries from developing large-scale nuclear, biological, chemical, or conventional threats.

As other elements of the New Triad are developed and integrated, they could assume tasks now assigned exclusively to nuclear forces. Under such circumstances the required number of operationally deployed nuclear weapons might be further reduced.

Elements of the New Triad

There are six underlying elements that support the legs of the New Triad:

Strike Capabilities. Non-nuclear strike capabilities include advanced conventional weapons systems, offensive information operations, and Special Operations Forces. Deployed nuclear strike capabilities include the three legs of the existing strategic triad and theater-based, nuclear-capable dual-role aircraft. Nuclear-armed sea-launched cruise missiles, removed from ships and submarines under the 1991 Presidential Nuclear Initiative, are maintained in a reserve status.

Defenses. Active defenses include ballistic missile defense and air defense. Passive defenses include measures that reduce vulnerability through mobility, dispersal, redundancy, deception, concealment, and hardening; warn of imminent attack and support consequence management activities. This element of the New Triad comprises defenses for the U.S. homeland, forces abroad, allies, and friends.

Infrastructure. The R&D and industrial infrastructure includes the research facilities, manufacturing capacity, and skilled personnel needed to produce, sustain, and modernize the elements of the New Triad. A responsive infrastructure that can augment U.S. military capabilities in a timely manner provides strategic depth to the New Triad.

Planning. Careful planning will be critical to integrate and balance the three elements of the New Triad. Planning for the New Triad must consider multiple goals, a spectrum of adversaries and contingencies, and the many uncertainties of the security environment.

Command and Control. A reliable, survivable, and robust command control system will serve as a critical portion of the New Triad.

Intelligence. "Exquisite" intelligence-access to an adversary's secrets without his knowledge-is essential to provide insight into the intentions as well as the capabilities of opponents. Such intelligence should enable the United States to tailor its deterrent strategies to the greatest effect.

Creating the New Triad

Development and deployment of elements of the New Triad will require several initiatives.

Major Initiatives. Developing and sustaining the New Triad will require investment in the areas of: (l) advanced non-nuclear strike, (2) missile defenses, (3) command and control, and (4) intelligence. These investments will reinforce the nation's strategic deterrent capabilities and contribute significantly to the improvement of the military's operational capabilities.

Overhaul of Existing Capabilities. To meet the demands of the New Triad, an overhaul of existing capabilities is needed. This includes improving the tools used to build and

execute strike plans so that the national leadership can adapt pre-planned options, or construct new options, during highly dynamic crisis situations. In addition, the technology base and production readiness infrastructures of both DoD and the National Nuclear Security Administration must be modernized so that the United States will be able to adjust appropriately to changing situations.

Nuclear Force Reductions and System Modifications. As elements of the New Triad are deployed and the number of operationally deployed nuclear warheads is reduced, adjustments may be needed to match the capabilities of the remaining nuclear forces to new missions. The large size of the Cold War nuclear arsenal allowed planners to develop weapons optimized for specific tasks. The large number of warhead types in the arsenal served to reduce the risk that technical problems with one type of warhead would substantially reduce the capability of the force overall. For the New Triad, the reduced size of the force will require more reliable systems. In addition to the efforts needed to refurbish aging weapons in the stockpile, a need may arise to modify, upgrade or replace portions of the extant nuclear force or develop concepts for follow-on nuclear weapons systems better suited to the nation's needs. It is unlikely that a reduced version of the Cold War nuclear arsenal will be precisely the nuclear force the United States will require in 2012 and beyond.

The New Triad will take time to develop as its elements are adjusted and adapted to each other. Nuclear forces assigned to the New Triad and their command and control systems are mature, but are in need of refurbishment. Advanced non-nuclear strike capabilities are comparatively new, their operational effectiveness is still developing, and planning for their employment is still evolving. Missile defenses are beginning to emerge as systems that can have an effect on the strategic and operational calculations of potential adversaries. They are now capable of providing active defense against short- to medium-range threats. The defense and nuclear infrastructure is well established, but in many respects neither is sufficiently flexible to respond quickly to new requirements.

Sizing the Nuclear Force for Immediate, Potential and Unexpected Contingencies

In setting requirements for nuclear strike capabilities, distinctions can be made among the contingencies for which the United States must be prepared. Contingencies can be categorized as immediate, potential, or unexpected.

Immediate Contingencies involve well-recognized, current dangers. During the Cold War, Soviet threats to the United States and Western Europe represented the immediate contingency for which U.S. nuclear forces were primarily prepared. Current examples of immediate contingencies include an attack using WMD on U.S. forces or a key friend or ally in the Middle East or Asia.

Potential Contingencies are plausible, but not immediate, dangers. They are contingencies which the U.S. leadership can anticipate and about which it has received timely warning. For example, the emergence of a new, hostile military coalition against the United States or its allies in which one or more members possess WMD and the means of

delivery is a potential contingency that could have major consequences for U.S. defense planning. The re-emergence of a hostile peer competitor is another example of a potential contingency.

Unexpected Contingencies are sudden and unpredicted security challenges. They could occur in the near term or well into the future. Contemporary illustrations might include a sudden regime change by which an existing nuclear arsenal comes into the hands of a new, hostile leadership group or an adversary's surprise acquisition of WMD capabilities.

