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**DRIVING TO ZERO: DEFINING CREDIBLE NUCLEAR
DETERRENCE IN AN ERA OF DISARMAMENT**

by

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A Research Report Submitted to the Faculty

In Partial Fulfillment of the Graduation Requirements

February 2012

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Biography

Lieutenant Colonel Scott Jacobs is a student at the Air War College at Maxwell Air Force Base, Alabama. He graduated from the United States Air Force Academy in 1991 with a B.S. in Aeronautical Engineering and has served in a variety of space & missile acquisition, operations, and staff assignments including Weapon System Programmer at United States Strategic Command and squadron command at the National Reconnaissance Office. He earned a M.S. in Aeronautical Engineering from California State Polytechnic Institute in 1994. In 2000, he completed a 2-year Nuclear Technology Fellowship at Sandia National Laboratories earning a M.S. in Engineering Mechanics from New Mexico School of Mines and Technology.

Abstract

Nuclear deterrence, like climate change, is a devilishly complex issue that tends to polarize its community of experts. Disarmament advocates talk about the catastrophic dangers posed by large nuclear weapon stockpiles. Proponents discuss the inherent security advantages provided by nuclear deterrence. With some notable exceptions, attitudes among world leaders in the past 40 years tend to support reduced weapon stockpiles and policies to prevent proliferation. The U.S., by virtue of its large nuclear stockpile and stature as a global superpower, remains a leader for this issue. U.S. leadership has long stated a policy towards nuclear disarmament that is conditional on the world environment and preserving security of U.S. interests and allies. This policy has generated numerous proposals by various strategists to reduce the U.S. nuclear stockpile to levels well below the current force structure. Inevitably, each proposal generates considerable debate about the quantity of the reduction. This paper contends that quantity of reductions should not be the primary focus of debate. Rather proposals should be analyzed within the larger context of a chronological continuum with New START as the initial point and global zero as the end point. This approach aligns the entire community along the same framework and permits objective analysis of each proposal's stated deterrence objectives, how they derive credibility for these objectives, and implications to U.S. policy. Several proposals were examined in the paper to populate the continuum. The end result shows that the process of reducing the U.S. stockpile to low numbers will have profound implications to U.S. nuclear policy that have not been adequately discussed or tested. Debate over *what* the 'right' number of weapons is must shift to *how* the U.S. credibly drives to zero.

Introduction

On 5 April 2009, President Obama spoke at Hradcany Square in Prague and declared “So today, I state clearly and with conviction America's commitment to seek the peace and security of a world without nuclear weapons.”¹ The President’s speech and follow-on policy in the 2010 Nuclear Posture Review emphasized a renewed focus on reducing the U.S. nuclear arsenal with a long-term goal of global nuclear disarmament. The New START Treaty, entered into force on February 5, 2011, was another tangible result of this focus on the ‘road to zero.’ While even the staunchest advocates admit total disarmament could take generations, if ever, these events imply a commitment to cut stockpiles that go far beyond previous arms control agreements and unilateral actions and have reenergized focus on various proposals for deeper reductions. Most of these proposals are essentially static analyses that claim deterrence would be preserved at some new stockpile threshold. Inevitably, strategists then spend considerable time arguing why the various thresholds either ‘go too far’ or ‘don’t go far enough.’ With all due respect to the experts, I contend they are missing the point. Rather than supporting or tearing apart each new proposal based on subjective stockpile numbers, proposals should be evaluated dynamically along a chronological continuum. This framework accommodates the idea that various thresholds may be valid at different times. Thus, it becomes more important to evaluate proposals based on their stated deterrence objectives, how they derive credibility for these objectives, and implications to U.S. policy when aligned chronologically along the ‘road to zero.’ To examine this approach, I will use several proposals that are representative of different points along the continuum.

¹ *Remarks By President Barack Obama, Hradcany Square, Prague, Czech Republic, 5 April 2009.*

Establishing the Continuum

New START provides a good starting point to establish the continuum or ‘road to zero.’ The U.S. and Russia must meet the treaty’s strategic nuclear weapon limits by 2018 with a treaty-accountable warhead limit 30 percent lower than the Strategic Offensive Reductions Treaty (SORT or Moscow Treaty) and a delivery vehicle limit 50 percent lower than allowed in START I.² Implementing these reductions is not expected to significantly affect the U.S. force structure. Analysis conducted as part of the 2010 Nuclear Posture Review (NPR) concluded that all legs of the U.S. nuclear Triad should be retained albeit at lower numbers.³ Sydney Drell and James Goodby provide the next example with a proposed U.S. force structure of 500 operationally deployed nuclear warheads and 500 warheads in a responsive force.⁴ Although Drell and Goodby used SORT as a launching point for their reductions, their proposal represents a school of thought that comes chronologically after New START.⁵ They envisioned both the U.S. and Russia cooperatively reaching this level within 5 years. Further down the continuum are James Wood Forsyth, B. Chance Saltzman, and Gary Schaub Jr., who propose a force

² The central treaty limits are: 1,550 Deployed Strategic Nuclear Warheads, 800 Deployed and Non-Deployed Strategic Launchers and Heavy Bombers, 700 Deployed Strategic Launchers and Heavy Bombers. Department of State, *Diplomacy in Action* website, <http://www.state.gov/r/pa/prs/ps/2011/02/156037.htm>.

³ Department of Defense, *Nuclear Posture Review Report*, April 2010, 21.

⁴ Drell and Goodby proposed an Operationally Deployed Force of 3 Trident submarines on station at sea each w/24 missiles and 96 W76/W88 warheads, 100 Minuteman III ICBMs each w/1 W87 warhead, and 20-25 B-2 and B-52H bombers configured for gravity bombs and cruise missiles. Additionally, there would be a Ready Responsive Force split between a 288-warhead Rapid Response Force of 3 Trident submarines in transit or in port each w/96 warheads and a 212-warhead Strategic Response Force of 50-100 Minuteman III ICBMs off-alert w/warheads de-mated and 20-25 bombers unarmed, in maintenance or training. Drell, Sidney D. and Goodby, James E. *What are Nuclear Weapons For? Recommendations for Restructuring U.S. Strategic Nuclear Forces*. Arms Control Association, 2007, 16.

⁵ A similar force reduction was proposed in a report sponsored by the Federation of American Scientists, the Natural Resources Defense Council, and Union of Concerned Scientists in 2008. The report calls for the U.S. to unilaterally reduce its nuclear arsenal to no more than 1,000 warheads, with half on alert and the remainder as a reserve force, although they do not provide a detailed force structure like Drell and Goodby. Blair et al. *Toward True Security: Ten Steps The Next President Should Take To Transform U.S. Nuclear Weapons Policy*. Federation of American Scientists, Natural Resources Defense Council, Union of Concerned Scientists, February 2008, 18.

structure of 311 warheads.⁶ The authors do not establish a timeline for implementing this force structure or see it as part of a continuum towards total disarmament.⁷ In 2007, Matthew Rendall argued for very small arsenals to ensure meaningful damage reductions when, not if, nuclear conflict occurs.⁸ Rendall does not specify a particular force structure or a timeline for implementation, but his concept for a truly minimum deterrent represents a significant departure from today's policy objectives. The end point of the continuum is 'global zero,' but even here strategists differ on specifics of the end state. Some propose conventional means to replace nuclear weapons. Others claim nuclear deterrence would be remain in effect as long as states possess the knowledge and capability to rearm. One point of general consensus is that conditions for total disarmament do not exist at present time and may not occur even in the distant future. Advocates are quick to point out that although the disarmament may unachievable, it should not dissuade pursuit of the goal. With the continuum now populated by some key points, further examination is warranted.

