

Strategic Weapons in the 21st Century
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**U.S. Strategic Capabilities for Preventing War:
The Way Forward**

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The strategic capabilities of the United States will influence future decisions of allies and friends, potential adversaries, and competitors. A major objective of the United States must be to assure those we wish to assure, dissuade those who might be tempted to challenge the United States, and deter those who could cause the United States major damage. The challenge is to understand the impact of United States strategic capabilities, and for the purposes of this paper especially nuclear capabilities, on the calculus of each nation it wishes to influence, and shape future U.S. capabilities to give the best prospects of achieving strategic objectives.

Today a political consensus is sorely needed on what U.S. strategic capabilities are needed for the future. Inadequate attention by the executive and legislative branches of government to strategic capabilities and their failure to jointly agree on a path forward have the potential for discouraging those who should be assured, encouraging rather than dissuading potential adversaries, and allowing inaction to undermine the credibility of deterrence. A consensus for action may not come easily or quickly, but it is essential if the United States is to develop coherent and sustainable policies and programs.

The next Congressionally-mandated Nuclear Posture Review (NPR) and the recently authorized Congressional Commission on the Strategic Posture offer opportunities to develop such a working consensus. Judging by the

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disparate views today in Congress, the administration, and the expert community, there is a long way to go.

This paper outlines a methodology for evaluating the adequacy of U.S. strategic capabilities, and for setting related investment priorities, which could help direct the Strategic Commission's efforts and support the next NPR. We also offer eight specific recommendations for improving capabilities.

Toward a Methodology for Strategic Planning of Strategic Capabilities

A strategic planning methodology for the next NPR must take into account five guiding principles.

- Use an Ends-Ways-Means Framework. It is not analytically possible or politically persuasive to move directly from broad U.S. policy goals such as assurance, dissuasion and deterrence, to required strategic capabilities. Put differently, it is not possible to go directly from strategic policy “ends” to operational capability “means.” One must consider the conceptual “ways” in which it is desired that the “means” can achieve the ends. As an example, this requires asking fundamental questions such as whether the future Sino-American nuclear balance will be deterrence based on the “way” of mutually assured second-strike capabilities, or on the “way” of a mix of deterrence by denial via defenses as well as deterrence by the threat of retaliation. Only after such questions are answered can appropriate operational capability “means” be credibly defined.
- Tailor Country-Specific Strategies and Consider Interactions. The United States should attempt to “tailor” both the force packages and the messages it presents to assure allies and friends, to dissuade potential foes, and to deter opponents. But there are limits. In particular, the same capabilities that help in one strategic relationship may hurt in another (e.g., extensive ballistic missile defenses may dissuade and deter nuclear challengers such as North Korea and Iran, but cause concerns in Russia and China). In addition, American capabilities and statements aimed at assuring, dissuading or deterring one actor are likely to be visible to others. Second-order effects may be hard to predict, but must be considered.

- Use All Tools of National Power. While this paper focuses in particular on the “New Triad” of strategic military capabilities (strike, defense, infrastructure along with supporting command, control, communication, intelligence, surveillance, and reconnaissance (C3ISR)), the full set of tools of American statecraft will be needed to deal with future nuclear threats and must be considered in any full analysis. Among key capabilities not considered in this paper, but critical are: private and public diplomacy, security guarantees, arms sales, and other forms of foreign aid and assistance; and military capabilities outside of the New Triad including the ability of general purpose forces to conduct operations against a nuclear-armed foe.
- Consider Alternative Futures and Balance Risk. U.S. strategic policies and capabilities must take into account that the United States is trying to reduce nuclear risks (including preventing proliferation) while simultaneously hedging against their becoming a reality. This fact means that U.S. policies and strategic postures must be evaluated under a diverse array of potential 21st century nuclear futures, ranging from positive through benign to dangerous. (Among the more dismal possibilities are the emergence of a Cold-War-like major power competition, the formation of a multi-polar nuclear world, and greatly heightened risks of nuclear terrorism after the loss of multiple weapons from an emerging nuclear power.)
- Set Priorities. Since the end of the Cold War, strategic capabilities, and in particular nuclear systems and infrastructure, have been seen largely as bill-payers. Because of the pressures of ongoing conflicts in Iraq and Afghanistan, as well as broader budgetary pressures on non-discretionary spending, nuclear weapons and related programs will have to compete for resources in a severely budget-constrained environment. This reality is another factor that will inevitably shape strategic capabilities. But, this means setting clear and conscious priorities and not continuing to allow capabilities to deteriorate through inattention.