The operationally deployed forces are sized to provide the capabilities required to meet U.S. defense goals in the context of immediate and unexpected contingencies. That is, a sufficient number of forces must be available on short notice to counter known threats while preserving a small, additional margin in the event of a surprise development. The United States plans to reduce its operationally deployed nuclear forces over the next decade to 1,700 to 2,200 warheads, while maintaining the flexibility necessary to accommodate changes in the security environment that could affect U.S. nuclear requirements. This reduction will provide a credible deterrent at the lowest possible number of nuclear weapons consistent with national security requirements and alliance obligations.

The United States will also maintain an ability to augment the operationally deployed force to meet unanticipated or surprising potential contingencies. This augmentation would be accomplished by moving the required number of individual warheads from storage to an operational unit. This capability is also an important tool to assure allies and friends and dissuade potential competitors. It will allow the United States to augment its operational forces over weeks, months and years to meet any potential contingencies. Depending on the time available, the United States could also pursue diplomatic, political, and economic measures to improve conditions. Additionally, it could choose to improve other elements of the New Triad.

Adopting a New Approach to Strategic Force Reductions

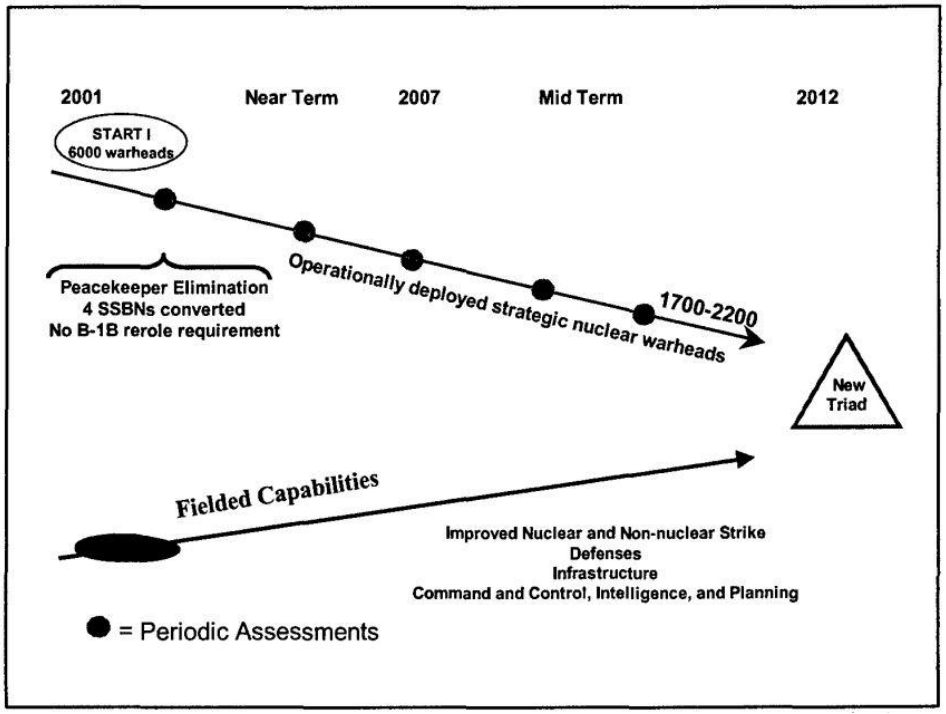
Figure 7.2 depicts the Department's approach toward reductions in strategic nuclear arms. The objective is an operationally deployed strategic nuclear force with 1700 to 2200 operationally deployed strategic nuclear warheads by 2012. Reductions are planned through a phased program beginning in FY 2002 that eliminates Peacekeeper ICBMs, removes 4 Trident SSBNs from strategic service, and downloads weapons from Trident SLBMs, Minuteman III ICBMs, and B-52H and B-2 bombers.

The precise method of achieving the reductions will be determined in the course of the periodic reviews the Department will conduct. The periodic reviews will:

- Review the progress to date in the reduction schedule;
- Evaluate existing assumptions regarding the risks facing U.S. national interests for the next one to three years and the role of nuclear forces in meeting those risks; and

- Review the progress made in the development of the New Triad and the capability of non-nuclear forces, defenses, intelligence, command and control, and the defense infrastructure to meet emerging risks.

Figure 7.2 Path for Nuclear Reductions



Note: The downward arrow illustrates a trend. U.S. reductions are unlikely to occur in a linear fashion.

As the President's announced reductions are implemented, the existing verification regime established by the first Strategic Arms Reduction Treaty (START I) that entered into force December 5, 1994 will remain in effect. The START I Treaty includes provisions that provide a useful baseline of transparency for offensive strategic forces. The U.S. will assess options for additional transparency and confidence-building options in the context of the new strategic relationship with Russia. In this regard, President Putin has announced that the Russian Federation also will reduce nuclear forces in line with its requirements. The United States will continue consultations with the Russian Federation on how to achieve increased transparency and predictability regarding reductions in offensive nuclear forces.

The U.S. Senate did not provide its advice and consent to the Comprehensive Test Ban Treaty (CTBT). The Administration does not support ratification of the CTBT but continues to support observance of the U.S. testing moratorium. The U.S. test readiness posture under a moratorium is an important aspect of the U.S. infrastructure. The Department of Defense is working with the Department of Energy to determine the appropriate test readiness standard that exercises the range of skills necessary to sustain this readiness posture and to be able to respond appropriately to unforeseen problems with the nuclear stockpile.

In sum, the U.S. strategy for its strategic forces will be transformed and adapted to meet the challenges of the decades to come. The risks associated with reductions in deployed nuclear warheads will be offset by the development and fielding of non-nuclear offensive and defensive capabilities and a revitalization of the infrastructure. The new strategy puts aside Cold War practices and planning and represents an important step in defense transformation.

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