⁶ Forsyth, Saltzman, and Schaub proposed a force of 8 Trident submarines on patrol each w/24 D-5 missiles and 24 warheads, 100 Minuteman III ICBMs each w/1 warhead, and 19 B-2 bombers each configured to carry 1 air-launched cruise missile. Forsyth, et al. "Remembrance of Things Past: The Enduring Value of Nuclear Weapons," *Strategic Studies Quarterly*, Spring 2010, 82.

⁷ Regarding the road to zero they contend, "While 311 is a radical cut from current levels, it is not the same as zero, nor is it a steppingstone to abandoning our nuclear deterrent. The idea of a nuclear-weapon-free world is not an option for the foreseeable future." Schaub, Gary, Jr. and Forsyth, James, Jr., "An Arsenal We Can All Live With," *The Opinion Pages, The New York Times*, 23 May 2010.

⁸ Rendall, Matthew. "Nuclear Weapons and Intergenerational Exploitation," *Strategic Studies* 16, no. 4 (October-December 2007): 525-549.

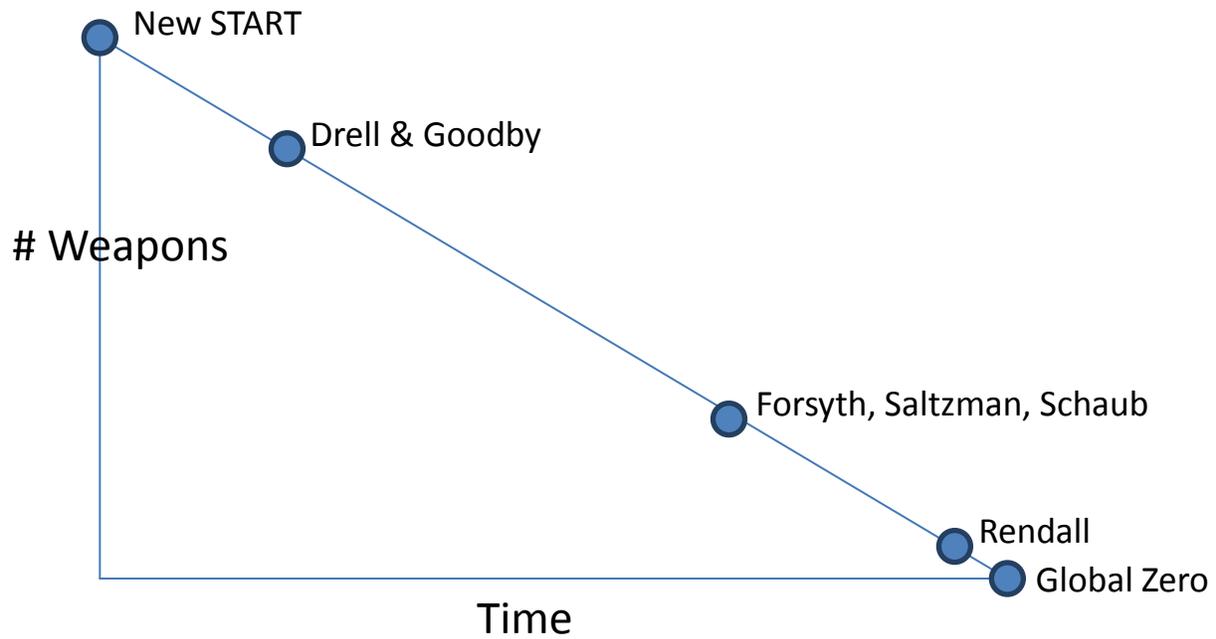


Figure 1.

Proposal Objectives

After World War II, *deterrence* emerged as the dominant concept among first-generation nuclear strategists. While their approaches varied widely, they all fundamentally accepted that military forces in the nuclear age should be used to deter war.⁹ This premise has not changed; nuclear weapons remain in the U.S. arsenal to deter adversaries. All of the example proposals claim to preserve deterrence, but a closer read reveals some key differences.

New START and 2010 NPR

New START negotiations were heavily influenced by the 2010 NPR (and vice versa).¹⁰

The NPR report lists five key objectives for U.S. nuclear policy:

⁹ Liddell Hart summarizes a prevailing opinion of many strategists early in the Cold War, "...old concepts and old definitions of strategy have become not only obsolete but nonsensical with the development of nuclear weapons. To aim at winning a war, to take victory as your object, is no more than a state lunacy." Hart, B.H. Liddell. *Deterrent or Defence*, London: Stevens, 1960, 66.

¹⁰ Per the 2010 NRP report, "The NPR analysis considered several specific levels of nuclear weapons, all below current levels of approximately 2,200 deployed strategic warheads. Its conclusions, approved by the President, the

1. Preventing nuclear proliferation and nuclear terrorism;
2. Reducing the role of U.S. nuclear weapons in U.S. national security strategy;
3. Maintaining strategic deterrence and stability at lower nuclear force levels;
4. Strengthening regional deterrence and reassuring U.S. allies and partners; and
5. Sustaining a safe, secure, and effective nuclear arsenal.¹¹

The third and fourth objectives describe two foundational concepts of deterrence: *central deterrence* and *extended deterrence*. *Central deterrence* is the principle of possessing strategic nuclear weapons to deter attack on a nation's homeland and has been a core tenet of U.S. nuclear policy for over 60 years.¹² This concept could also be applied to other U.S. vital interests such as deployed U.S. troops.¹³ Minuteman III Intercontinental Ballistic Missiles (ICBMs) in protective, underground launch facilities across the northern tier of the U.S., nuclear-armed ballistic missile submarines (SSBNs) on active patrol at sea, and U.S.-based strategic bombers armed with nuclear bombs and cruise missiles compose a strategic triad that fulfill the role of central deterrence. *Extended deterrence* was originally conceived early in the Cold War to broaden U.S. nuclear objectives to protect U.S. allies from conventional and/or nuclear attack.¹⁴ Extended deterrence remains a primary element of U.S. policy to assure allies, deter adversaries, and strengthen nonproliferation regimes.¹⁵ Besides the strategic systems listed above, the U.S.

Secretary of Defense, the Joint Chiefs of Staff, and Commander, U.S. Strategic Command, formed the basis for U.S. negotiations with Russia on New START.” 2010 NPR report, 20.

¹¹ Ibid, 2.

¹² Philip Bobbitt defines central deterrence as “...the relationship between vital objectives whose very centrality guarantees them the highest value to the deterrer and therefore guarantees also the willingness to run the highest risks of retaliation or pre-emption in their behalf as well as the will to inflict a level of harm commensurate with the necessity to protect those objectives.” Bobbitt, Phillip. *Democracy and Deterrence*. New York, NY: St Martin's Press, 1988, 9.