The remainder of this paper applies an ends-ways-means framework by suggesting how various capabilities can support assurance, dissuasion or deterrence of five key sets of actors.

In considering the “ends” of U.S. policy, we focus particularly on the goals of assurance, dissuasion, and deterrence as articulated in the 2001 Nuclear Posture Review (NPR) and in other strategy documents.² Other goals, ranging from non-proliferation to war-fighting (recall that strategic capabilities include long-range non-nuclear strike), should also be addressed in a more comprehensive review.³

In considering “ways” we combine a number of actors into categories, e.g., we consider U.S. allies and friends as one group. This is for simplicity of analysis and presentation; of course Japan is different from South Korea which is different from Turkey. The NPR, and U.S. policy more broadly, must consider key countries individually.

In considering “means” we focus initially on capabilities associated with the so-called New Triad,⁴ and then narrow further to nuclear strike systems and the supporting infrastructure when we consider funding and programmatic issues in later sections.

Considering Ends: Assurance, Dissuasion and Deterrence

A comprehensive and broadly shared understanding of what strategic capabilities are needed to implement U.S. policy goals including assurance, dissuasion, and deterrence is critically important. This understanding is currently highly constrained, in two distinct and important senses.

First, we cannot know with certainty (or in some cases even confidence) what will assure specific allies, dissuade potential competitors, or deter

² We acknowledge that some may not be enamored with the Assure-Dissuade-Deter-Defeat paradigm introduced by the 2001 NPR. Ultimately, another vocabulary may be invented to capture the concepts, which like all terms carry some conceptual and political baggage. In the meantime, we believe it is useful to distinguish between the objectives and capabilities needed for assuring friends and allies, dissuading those who might be tempted to build new capabilities to challenge us, and deterring hostile acts by adversaries.

³ Section 1070 of the FY2008 Defense Authorization Act mandates a broadened Nuclear Posture Review, to be completed concurrent with the next Quadrennial Defense Review (January 2009). Section 1062 of the bill requires that an even broader review of U.S. strategic posture, including both nuclear and conventional weapons, be conducted by an independent commission by June 2009.

⁴ The 2001 NPR defined the New Triad as including: conventional and nuclear strike; active and passive defenses; a responsive infrastructure including the industrial base, science, and human capital; and supporting command, control, communications, intelligence, surveillance, reconnaissance (C3ISR) and planning capabilities.

specific adversaries, At the same time, it should be a national priority to better understand the answers to these questions – and to use the answers to guide the development of robust strategies and supporting capabilities. U.S. Strategic Command’s Strategic Deterrence Assessment Lab is doing interesting and important work, but has barely scratched the surface of understanding what we know, what we don’t know, and indeed what is knowable. The level of sustained effort on these issues amounts to a few people per year – a tiny fraction of the effort devoted to understanding the Soviet Union during the Cold War.

Second, in the highly competitive process for the allocation of DoD resources to improve capabilities, greater success comes to those who can analytically demonstrate the cost-effectiveness of their program in the context of current operations or sanctioned scenarios. Unlike those seeking funding for war-fighting capabilities, those seeking funding of capabilities that focus on avoiding conflict, specifically assurance, dissuasion, or deterrence have had three major handicaps: a dearth of relevant sanctioned scenarios, a lack of agreed measures of effectiveness to assure, dissuade and deter, and an absence of appropriate analytic tools.

The above-noted analytical shortfalls persist despite the fact that deterrence is a central element of the national defense strategy, the national military strategy, and the 2006 Quadrennial Defense Review (which emphasized “tailored deterrence”). Thus our first recommendations should be a focus in the next administration’s NPR and QDR:⁵

Rec. #1. DoD, in coordination with the intelligence community and State Department, should establish an on-going program for the country-by-country assessment of appropriate policies and capabilities to support U.S. policy goals including assurance, dissuasion and deterrence. Because there may be important interaction effects within and between countries, and between the U.S. and these countries, the program should provide an annual net assessment.

⁵ If the next administration conducts a broader Quadrennial National Security Review, as some have recommended, this effort might appropriately include an initial net assessment as suggested above. Similarly, if the National Security Council has responsibility and capacity for guiding and coordinating strategic planning, it might oversee any ongoing net assessment effort.

Rec. #2. DoD, within its planning, requirements and acquisition systems, should develop appropriate analytic tools and use planning scenarios designed to evaluate which specific strategic capabilities most effectively contribute to the avoidance of warfare by assuring, dissuading, and deterring.

Neither the detailed assessments of the first recommendation nor the scenarios and other tools of the second recommendation will be completed by the time of the next NPR. Because of inherent uncertainties and because assessments, scenarios and tools should evolve over time as learning occurs and as the strategic situation shifts, major decisions in the next and any future NPRs will have to be based on partial and incomplete data. This reality puts a premium on developing approaches that are robust to a range of reasonable assumptions, and that are adaptable over time.

Considering Ways: How to Assure/Dissuade/Deter Various Parties

In principle U.S. efforts to assure, dissuade and deter should be oriented on any and all countries and non-state actors. In considering U.S. strategic capabilities, it is useful to first distinguish between five groups: Russia, potential nuclear challengers such as North Korea and Iran, China, terrorist groups and other non-state actors, and finally (and very distinctly) U.S. allies and friends. (As noted above, a more detailed assessment, likely classified, will be needed in the NPR.)

Table 1 provides a first cut at what capabilities are needed to underwrite assurance, dissuasion and deterrence vis-à-vis each of these five groups. This analysis is not as the final word, but hopefully may motivate more in-depth work.

Table 1. “Ways”: A First Cut at How the United States May Pursue Assurance, Dissuasion and Deterrence

Capability Area	Russia (goals: Assure, Dissuade, Deter)	Potential Nuclear Challengers (goals: Assure, Dissuade, Deter)	China (goals: Assure, Dissuade, Deter)	Terrorist Groups, Non-state Actors (goals: Dissuade, Deter, Disrupt, Defeat)	Allies and Friends (goal: Assure)
Nuclear Strike	Small safe secure arsenal capable of devastating 2nd-strike, incapable of splendid 1 st -strike	Small safe secure arsenal capable of devastating 1st or 2nd-strike	<i>Arsenal scaled to dissuade nuclear parity-seeking by China (??) Incapable of splendid 1st-strike (??)</i>	Safe secure inventory and materials with no opportunities for theft or diversion	U.S. strategic nuclear capabilities second to none
Defenses	Protection against accid/unauth. launches without threatening Russian 2 nd -strike	Defenses that <u>do</u> negate viability of 1st-strike	<i>Defenses that do [or do not?] threaten viability of Chinese 2nd-strike (??)</i>	Layered defense that can defeat all delivery means	Effective combined defenses against possible nuclear challengers, terrorists
Non-Nuclear Strike	Capabilities that do not threaten viability of Russian 2 nd -strike	Conventional strike systems that <u>do</u> threaten WMD capabilities	<i>Capabilities that do [or do not?] threaten viability of Chinese 2nd-strike (??)</i>	Discriminant capability to defeat or disrupt operations	Effective combined strike capabilities
C3	Secure nuclear-survivable C3	Rapid decision-making for integrated offense/defense and nuclear/non-nuclear ops	<i>Rapid decision-making for offense/defense and nuclear/non-nuclear ops (??)</i>	Ability to support overt, covert and clandestine antiterrorist operations	Secure combined C3 including appropriate consultation processes
Intelligence	Intel on capabilities, perceptions and nuclear security	Intel on capabilities, perceptions and nuclear security	<i>Intel on capabilities, perceptions and nuclear security</i>	Intel on capabilities and networks	Secure ability to share information and inter-operate with allies
Infrastructure	Support dissuasion with adequate responsiveness	Support current and planned defensive and non-nuclear strike programs	Support dissuasion with adequate responsiveness	Support special operations and non-nuclear strike	Support combined capabilities
Strategic Communication (Key Messages)	U.S. desires long-term stability and nuclear risk reduction	Costs of competition or escalation with U.S. will outweigh gains	<i>U.S. seeks stability but will not allow Chinese military parity (??)</i>	You will not succeed in attacks against U.S. and allies/friends	U.S. strategic posture supports commitment to your security
Strategic Planning	Ability to undertake net assessments, conduct integrated planning within U.S. and with allies/friends, and anticipate and prepare for a wide range of possible futures and contingencies				

Although space limitations preclude an in-depth discussion of every judgment in Table 1, a number of comments are in order.