¹³ From the 2010 NPR, “The United States would only consider the use of nuclear weapons in extreme circumstances to defend the vital interests of the United States or its allies and partners.” 2010 NPR report, 17.

¹⁴ Garrity and Maaranen describe the early application of extended deterrence in Europe, “Much of the Cold War conflict can be characterized as an effort by the United States to guarantee the security of its principal allies—a guarantee that ultimately rested on the threat to use nuclear weapons—in the face of what was believed to be, at least in the European theater, a superior Soviet conventional capability.” Garrity, Patrick J. and Maaranen, Steven A., ed. *Nuclear Weapons in the Changing World: Perspectives from Europe, Asia, and North America*. New York, NY: Plenum Press, 1992, 6.

¹⁵ The 2010 NPR report states, “Security architectures in key regions will retain a nuclear dimension as long as nuclear threats to U.S. allies and partners remain. U.S. nuclear weapons have played an essential role in extending

retains a forwarded deployed force of non-strategic or ‘tactical’ nuclear weapons in the European theater to support extended deterrence.¹⁶ U.S. policy expresses a long term commitment to extended deterrence despite future stockpile reductions. Per the NPR report, “...the size and pace of U.S. nuclear force reductions will be implemented in ways that maintain the reliability and effectiveness of our security assurances to our allies and partners.”¹⁷

Drell and Goodby

As stated previously, SORT established a point of departure for Drell and Goodby.¹⁸ Their purpose was to examine deterrence/dissuasion requirements in the 21st century.¹⁹ Acknowledging a long, complex history of the U.S. / Russia deterrent relationship, the authors offer that, “It is very difficult to escape from the mutual deterrence mindset, even after conditions have changed very considerably, but we think the United States and Russia, the two nations that possess more than 90 percent of the world’s nuclear weapons, can do better than they have.”²⁰ Their analysis includes a set of contemporary scenarios and the implications for nuclear arsenal size:

- in the case of former adversaries (i.e., Russia)
- in the case of present adversaries (i.e., North Korea and Iran)

deterrence to U.S. allies and partners against nuclear attacks or nuclear-backed coercion by states in their region that possess or are seeking nuclear weapons.” 2010 NPR report, 31.

¹⁶ A 2009 report from the Council on Foreign Relations made the following observation “The small U.S. nuclear stockpile deployed in Europe still supports NATO political objectives and may help convince certain NATO allies not to build their own nuclear forces.” Perry, William J. and Scowcroft, Brent, Chairs. *Independent Task Force Report No. 62, U.S. Nuclear Weapons Policy*. New York, NY: Council on Foreign Relations, 2009, 34.

¹⁷ 2010 NPR report, 30.

¹⁸ The authors summarize their thesis, “Planning for U.S. nuclear forces will inevitably take into account plausible scenarios in which the use of nuclear weapons by the United States might seem to decision-makers of the future to be a necessary option, although a thoroughly unattractive one. Our thesis is that, even if one accepted the validity of these scenarios, some of which we describe below, the requirements for nuclear weapons do not add up to anything like the Bush administration’s projected numbers. Our view is that most of the potential military tasks we cite could be accomplished with modern conventional weapons.” Drell and Goodby, 6.

¹⁹ Drell and Goodby explain that the Bush administration considered dissuasion as separate and distinct from deterrence. Although dependent on individual circumstances, dissuasion “...amounts to deterring peacetime activity from occurring that could present a future threat to peace and security.” Ibid, 6.

²⁰ Ibid, 14.

- in the case of potential adversaries (i.e., China)
- in regional conflicts, for example, the Middle East
- in the special cases of the threatened use of biological and chemical weapons, where the Bush administration has reserved the right to use nuclear weapons if attacked with such weapons.²¹

Since a bipolar adversarial relationship with Russia no longer exists, the authors claim a responsive force, as opposed to an operationally deployed force, should be sufficient to maintain a hedge against renewed hostility. Reductions are considered within the construct of counterforce targeting.²² Further, they propose that a 500 warhead responsive force would be adequate to cover an additional Russian sites affecting industrial recovery, although they admit this is a legacy to assured destruction policies from the Cold War and should eventually be eliminated. For the other scenarios the authors conclude that the 500/500 force structure easily envelopes the number of targets imagined for smaller adversaries. They do not believe nuclear weapons will effectively deter/dissuade non-state actors.²³ Like current U.S. policy, they see conventional capabilities playing an increased role for some deterrence objectives.²⁴ The authors dismiss the role of non-strategic nuclear weapons in U.S. extended deterrence commitments in

²¹ Ibid, 10. Note: The 2010 NPR report has since revised the last scenario "...by declaring that the United States will not use or threaten to use nuclear weapons against non-nuclear weapons states that are party to the Nuclear Non-Proliferation Treaty (NPT) and in compliance with their nuclear non-proliferation obligations." 2010 NPR report, 15.

²² Per the authors, "We estimate these military targets [generically described in the 2001 NPR], under the conditions we postulate, to number between 200 and 300, and we have sized the operationally deployed force of strategic warheads at a larger number of 500 for reasons of conservatism." Drell and Goodby, 15.

²³ Sauer argues the futility of attempting to deter non-state actors, "Nuclear deterrence against non-state actors does not make sense, especially if these non-state actors are religiously motivated. First of all, it is by definition impossible to target non-visible terrorists. Second, religiously motivated terrorists do not care about dying for their cause. Therefore, nuclear deterrence does not make any difference in preventing terrorists acquiring and using nuclear weapons." Sauer, pg 755. Drell and Goodby state, "It is not nuclear deterrence but activities such as the Cooperative Threat Reduction program that are key to preventing nuclear terrorism." Drell and Goodby, 8. The 2010 NPR report emphasizes similar activities.

²⁴ In discussing various scenarios where U.S. decision-makers could entertain nuclear weapons, Drell and Goodby state, "Our view is that most of the potential military tasks we cite could be accomplished with modern conventional weapons." Drell and Goodby, 6.

Europe since they do not foresee a likely scenario where their use would be a consideration.²⁵

With the exception of extended deterrence commitments now accomplished via forward-deployed weapons, Drell and Goodby's proposal does not significantly depart from current U.S. policy objectives.

Forsyth, Saltzman, and Schaub

Forsyth, Saltzman, and Schaub see nuclear weapons as essentially a political tool to enhance *general deterrence*.²⁶ In discussing the "sanctuarizing" effect of nuclear weapons, the authors state "One could argue that nuclear weapons enhance general deterrence by virtually precluding acts of aggression against states that possess them, and thereby greatly enhance stability."²⁷ While military utility is downplayed, the authors claim a small triad of strategic weapons would ensure readiness, survivability, and flexibility are achieved.²⁸ Like Drell and Goodby, the authors see no utility in tactical nuclear weapons. In fact, they contend extended deterrence is a by-product of alliances, which they question as a whole.²⁹ Assurances to European allies are basically left to be provided by British and French nuclear capabilities and they propose a hands-off approach to security challenges in the Middle East caused by Iran's nuclear ambitions.³⁰ Overall, Forsyth, Saltzman, and Schaub's proposal represents a significant departure from current U.S. policy objectives.

²⁵ The authors state, "Reportedly, the United States maintains a stockpile of tactical nuclear weapons in Europe. No need exists for them under present circumstances, and they, like similar Russian nuclear systems, should be consolidated in rear areas in the United States and Russia, and ultimately eliminated." Ibid, 12.

²⁶ The authors reference Patrick Morgan's definition for *general deterrence*, "General deterrence relates to opponents who maintain armed forces to regulate their relationship even though neither is anywhere near mounting an attack." Forsyth, et al. "Remembrance of Things Past," 77.

²⁷ Ibid, 78.

²⁸ Forsyth, et al. "Minimum Deterrence and its Critics," 5.

²⁹ Per the authors, "...alliances might be necessary but they are not always useful. The corollary to this is simple: while extended deterrence might have been our fate, it should not automatically be our policy." Forsyth, et al. "Minimum Deterrence and its Critics," 9.

³⁰ Admitting Iran's pursuit of a nuclear capability will spur proliferation in the region, the authors offer that "...the shrewdest thing to do might be nothing. As odd as it sounds, the United States might be better off by not acting and

Rendall

Rendall's motivation for reducing stockpiles is based on the concept of intergenerational justice. Following the logic that nuclear deterrence will eventually fail, he concludes that greatly reduced stockpiles are the only way to reduce certain catastrophic damage.³¹ Rendall is even willing to concede near-term peace in pursuit of this objective, "...we should prefer a world with a higher risk of war but a lower risk of apocalyptic destruction. In such a world we pay more of the costs of our defense and externalize fewer to future generations."³² Additionally, some amount of weapons is thought to be more sustainable than total disarmament because Rendall is pessimistic about various rearmament scenarios that would lead to greater overall stockpiles and in turn, greater risk of large-scale nuclear war. Regarding critics' claims that the U.S. would not use a small arsenal except in response to homeland attacks and how this might encourage allied proliferation, he counters "In fact it is hard to imagine any aggressor so reckless as to gamble on this assumption, given the cost of being wrong."³³ Rendall recognizes the challenge of changing behavior now to benefit future generations. He is left recommending that, "Anti-nuclear campaigners and other environmental activists concerned with the distant future face a common challenge and should develop common strategies."³⁴

even allowing the Saudis to deploy a counterweapon should the Iranians decide to do so. In short, more might be better." Forsyth, et al. "Remembrance of Things Past," 81.

³¹ Referencing Rudolf Avenhaus's work on the probability of nuclear war, Rendall states "As long as the risk of nuclear war does not steadily decrease, if we wait long enough it becomes a near certainty." Rendall, 530.

President Obama made similar statement in his Prague Speech, "Some argue that the spread of these weapons cannot be stopped, cannot be checked — that we are destined to live in a world where more nations and more people possess the ultimate tools of destruction. Such fatalism is a deadly adversary, for if we believe that the spread of nuclear weapons is inevitable, then in some way we are admitting to ourselves that the use of nuclear weapons is inevitable." *Remarks By President Barack Obama*, 5 April 2009.

³² Rendall, 526.

³³ Rendall does concede that Germany, Japan, Taiwan, and others could nuclearize. Ibid, 549.

³⁴ Rendall sees potential in making a clear moral case, "Forbearance is particularly likely if they [people] understand that their actions threaten their own descendants and any legacy they may hope to leave." Ibid, 553.

Global Zero

Because strategies for total disarmament vary so widely, a single proposal has not been chosen for this point on the continuum. While some strategists support enhanced conventional capabilities and defensive systems to replace nuclear forces, others claim that simply possessing the knowledge and ability to develop nuclear weapons is sufficient for deterrence to remain effective.³⁵ Roger Hilsman goes as far as to claim that, “Only by establishing a single government for the whole planet can the chances of avoiding nuclear war be maximized.”³⁶ These concepts may not be immediately actionable, if ever, as even the staunchest advocates for disarmament acknowledge huge challenges. Regardless, ‘global zero’ remains the brass ring for disarmament advocates emboldened by a vocal lobby and strong global support for non-proliferation regimes.³⁷ As such, any changes to U.S. nuclear policy objectives will be viewed by these advocates through the lens of achieving this end state.

Credibility

Having reviewed the objectives of proposals along the continuum, it is prudent to discuss credibility. Credibility causes vigorous debate among strategists. Like the concept of deterrence itself, credibility is dependent on what an adversary believes. Some argue that credibility can be achieved by a possessing a warfighting capability. Per Michael Gerson, “For deterrence to be credible, the adversary must believe that the defender has both the necessary military capabilities

³⁵ Sauer elaborates, “One could argue that many states already possess virtual nuclear weapons arsenals. States like Japan and Germany that have extensive civilian nuclear programmes are able to produce nuclear weapons in a couple of months.” Sauer, 750 & 766

³⁶ Hilsman, Roger. From Nuclear Military Strategy to a World Without War: A History and a Proposal. Westport, CT: Praeger Publishers, 1999, 234.

³⁷ From Blechman and Bollfrass, “On September 24, 2009, the leaders of the fifteen members of the UN Security Council, including the first five states to possess nuclear weapons (coincidentally, the permanent members of the Security Council), unanimously approved a resolution committing each of their governments to ‘create the conditions for a world without nuclear weapons, in accordance with the goals of the Treaty on the Non-Proliferation of Nuclear Weapons...in a way that promotes international stability, and based on the principle of undiminished security for all.’” Blechman, Barry M. and Bollfrass, Alexander K. “ZERO NUCLEAR WEAPONS: The Pragmatic Path to Security,” *The Nonproliferation Review*, 11 October 2010, 570.

– in other words the proper weapons and concomitant C4I (command, control, computers, and intelligence) apparatus to physically carry out the attack – and the necessary political resolve to act on its threats and use force if deterrence fails.”³⁸ The original U.S. nuclear force structure was initially developed as a warfighting capability. The bombs developed by the Manhattan Project were used to end World War II, not to deter Japan. During the early Cold War, the U.S. military went to great lengths to prepare for nuclear combat with the Soviet Union because it was widely believed to be a possibility.³⁹ By the 1960s, the U.S. and Soviet Union had essentially achieved nuclear parity with survivable, second strike capabilities, but both sides continued to embrace warfighting capabilities.⁴⁰ The U.S. pursued this approach in several ways: a plethora of weapon types incorporated into a counterforce targeting allocation process, nuclear forces maintained on-alert for immediate response, and a robust infrastructure used to continuously upgrade the stockpile.⁴¹ This approach survives in current U.S. policy despite declaring that “Russian is not an enemy” and the most urgent priorities are “preventing nuclear terrorism and nuclear proliferation.”⁴² Barring some kind of severe budget crisis or collapse of the U.S.

³⁸ Kamp, Karl-Heinz and Yost, Davis S., ed. *NATO and 21st Century Deterrence*. Rome, Italy: NATO Defense College, 2009, 161.

³⁹ For this reason, strategists like Albert Wohlstetter and Herman Kahn would spend much effort studying how nuclear war would be conducted. Per J.C. Garnett, “Despite strategies of deterrence and policies of arms control, Kahn knew that war was possible, and since, at any given moment, there was a finite but unmeasurable chance of it occurring, it was important to know what it would be like.” Baylis, John and Garnett, John, ed. *Makers of Nuclear Strategy*. New York, NY: St. Martin’s Press, 1991, 82.