1. In some cases, and in particular regarding Russia, there may be a ceiling as well as a floor on what capabilities the United States should pursue. For example, because the stability of the U.S.-Russian strategic nuclear balance today depends on assured second-strike capabilities for both sides, it is possible in principle (though unlikely in reality for the near future) that missile defenses would be too effective – unless both parties agree that deterrence by denial via deployed defenses is a preferred and feasible approach and develop a feasible pathway to get there. Barring this fundamental change in the “way” of U.S.-Russian strategic deterrence, it is critical to maintain effective U.S. strike capabilities, and to understand Russian perspectives of any U.S. actions or inactions that diminish the effectiveness of those forces.
2. In contrast to deterrence of Russia, U.S. deterrence of potential nuclear challengers – principally North Korea and Iran today – is not based on mutually assured destruction capabilities, but instead on American military superiority. The United States would like North Korea, for example, to be deterred from attacking largely because it believes if it tries it will fail – and in addition that it would then suffer an overwhelming and devastating counter-attack, whether by nuclear and/or non-nuclear capabilities. In addition, particularly for emerging or potential nuclear powers, a key U.S. goal is to dissuade them from continuing to pursue nuclear weapons capabilities, and where possible to roll back their programs.
3. Unlike the U.S.-Russia nuclear balance and the U.S. relationship with potential nuclear challengers, the fundamental basis of the future U.S.-China strategic balance is open to question (the italicized text and question marks in the table emphasize the uncertain future). Today, China’s nuclear capabilities are less than that of Russia and greater than those of what we have called potential challengers. U.S. efforts to deter these latter states by denial and dissuade their further nuclear capabilities via U.S. defenses and strike capabilities may require defenses and non-nuclear strike capabilities that in China’s view would require a substantial build-up of Chinese nuclear strike forces. Is it desirable to have a U.S.-China deterrent relationship analogous to the U.S.-Russia relationship, i.e., mutually assured destruction through survivable second-strike capabilities on both sides? Should the U.S. limit its ability to defend itself against unauthorized launch or limited attack

in order to dissuade China from nuclear strike expansion? Or can China be convinced that its nuclear deterrent remains credible in U.S. eyes despite U.S. measures to defeat unauthorized and very limited attack? The U.S. is capable of dealing with either approach but the answer will fundamentally affect U.S. nuclear strike, non-nuclear strike, and defensive capability goals, as well as infrastructure requirements. A robust and responsive U.S. nuclear infrastructure could allow the U.S. to forego the substantial nuclear buildup that would be required to counter a Chinese buildup while such questions are resolved.

4. Table 1 implicitly treats states and terrorist groups as unitary actors, when in reality decisions will be taken by individuals or small groups and implemented by individuals and organizations. Effective strategies for assurance, dissuasion and deterrence should consider the specific individuals responsible and the decision/implementation processes (and associated uncertainties)
5. The nuclear weapon capabilities of the United States have contributed to international stability, in part, through the confidence they have provided to allies and friends that they need not seek large nuclear weapon inventories, and in most cases, could eschew their own nuclear capability entirely. Since the end of the Cold War the number of U.S. nuclear weapon systems has declined and there are calls for further reductions. In this situation it is not surprising that some of those under the United States nuclear umbrella are asking for more information about United States capabilities and plans. It is vital that special efforts be expended to understand what capabilities individual allies and friends believe are fundamental to their assurance. As noted in recommendation #1, DoD, in coordination with the intelligence community and State Department, should establish a formal program for the country-by country assessment what is required for assurance.
6. U.S. nuclear weapon modernization has been virtually eliminated by Congressional opposition from those who believe restraint in U.S. modernization is critical to dampening proliferation and required by Article 6 of the Non-Proliferation Treaty. Others, so far less influential, have failed to be persuasive that no evidence exists of U.S. nuclear weapon activities ever having had influence on past nuclear proliferators and that in fact U.S. failure to keep its stockpile credible may actually encourage proliferation by allies and friends who have counted on the U.S. nuclear umbrella. Clearly this issue is one that should be addressed in the country-by-country

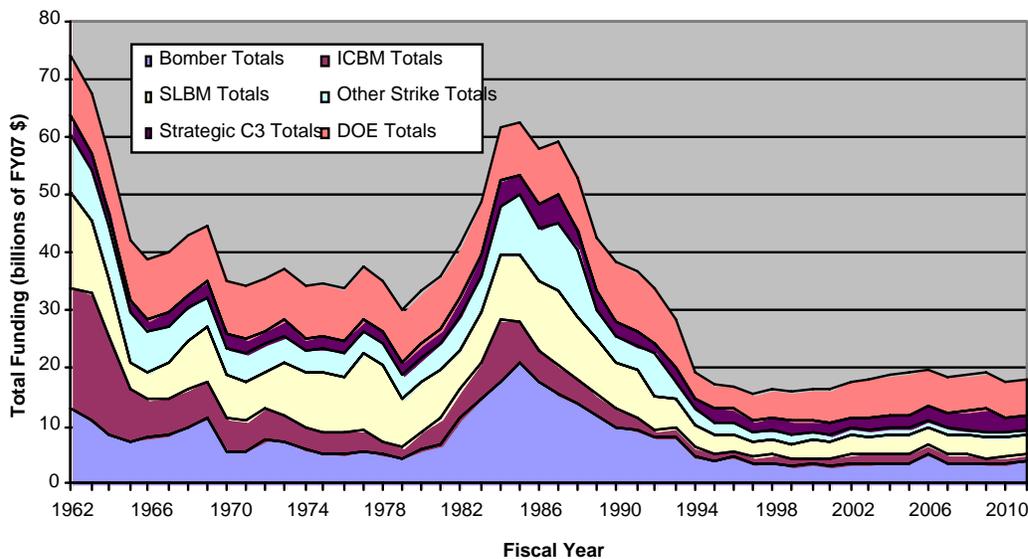
assessment of what is needed to assure and dissuade.