⁴⁰ Keir Lieber and Daryl Press state, “By the early 1960s, the United States and the Soviet Union possessed such large, well dispersed nuclear arsenals that neither state could entirely destroy the other’s nuclear forces in a first strike.” Lieber, Keir A. and Press, Daryl G. “The End of MAD? The Nuclear Dimension of U.S. Primacy,” *International Security*, Vol 30, No. 4 (Spring 2006), 7.

⁴¹ In a 1993 report from the United Nations Institute for Disarmament Research, Yves Boyer expanded on the warfighting approach during the Cold War, “To take, for example, the operational plan for the American nuclear forces, the SIOP (‘Single Integrated Operational Plan’), its execution depends on integration of the number of payloads, the hardening of targets, the possible defence [sic] of targets, their size, the timing of the strike, the requisite level of destruction, targets requiring several payloads to ensure destruction, mobility of targets and the availability of weapons....It led to a maximalist posture in terms of warheads (25,000 to 30,000)...” Sur, Serge, ed. *Nuclear Deterrence: Problems and Perspectives in the 1990’s*. New York, NY: United Nations Institute for Disarmament Research, 1993, 100.

⁴² Even after the Cold War ended only one component of the U.S. strategic triad, nuclear-armed bombers, was taken off alert. ICBMs and SLBMs remain in an alert posture for rapid execution. 2010 NPR report, 6.

nuclear infrastructure, the level of reductions dictated by New Start are not significant enough to alter this approach to achieve credibility in the near future.

Drell and Goodby's proposal, which includes all elements of today's strategic triad, also relies on its military utility to retain credibility. They claim their force structure is "...very conservative in terms of target coverage..." in recognition of legacy Cold War thinking still prevalent in U.S. and Russian policy.⁴³ Additionally, the authors stress the need for a nuclear infrastructure capable of sustaining a credible responsive force. Assuming their target estimates are correct, Drell and Goodby's force structure fits neatly within the current U.S. approach for nuclear planning.⁴⁴ However, the authors also propose a follow-on fifty percent reduction within 10 years to a completely responsive force of 500 warheads with no mated ICBMs or SSBNs on patrol.⁴⁵ This type of force structure severely strains the notion of a warfighting capability, but the authors do not address possible effects on credibility in this case.⁴⁶

In a clear departure from the above approach, the next few proposals in the continuum use a *minimum deterrence* approach for credibility. Jeffrey Lewis explains minimum deterrence as, "An enemy who *can* be deterred, *will* be deterred by the prospect of a counterattack, even if it consists of only a few nuclear weapons."⁴⁷ Proponents of this approach take a more existential view of nuclear war where the risk of catastrophic damage is so high neither side can prevail and

⁴³ Drell and Goodby, 18.

⁴⁴ In 2000, The New York Times published an op-ed by Bruce Blair in which he said his research indicated there were 2,260 Russian targets (1,100 nuclear arms sites) in the U.S. strategic war plan. He then makes the connection between this number and the 2,200 U.S. warheads thought to have been on alert at the time. Blair, Bruce G. "Trapped in the Nuclear Math," *The New York Times: Opinion*, 12 June 2000. By 2008, he had lowered the alert count to 1,300-1,400. Blair et al. *Toward True Security: Ten Steps The Next President Should Take To Transform U.S. Nuclear Weapons Policy*. Federation of American Scientists, Natural Resources Defense Council, Union of Concerned Scientists, February 2008, 2.

⁴⁵ Drell and Goodby, 18.

⁴⁶ The authors summarize their view on credibility as such, "Experts spend a great deal of their time wondering whether a threat to use nuclear weapons is credible. A weapon that has not been used in combat for 60 years is not a weapon that is used lightly, and the consequences of its possible use are so dire that even the most irresponsible of rogues probably is impressed." Ibid, 13.

⁴⁷ Lewis, Jeffrey. "Minimum deterrence," *Bulletin of Atomic Scientists*, Vol. 64, No. 3, pp. 38-41 DOI: 10.2968/064003008, July/August 2008, 38.

thus becomes ‘unthinkable’.⁴⁸ Although any nuclear force should suffice, strategists often define a minimum nuclear force as composed of a limited survivable, second strike capability.⁴⁹

Minimum deterrence is not without precedent. While the U.S. and the Soviet Union engaged in a costly arms race in an effort to obtain nuclear superiority, other countries like United Kingdom, France, and China maintained minimum deterrence policies rejecting the premise that possessing a nuclear capability inevitably leads to expanded objectives and stockpiles.⁵⁰

Forsyth, Saltzman, and Schaub justify their 311-warhead force by advocating a minimum deterrence strategy.⁵¹ In assessing the necessary size of a nuclear arsenal, the authors favor the concept of *proportional deterrence* – that is, “...the defender would need to possess, at a minimum, enough survivable nuclear forces to inflict damage on the aggressor roughly equivalent to the gains—in territory, industrial capacity, et cetera—that the aggressor could hope to achieve if it successfully conquered the defender.”⁵² Size of the arsenal thus rests upon valuation of one’s own territory, which in the case of the U.S. is very large. The authors hold up

⁴⁸ Sauer, 749. Patrick Blackett, a former British naval officer during World War I, embraced this theory. Michael Howard explains Blackett’s position, “It assumed that the prospect of nuclear war *in itself*, without any assessment of what level of destruction might or might not be ‘tolerable’, would be enough to deter the Soviet Union or any other revisionist power from initiating war as a deliberate instrument of policy.” Baylis and Garnett, 161.

⁴⁹ Peter Gizewski elaborates, “In theory, a nuclear arsenal of any size or composition could serve as a minimum deterrent. But the concept has most often been associated with countervalue (i.e., counter-city) as opposed to counterforce targeting, and possession of the capability to retaliate against an adversary’s society after absorbing an initial nuclear strike (i.e., second-strike capability).” Gizewski, Peter, ed. *Aurora Papers 24: Minimum Nuclear Deterrence In a New World Order*. Ontario, Canada: Canadian Centre for Global Security, 1994, 2.

⁵⁰ In a 2003 report sponsored by the Defense Threat Reduction Agency, Gregory Giles, Christine Cleary, and Michele Ledgerwood state, “All three countries [U.K., France, and China] reached the conclusion that beyond a certain level of assured damage that it was able to inflict on an aggressor in a second-strike, additional nuclear weapons were unnecessary. What that level of assured damage was and how many weapons were needed to achieve it varied among the three, however, due to distinctive national approaches to nuclear planning.” Giles, et al. *Minimum Nuclear Deterrence Research: Final Report*. Prepared for Defense Threat Reduction Agency Advanced Systems and Concepts Office by SAIC Strategies Group, Contract No: DTRA01-00-D-0003, Delivery Order 0018, 15 May 2003, I-6.

⁵¹ Per the authors, “Today the United States can adopt a minimum deterrence strategy and draw down its nuclear arsenal to a relatively small number of survivable, reliable weapons dispersed among missile silos, submarines, and airplanes.” Their triad composition is slightly different. In the interest of enhancing stability, they change the configuration of each weapon system to a single warhead per missile and aircraft. Forsyth, et al. “Remembrance of Things Past,” 82-83.