Considering Means: What Capabilities are Needed?

Current Situation

Since the collapse of the Soviet Union in late December 1991, funding for nuclear weapons, delivery systems and supporting infrastructures has gone down and stayed down. A recent analysis by the Office of the Secretary of Defense found that spending on strategic offensive systems including long-range strike, C3 and infrastructure declined from over 10% of the combined DOD and DOE budgets over the period 1962 to 1993, to only 4% currently. In constant 2007 dollar terms, the decline was from an average of \$43 billion for the 1962 to 1993 period, to less than \$20 billion per year today. Figure 1 shows the story.⁶

Figure 1. DoD/DOE Strategic Funding History
Strategic Offense, C3, and DOE/Weapons in FY 2007 Dollars



⁶ Figure 1 and Figure 2 are taken with permission from DoD briefing *Future Strategic Forces: An Overview of Historical Trends* (July 11, 2007). Figure 1 includes both investment and sustainment, with the latter accounting for more than half of total spending since 1993.

Whatever one's view of the desirability of the "procurement holiday" for new offensive strategic systems over the past fifteen years, because of the long lead-times involved in developing and deploying major new systems the United States will face important decisions over the next few years about the long-term future of its offensive strategic arsenal.

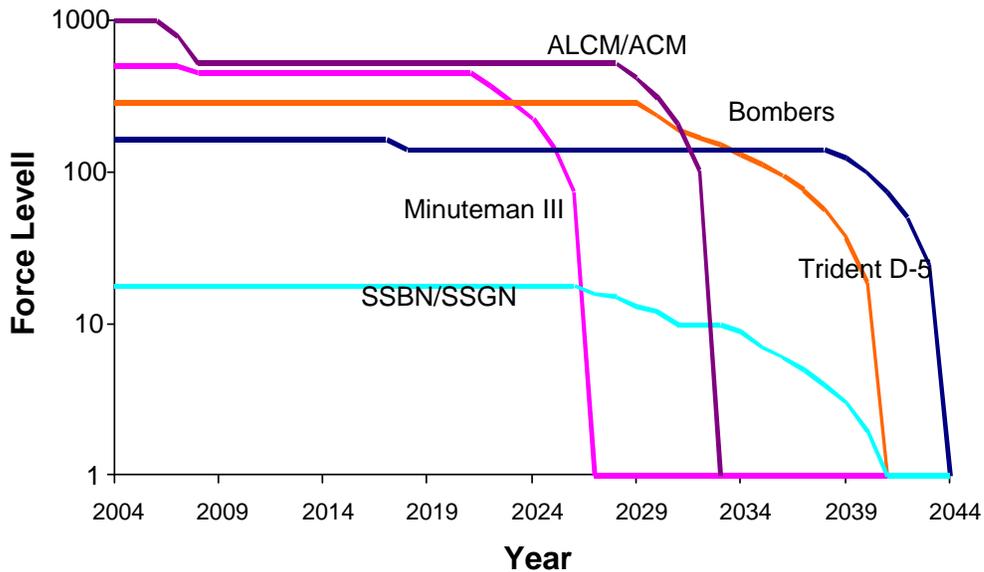
Nuclear Strike Systems

Figure 2 provides a sense of how rapidly force levels would decline in the absence of replacement systems. The Air Force is evaluating alternatives for the next long-range bomber, and the Navy is considering alternatives for the follow-on to Trident SSBNs and missiles. And with the Minuteman III system slated for retirement as early as 2020 the question of whether the "old triad" of ICBMs, SLBMs and bombers can still be afforded will come to the fore.

Recent calls by former Senator Sam Nunn, Secretary of Defense Bill Perry, and Secretaries of State Henry Kissinger and George Schultz for the goal of nuclear abolition have reinforced the view of some that spending scarce defense dollars on nuclear modernization is paying to move in the wrong direction.