⁵² *Ibid*, 78.

the nuclear arsenals of France and China as examples of proportional deterrence currently in practice. However, in their follow-up article, the authors seem to downplay this logic and concede that "...several second-strike nuclear weapons are more than enough to keep the most aggressive adversary at bay."⁵³ Interestingly, the author's envision a second strike force composed of counterforce and countervalue weapons while describing the weapon systems in terms of 'military utility' and 'pinpoint accuracy' which seem to run counter to the tenets of minimum deterrence.⁵⁴ The authors do make some pragmatic allowances in recognition of the challenges in changing U.S. policy, but it is not entirely clear if that is also the reason they chose to mix warfighting and minimum deterrence concepts.⁵⁵ Regardless, this hybrid approach could serve as an analytical bridge between current warfighting strategies and minimum deterrence.

Unlike Forsyth, Saltzman, and Schaub, Rendall does attempt to relate his minimum deterrence approach to current policy. Rendall also discusses nuclear war in much more existential terms.⁵⁶ Motivated by the requirement for meaningful damage reduction, he builds a case for minimum deterrence composed of a very small arsenal of survivable weapons.⁵⁷

Rendall rejects other forms of damage control such as counterforce targeting, low-yield weapons,

⁵³ Forsyth, et al. "Minimum Deterrence and its Critics," 7.

⁵⁴ Per the authors, "...the United States could address military utility concerns with only 311 nuclear weapons in its nuclear force structure while maintaining a stable deterrence. These 311 weapons should include missiles that are integral to a stable deterrence because they cannot be moved, are easily detected, and can hold enemy forces at bay with pinpoint accuracy." Also, "...America's nuclear security can rest easily on a relatively small number of counterforce and countervalue weapons totaling just over 300." Forsyth, et al. "Remembrance of Things Past: The Enduring Value of Nuclear Weapons," 82-83.

⁵⁵ The authors claim their force structure retains dispersed ICBMs to be "politically palatable," but they do not use this justification to explain the retention of counterforce targeting or SLBMs capable of holding hardened targets at risk. Ibid, 83.

⁵⁶ Rendall states, "Human casualties from an all-out nuclear war between NATO and Russia could be in the hundreds of millions or billions. At worst, the smoke from burning cities and oil facilities could plunge the earth into chilly darkness, though some claim that predictions of 'nuclear winter' are overblown. The environment would remain poisoned for thousands of years." He further claims even if initial war is limited, "Eventually—in the second, third, or twenty-eighth nuclear war—fanatics, fools, or leaders fearing preemption will be at the helm and use large numbers of hydrogen bombs." Rendall, 533-534.

⁵⁷ Per Rendall, "As Stansfield Turner observes, to deter the Russians 'probably takes the same number as it does to deter the United States—one. But let us play it safe. Call it five or ten, or some such number—still, it will not be in the hundreds or thousands.' We may need a few more weapons to ensure that some will survive and get through—but not more than a few." Ibid, 545.

and missile defenses as ineffective, unreliable, or destabilizing unless implemented in conjunction with deep cuts to arsenals.⁵⁸ He acknowledges that some strategists claim smaller arsenals could lead to greater risks of a first strike, based on an adversary's belief that they could disarm an opponent, but he says this argument can be mitigated by ensuring forces are not vulnerable.⁵⁹ Rendall does not directly address credibility, but invoking the core tenet of minimum deterrence he states, "Even the chance that a couple of weapons might get through should deter attack."⁶⁰

Discussing credible deterrence may seem odd in the context of 'global zero', but advocates claim it can still hold. Critics of 'global zero' point out that a non-nuclear world could increase the likelihood of large conventional conflicts similar to the early 20th century.⁶¹ Others claim that nuclear weapons cannot be 'uninvented'.⁶² *Post-existential deterrence* provides a possible path for nuclear states to disarm but still retain security provided by nuclear deterrence.⁶³ Credibility under such a regime depends on preserving a non-nuclear environment. Sauer states, "The only way to prevent states to go nuclear is to create a moral- political climate in which nuclear weapons are completely de- legitimized, where rules are set for how to deal

⁵⁸ Ibid, 544.

⁵⁹ In rebutting first strike issues Rendall states, "China has made the most out of its arsenal by separating its missiles into small units. Any advanced industrial power could ensure survivability by fielding multiple submarines, each armed with one or two warheads." Ibid, 547.

⁶⁰ Ibid, 545.

⁶¹ Gizewski, Peter, ed. *Aurora Papers 24: Minimum Nuclear Deterrence In a New World Order*. Ontario, Canada: Canadian Centre for Global Security, 1994, 84.

⁶² George Perkovich and James Acton rebut this argument, "...uninvention is neither necessary nor sufficient for the abolition of nuclear weapons. The real prerequisites are twofold. First, verification and enforcement procedures capable of detecting and responding to rearmament swiftly and effectively would have to be developed. Second, states that possess nuclear weapons today would need to be convinced they could protect their vital interests without them." Perkovich, George and Acton, James M, ed. *Abolishing Nuclear Weapons: A Debate*. Washington DC: Carnegie Endowment for International Peace, 2009, 1.

⁶³ Sauer elaborates on post-existential deterrence, "Post-existential deterrence corresponds with what Michael Mazarr has called 'virtual deterrence', and to what Jonathan Schell has termed 'weaponless deterrence'. Schell, for his part, proposed to replace the existing logic of 'missile deters missile, bomber deters bomber, submarine deters submarine' with the logic 'factory would deter factory, blueprint would deter blueprint, equation would deter equation'." Sauer also states, "The fact that post-existential deterrence does not throw the concept of nuclear deterrence aside should make the idea attractive for those who are still not convinced of the desirability of a world without nuclear deterrence." Sauer, 750 & 766.

with potential cheaters, and a highly intrusive verification-system is set up.”⁶⁴ Blechman and Bollfrass are more optimistic than Rendall regarding potential risks of rearmament claiming the world would be no worse off than before.⁶⁵ What is not disputed is that the probability of nuclear conflict drops to zero in a world without nuclear weapons and as such, advocates will continue to seek ways to achieve and preserve that end.

The Continuum and Implications to U.S. Policy

Nuclear disarmament efforts have been proposed since the advent of nuclear weapons in 1945.⁶⁶ Despite large stockpile growth during the Cold War, disarmament advocates can claim some successes by influencing various arms limitations & reductions, test bans, and non-proliferation treaties. In today’s politically favorable environment, advocates acknowledge multiple challenges to reach ‘global zero’ including the process of disarmament, monitoring & enforcement, and proliferation of materials used for nuclear energy.⁶⁷ Blechman and Bollfrass seem optimistic that any challenges can be overcome, “We already know how to design an elimination regime and how to implement it without risk to any nation’s security. There are no technical obstacles to the goal; it is strictly a matter of political will.”⁶⁸ The focus of this section

⁶⁴ Ibid, 755.

⁶⁵ Directly countering Rendall’s intergeneration argument, Blechman and Bollfrass state, “Critics expressing concern about the instability of such a rearmament race err in worrying more about such a distant (both in time and likelihood) and hypothetical risk than they do about the instabilities of current proliferation trends or, for instance, the Indian-Pakistani arms race. Instead, a nuclear stand-off would likely evolve in less than a year, leaving the cheater nothing to show for its efforts but the enmity of the rest of the world.” Blechman and Bollfrass, 573.

⁶⁶ Zia Mian describes early disarmament efforts immediately after World War II, “The United States and Soviet Union responded to the United Nations General Assembly’s call for plans to eliminate nuclear weapons. The U.S. Report on the International Control of Atomic Energy (known as the Acheson-Lilienthal Report), and the official U.S. and Soviet proposals to the United Nations (the Baruch and Gromyko Plans, respectively) were the most prominent attempts to realize this goal.” Mian, Zia. “Charting a path toward eliminating nuclear weapons,” *Bulletin of the Atomic Scientists*, 27 Sep 2010, 3.

⁶⁷ S.J. Cimbala summarizes the mood towards disarmament, “Not since the ‘nuclear freeze’ movement of the 1980s has a worldwide momentum in favor of a once-unthinkable policy stance, with extraordinary military complications, captured such attention.” Cimbala, Stephen J. “Nuclear Arms Reductions, Abolition and Nonproliferation: What’s Ideal, What’s Possible, What’s Problematical?” *Journal of Slavic Military Studies*, 22:329–351, 2009, 330. See Mian’s article for disarmament challenges. Mian, 6.

⁶⁸ Blechman and Bollfrass, 571.

is on weapon reductions and their implications to U.S. policy. Prior examination of several reduction proposals has shown disparate objectives and methods to achieve credibility. Political will may very well be the primary obstacle for disarmament, so it only makes sense to analyze reductions along a continuum to fully understand implications to U.S. policy.

As stated earlier, New START represents a starting point on the continuum. New START reductions were negotiated after the U.S. had determined an acceptable force structure to maintain stable deterrence.⁶⁹ Per the 2010 NPR report, four requirements were stated for the U.S. nuclear force structure during the ten-year duration of New START:

- Supporting strategic stability through an assured second-strike capability;
- Retaining sufficient force structure in each leg to allow the ability to hedge effectively by shifting weight from one Triad leg to another if necessary due to unexpected technological problems or operational vulnerabilities;
- Retaining a margin above the minimum required nuclear force structure for the possible addition of non-nuclear prompt-global strike capabilities (conventionally-armed ICBMs or SLBMs) that would be accountable under the Treaty; and
- Maintaining the needed capabilities over the next several decades or more, including retaining a sufficient cadre of trained military and civilian personnel and adequate infrastructure.⁷⁰

Additionally, the NPR report says limitations on missile defenses and conventional bomber/missile systems should be avoided to preserve their contributions to regional deterrence. Even after all elements are in force, New START does not significantly alter the dynamic of U.S. nuclear policy with regard to objectives and credibility.⁷¹ As of 2009, the U.S. nuclear stockpile consisted of 5,113 warheads.⁷² As of September 2011, 1,790 warheads were deployed on

⁶⁹ Per the 2010 NPR report, “An early task for the NPR was to develop U.S. positions for the New START negotiations and to consider how U.S. forces could be structured in light of the reductions required by the new agreement.” 2010 NPR report, ix.

⁷⁰ Ibid, 19-20.

⁷¹ The 2010 NPR report admits New START is intended as an initial step towards future reductions and thus the analysis for acceptable reductions was conservative. Ibid, 20.

⁷² This number was released by the Obama Administration in 2010 and does not include retired warheads slated for dismantlement. Associated Press, “U.S. Releases Details of Nuclear Weapons Inventory,” published 3 May 2010.

strategic weapon systems with that number decreasing to a maximum of 1,550 under New START by 2018.⁷³ Non-strategic nuclear weapons are not affected by the treaty, so extended deterrence commitments are not likely to change unless the U.S. takes additional unilateral actions outside of New START.

Drell and Goodby's proposal for a 1,000-warhead force (500 operational and 500 responsive force), represents a two thirds reduction from the New START operationally deployed strategic warhead limit. The authors envisioned these activities occurring within 5 years of their proposal.⁷⁴ Since Drell and Goodby used the 2001 NPR as a foundation for their proposal, moving from New START to their force structure does not largely conflict with current U.S. policy. Retention of the strategic triad preserves most of the requirements outlined in the 2010 NPR, but the flexibility to shift between legs of the triad for technical hedging would be decreased due to smaller numbers. Like current policy, Drell and Goodby see no need to develop new weapons to reach their reduction goals.⁷⁵ However, their proposal departs from current policy with one significant exception, extended deterrence commitments. Returning deployed non-strategic nuclear weapons to the U.S. could dramatically alter the dynamic in Europe, the Middle East, and other regions with respect to allied assurances and proliferation.⁷⁶ Drell and Goodby admittedly focused their efforts on strategic reductions, but their non-strategic warhead recommendations could have even greater consequences and as such, should not have been so easily dismissed. Additionally, their proposed drawdown to 100 ICBMs could pose a

⁷³ Department of State, *New START Treaty Aggregate Numbers of Strategic Offensive Arms Fact Sheet*, 25 October 2011.

⁷⁴ Drell and Goodby originally envisioned amending SORT to achieve their force structure by 2012. Drell and Goodby, 14.

⁷⁵ Per the authors, "It takes an extraordinary flight of imagination to postulate a modern new arsenal composed of such untested designs that would be more reliable, safe, and effective than the current U.S. arsenal based on more than 1,000 tests since 1945. A comprehensive and rigorous stockpile maintenance program confirms and sustains this high confidence." Ibid, 20.

⁷⁶ Although current U.S. policy seeks to jointly reduce non-strategic weapon stockpiles with Russia, changes must occur in close consultation with allies and partners which is likely to be a complex task. 2010 NPR report, xiv.

challenge due to basing issues.⁷⁷ Consolidating ICBMs to a single missile wing is relatively straight-forward technically and logistically, but has implications for stability due to spacing of launch facilities.⁷⁸ However, retaining ICBMs across multiple wings would prove more costly in an era of budget austerity. Additionally, any force structure changes are likely to be politically contentious with congressional leaders from states with nuclear forces or infrastructure.

Forsyth, Saltzman, and Schaub's proposal for a 311-warhead force does not seem too far off previous proposals on the chronological continuum, but ideologically it represents the first large departure from U.S. policy. Whether 311 is the 'right' number or not, at some point down the continuum, warfighting approaches cease to be credible and minimum deterrence must be embraced. This will drive fundamental changes in the way the U.S. approaches nuclear strategy. Minimum deterrence requires acceptance of countervalue targeting. For the first time since the early Cold War, planners will be required to plan attack scenarios for maximum civilian casualties. Possibly predicting negative public perception regarding countervalue targeting, Forsyth, Saltzman, and Schaub claim "...the political effect of nuclear weapons does not stem from countervalue or counterforce targeting but from the destructive power of the weapons themselves. Put another way, the mere prospect of the punishment delivered by nuclear weapons tames the most bellicose of statesmen."⁷⁹ This may be a convenient way to downplay a distasteful subject, but the issue remains that U.S. decision-makers will have to publicly accept and communicate countervalue targeting as U.S. policy. Beyond the philosophical challenges of minimum deterrence, the authors' force structure may pose some practical problems.⁸⁰ Issues

⁷⁷ Some strategists consider consolidation of targets destabilizing since it potentially lowers the first-strike risk calculus. This risk can be mitigated if the peer adversary also adheres to overall stockpile reductions.