Even if abolition turns out to be politically possible, it would take many decades at least – longer than current U.S. nuclear delivery systems are likely to last. In the meantime, the United States will need a small, safe and secure nuclear deterrent (including weapons, delivery systems and survivable C3). And in order to support these capabilities, as well as to provide a basis for assurance, dissuasion and deterrence in a world freed of nuclear weapons (but not nuclear knowledge) supporting infrastructures would also be essential.

Figure 2. “Old Triad” Force Levels Without Replacement Systems



At the same time there may be room for further nuclear reductions. Reducing nuclear forces has fiscal benefits for both the United States and Russia and, some believe, important political non-proliferation benefits, but care must be taken to ensure that those nations dependant on the United States nuclear umbrella do not see reductions as a weakening of United States resolve and thus spawn proliferation among this group of nations. There is a valid question of whether reductions should be negotiated or conducted with the expectation of reciprocation, but at this point in the U.S.-Russian relationship the reality is that either way there should be prior consultations, and either way there should be a signed implementation agreement.

Major reductions in the perceived reliability of nuclear weapons and/or delivery systems could undermine deterrence, as could any safety or security concerns that resulted in large numbers of U.S. nuclear weapons being taken off-line. Potentially severe long-term challenges to maintaining the infrastructure needed to produce nuclear weapon systems and weapons have been noted by recent commissions, including the May 2006 Evaluation of DoD’s Responsive Infrastructure for Strategic Strike by the Threat Reduction Advisory Panel and the December 2006 Defense Science Board Task Force on Nuclear Capabilities.

Given improvements in the accuracy of delivery systems, the yields of U.S. nuclear weapons are absurdly high. Any nuclear attack, whether first use or retaliation,

would result in far greater than necessary collateral damage to civilians as well as fallout on U.S. allies and friends. Reducing yields is associated in some peoples' minds with lowering the threshold for U.S. nuclear use (some see this as enhancing extended deterrence, others as undermining non-proliferation). However the fundamental reality is that the threshold for U.S. nuclear use is extremely high and will remain so; in the event that nuclear weapons are used – first or second – it would be far preferred to reduce collateral damage to innocent civilians, and to our friends and allies. Making progress on this issue will require rebuilding trust between Congress and a new administration.

Given the reluctance of the Congress to fully commit to the RRW program as well as lack of replacement delivery systems in DoD, the reality is that the next administration will have to make decisions on specific systems as well as its overall approach. Achieving a sustainable bipartisan agreement should be a priority.

Rec.#3: The United States should develop a plan for the replacement of nuclear delivery systems. The next NPR should reexamine the value of diversity in nuclear delivery systems as perceived by those we hope to assure, dissuade and deter. Further reductions in U.S. and Russian nuclear weapons systems should be evaluated, while being alert to the concerns of allies and friends regarding their confidence in the United States umbrella.

Rec. #4: The next administration should work to develop a bipartisan consensus in Congress on an agreed path forward for the replacement of aging nuclear weapons over the coming decades, including defining the role of the Reliable Replacement Warhead.

Defenses

With respect to national missile defense, U.S. policies evolved significantly with the end of the Cold War toward broad support for deploying limited systems to cope with “rogue” threats such as Iran and North Korea as well as accidental launch by Russia. This trend was accelerated in the early days of the George W. Bush administration as evidenced in advances in deployed capabilities made

possible by withdrawal from the 1972 ABM Treaty and a push for deployment at several sites.

Defense capabilities directly address assurance, dissuasion, and deterrence by potentially denying effectiveness to offensive forces -- active defenses by destroying offensive weapons before they can cause damage and passive defenses by limiting damage even when offensive weapon use cannot be prevented. The ability to attribute an attack to the perpetrator also can contribute to dissuasion and deterrence.

Active defenses may be the only area in which capability growth has matched the NPR vision. Funding has been robust. Research and development have been strong. While currently deployed technical capability may be limited, the promise has been sufficient that allies have begun to express interest. The Ballistic Missile Defense System now in development and testing has the objective of providing a layered, integrated defense for the U.S. homeland, deployed forces, allies and friends against ballistic missiles of all ranges, in all phases of flight—boost, midcourse and terminal. Patriot and Terminal High Altitude Area Defense (THAAD) missiles, as well as the long-range Ground-based Midcourse Defense and the sea-based Aegis Ballistic Missile Defense components of the system, all use “hit to kill” technology.

Current plans continue to limit the potential effectiveness of future defenses by not including space-based interceptors. Directed Energy concepts, initially explored in the 1970s and 1980s are also not being aggressively pursued. Significantly improved capabilities in both these areas could raise concerns about the relationship with Russia and China and should be the subject of discussions with them if undertaken.

National missile defense will remain an important part of the overall strategic equation. The objective should be to develop and when ready deploy a system that can negate the missile arsenals of small states such as North Korea and Iran, while avoiding undercutting the stability of the mutual deterrence relationship with Russia, until such time as both nations can agree that denial based deterrence is better for both countries. There are significant technical challenges to the former task, and significant diplomatic challenges to the latter. The strategic balance with China, as discussed above, will also be a key consideration.

In the area of passive defenses, capability development is spottier. Consequence management, minimizing the impact of an attack can contribute to deterrence of

smaller-scale terrorist or state-based attacks by blunting their usefulness. For biological and chemical attacks, consequence management is well funded while that for radiological and nuclear attack suffers. It may be possible to better balance investments in the area of consequence management. There is also a substantial interagency effort in nuclear forensics, with the objective of promptly identifying the source of any radiological or nuclear detonation, so that a prompt response can be accurately targeted, thus contributing to dissuasion and deterrence.

Rec.#5: Deterrence and dissuasion by denial, by denying effectiveness to the destructive capabilities of potential adversaries also offers the preservation of lives and infrastructure if attack comes. The Administration should work with the Congress to better balance investments in these areas.

Non-Nuclear Strike Systems

Some have suggested that advanced long-range conventional strike capabilities could place the adversary in a perceived situation of “using or losing” its nuclear capability (a consideration that if valid would apply in even greater measure to U.S. nuclear capabilities). A more dramatic viewpoint, which we reject, is that prompt global strike capabilities should not be procured because a future President might be inclined to use them.

Our judgment is that as a rule improving prompt non-nuclear global strike capabilities will generally be beneficial to deterrence of state actors. And as long as concerns about overflight are addressed such developments are unlikely to affect the stability of U.S.-Russia deterrence. (China is a special case, which as noted above deserves more in-depth consideration).

Air –delivered weapon capability has seen dramatic improvements over the last decades and more improvements are in train. The F-15 and more modern F-22 and F-35 aircraft while not having strategic range from the U.S. are capable of strategic missions if forward based. Their weapon suite is also impressively modern. The B-52 and B-2 strategic bombers, while aging, also are part of the non-nuclear strategic strike capability and, with refueling, can operate from U.S. bases. Non-nuclear cruise missiles, both air- and sea-delivered, have also kept up with technology, with the Navy’s Tactical Tomahawk (TACTOM) arguably being the best example. The accuracy and yield delivery capability of these weapons have the potential for destroying targets once requiring a nuclear weapon if the weapon

can be based sufficiently close to the target and if the critical node of the target can be located with sufficient precision. None of these systems poses the threat of prompt action that is associated with ballistic missile delivery, and for mobile targets the longer delivery timelines significantly compromise effectiveness.

In the area of non-nuclear strategic missiles progress has been non-existent. The Congress has killed every attempt to develop, let alone produce, long-range ballistic missiles for the delivery of non-nuclear ordinance. Such systems offer the only promise of high-confidence prompt delivery on the scale associated with nuclear weapon systems. In addition it is such systems, if realized, that might be viewed as reducing some of the roles now associated solely with nuclear weapons. Of course this supposes that the intelligence challenge of precision location of critical target nodes can be realized. There is little basis for supposing that such missiles could replace the threat of destruction of nuclear missiles in the second strike role so their deployment is likely in low numbers sufficient only for limited strikes. At such numbers they should pose no concern for Russia and possibly even for China. Because of the potential value of these systems to deterring and if necessary engaging emerging nuclear competitors, reaching a working consensus on an appropriate capability level should be a priority.

Rec. #6: The U.S. should define the scope of non-nuclear strategic missiles that can effectively deter small and emerging nuclear powers while clearly not threatening the deterrent of peer and near peer competitors. Consideration should be given to transparency regimes that would eliminate any concerns of China or Russia.

Infrastructure

A responsive infrastructure, one that can be mobilized faster than a threat to existing deployed capability can materialize, is most commonly associated with dissuasion. If an actor can be convinced that a potential offensive development will be countered before it can be realized he will be dissuaded from even trying. In the areas where such an infrastructure capability can be realized, it is possible to imagine smaller deployments of weapon systems numbers. In particular, a responsive infrastructure would allow the U.S. to forgo building a nuclear stockpile in advance of possible threats while consultations and negotiations determined if

the threat was real. In the area of strategic nuclear strike the DOE and DoD infrastructure cannot meet this challenge today.

In DOE, efforts are underway to define and then invest in an infrastructure modernization that would achieve the objective. DOE has, however, had such plans for several years now with no visible progress to date, largely due to Congressional opposition to any plan presented. So the U.S. remains the only declared nuclear weapon state without a responsive infrastructure and likely will be that way for another couple of decades.

On the DoD side, no plan exists to preserve the strategic nuclear weapon system infrastructure that produced the existing delivery systems. Life extension programs for sea-based and land-based ballistic missiles will end shortly with replacement systems decades away. In the interim, design, development, and production facilities and their skilled personnel will evaporate. Far from being ready to respond promptly to any challenge, it will take years to reconstitute a capability that can be expected to enjoy all the risks and many of the failures associated with any start-up.

The lack of modernization and new programs, even of an exploratory, developmental nature, is having a profound impact on the ability of both the DOE and DoD contractor community to retain skilled workers and attract new workers to the field. Once the skills have been lost, the greatest challenge to reconstitution of infrastructure may be the time necessary to train a new generation of scientists, engineers, and production personnel.

With regard to strategic aircraft, manufacturers remain optimistic that they can respond promptly because of the ongoing combination of non-strategic aircraft and commercial craft. Similarly, with active programs underway, active defenses, non-nuclear strike, and C4ISR enjoy responsive infrastructures.

Gaining agreement on infrastructure will likely require re-establishing a working consensus on the role of nuclear weapons and U.S. strategy, which is likely to take more time than remains in the Bush administration.

Rec. #7: The next administration should work with Congress to develop an agreed approach on the infrastructure that supports nuclear weapons and delivery systems and retains the critical skills necessary to preserve the credibility of deterrence. This should be part of a dialogue associated with the next NPR on the full range of issues relating to nuclear weapons, proliferation and arms control.

Strategic Communication

The effective communication of United States capabilities, intentions, and long term plans is critical to deterrence and dissuasion. The foundation is face-to-face meetings, which were an essential part of stabilizing the U.S.-Soviet nuclear relationship during the Cold War. High-level U.S.-Russian strategic discussions continue to be undertaken and are important. To avoid misperceptions that could undermine deterrence or encourage arms racing, habitual and substantive face-to-face meetings with the Chinese civilian and military leadership on nuclear issues are also needed at multiple levels. Ballistic missile defense is an important area of discussion in both cases.

Rec. #8: The United States should continue and expand discussions with Russia and China regarding the strategic balance, including nuclear and conventional strike and ballistic missile defenses. Equally important are the interactions necessary to understand whether allies and friends, and potential nuclear challengers have understood U.S. strategic communications.

Conclusions

Since the NPR was completed in 2001, the New Triad has not been as fully realized as some may have hoped. In some areas, including the Reliable Replacement Warhead (RRW) and the Conventional Trident Modification program, the administration failed to convince a majority in Congress that new systems were needed. Other potentially valuable programs were not made a budgetary priority by the Defense Department, for example the provision of

passive defenses against radiological threats. Finally, in a few areas, technical constraints limited how fast and far programs could proceed, for example the challenges of detecting and engaging stealthy vehicles in cruise missile defense, and distinguishing nuclear warheads from decoys in the mid-course phase of ballistic missile defense.

No future administration will have enough political will, money, and technological freedom to move forward on all fronts equally. Setting reasonable and clear priorities for the goals for capability development to assure, dissuade and deter will be essential to making discernable progress, and to competing for federal budget dollars in what is certain to remain a resource-constrained environment.

This paper has provided a framework for the assessment of capabilities to support assurance, dissuasion and deterrence, and a partial first-cut at applying it. We have provided eight concrete recommendations for change pending the results of the more extensive analysis that is sorely needed.

Progress on deterrence-related issues has been delayed in part because the lack of analytical understanding means that there is a limited ability to set priorities or to make a compelling case. Therefore, perhaps the most important recommendations are the first two: that significantly more national attention and resources go into improving our ability to assess and design more effective strategies and supporting capabilities. This will require in particular a working consensus on the basis of the Sino-American strategic nuclear balance.

Progress on the development of strategic capabilities has also been stymied by the military's understandable focus on ongoing conflicts, and in particular on the Iraq War. It is natural that leadership time, analytical attention, and resources may flow to the war we are in today, but responsibility remains for preventing the war we may have – and wish to avoid – tomorrow. With the Iraq War entering into its end-game (albeit a prolonged one), and with a new administration taking power in less than twelve months, it is time for a renewed focus on preventing future conflict.

Moving forward will require establishing a sufficient bipartisan consensus on the United States' long-term approach to deterrence and nuclear weapons. This does not require agreement on every issue, but does require broad agreement on at least the essential next steps that must be taken. This paper is intended to provide a starting point for this effort.

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