⁷⁸ The U.S. ICBM force consists of 450 deployed Minuteman III ICBMs in three missile wings across several northern tier states.

⁷⁹ Forsyth, et al. "Minimum Deterrence and its Critics," *Strategic Studies Quarterly*, Winter 2010, 6.

⁸⁰ The authors issue a disclaimer "...not all of the political or logistical challenges associated with reducing or redesigning the force have been factored into this analysis. These challenges will be substantial." Ibid, 12.

with distributing a 100-ICBM force have already been discussed. The air leg of their triad would be composed of 19 B-2 bombers each armed with one nuclear air-launched cruise missile (ALCM) although they foresee possible intermixing of convention munitions.⁸¹ Intermixing could be destabilizing, as the adversary cannot determine how bombers are armed and unintentional signaling may occur during a crisis causing rapid escalation.

If the previous proposal signaled the initial transition away from legacy Cold War strategy, Rendall's proposal represents the end result. Chronologically on the continuum, dropping to tens of weapons should not be an extended process as long as the U.S. has fully embraced a minimum deterrence strategy. Rendall's arguments are not meant as a road map to these reductions, but rather they illustrate the type of mindset required to accept a very small force structure.⁸² Since survivable, second strike was established as a key tenet for minimum deterrence, SLBMs seem the most logical choice for a force structure supporting his approach. As stated earlier, Rendall is willing to trade near-term stability to enhance long-term damage control, so dispersed ICBMs may not be necessary. However, even at very low numbers several weapon systems may be practical to prevent technical issues from affecting the entire force. Rendall also rejects that deep cuts would require are resumption of nuclear testing, stating "When many American experts testify that the Stockpile Stewardship Program ensures the U.S. deterrent's reliability, what enemy would be crazy enough to gamble?"⁸³ The same issues with countervalue targeting, extended deterrence commitments, and proliferation exist here, but at

⁸¹ Forsyth, et al. "Remembrance of Things Past: The Enduring Value of Nuclear Weapons," 83.

⁸² Rendall summarizes his viewpoint, "For states that have already nuclearized, going down to minimum deterrents may not cost anything. It will probably reduce the risk of accidental war, while lowering the costs when war eventually breaks out." Rendall, 554.

⁸³ Ibid, 548.

these low numbers, specific force structures and employment strategies become secondary concerns.⁸⁴

If adopting a minimum deterrence approach presents formidable challenges, they are dwarfed by those created in achieving the final step in the continuum to 'global zero.' Even if U.S. policy makers can accept the philosophical leap from minimum deterrence at small numbers to zero weapons, complete nuclear disarmament requires international consensus.⁸⁵ Sauer claims nuclear deterrence is weakening and the international community should opt for a political climate where nuclear weapons are completely de-legitimized.⁸⁶ Blechman and Bollfrass call for an international treaty that establishes phased destruction of all nations' nuclear weapons, materials, and facilities, "To ensure that no state gained a destabilizing advantage, the treaty would incorporate a dynamic milestone-based schedule. If a state delayed compliance or refused to comply with a scheduled measure, procedures would be in place to invoke a suspension of other nations' scheduled reductions until the violation had been corrected."⁸⁷ Completely transparent and intrusive inspection regimes would also be required to monitor the disarmament process and prevent rearmament. Perkovich and Acton acknowledge the importance of assuring

⁸⁴ Jeffery Lewis discusses the 'faith' required for minimum deterrence, "This is the central question of minimum deterrence, whether one is talking about the stability of deterrence, assuring allies, or credibly threatening retaliation. How much do the details matter relative to the existence of the most destructive weapons in human history? For many, talk about nuclear strategy has a surreal quality that seems disconnected, both from the realities of political life and the horror that would ensue in the event of a nuclear war. It's this essential judgment, more than any other, that informs whether one is willing to place one's faith in a minimum deterrent or not." Lewis, 41.

⁸⁵ During the 2000 NPT Review Conference, members adopted a set of 13 "practical steps" towards disarmament. While most of the steps reaffirm previous positions, such as no further nuclear testing, they signal pressure from the international community to strive towards 'global zero'. Gillis, Melissa. *Disarmament: A Basic Guide*. New York, NY: United Nations, 2009, 30.

⁸⁶ Sauer states, "Whatever the benefits of nuclear deterrence have been in the past, five current trends undermine the potentially stabilizing effect of nuclear deterrence: horizontal proliferation; the nuclear taboo; international law; the risk of nuclear terrorism; and missile defence." Based on these trends, Sauer says political leaders will opt for a world without nuclear weapons. Sauer, 752 & 765.

⁸⁷ Blechman and Bollfrass acknowledge challenges, "A disarmament treaty is not a nuclear cure-all. It would be unreasonable to expect that a treaty would immediately roll back every nuclear threat that has emerged under the current regime. Promises that a global treaty for zero weapons would immediately solve the problems posed by North Korea or Iran would be disingenuous. Nor is it likely that Israel or Pakistan, two states who believe their nuclear arsenals offset existential threats from superior conventional forces, would sign on immediately. However, the current nonproliferation regime fares no better." Blechman and Bollfrass, 571.

allies during the process.⁸⁸ Whichever methods are used to reach and enforce ‘global zero’, the U.S. will have to take a primary leadership role in the process.

Putting Deterrence to the Test

The core tenets of nuclear deterrence discussed in this paper were logically deduced in a unique bipolar environment. Despite the appearance of rigor from detailed force employment systems analysis like that first performed by Wohlstetter and Kahn and continued today by analysts in the DoD, deterrence objectives and conditions for credibility have never been empirically derived and exist only as concepts, not as proven fact. Drell and Goodby counter the argument that deterrence was effective during the Cold War, “...policy choices of governments and a good measure of luck brought the world through the danger years [of the Cold War] without a nuclear conflict.”⁸⁹ Some strategists assert that Post-Cold War deterrence needs to be situational-based; rejecting a one size fits all approach. Keith Payne et al expand this concept called *tailored deterrence*, “Strategies for deterrence need to be tailored to specific adversaries and take into consideration the actions to be deterred, personalities and cultural norms of adversary leaders, and numerous other contextual factors. Similarly, assurance and extended deterrence commitments need to be tailored for each ally and threat environment.”⁹⁰ Jeffrey Knopf, expanding on a framework originally developed by Robert Jervis, coined deterrence research in this era the *fourth wave*.⁹¹ Regardless of viewpoint, these positions support the need

⁸⁸ Per the authors, “If China, Russia, North Korea, Iran and others do not cooperate in reducing insecurities surrounding the states that now benefit from extended nuclear deterrence, the US, as the principal guarantor, would not and should not be expected to relinquish this deterrent.” Perkovich, George and Acton, James M, ed. *Abolishing Nuclear Weapons: A Debate*. Washington DC: Carnegie Endowment for International Peace, 2009, 37.

⁸⁹ Drell and Goodby, 2.

⁹⁰ Payne, Keith, et al. *U.S. Extended Deterrence and Assurance for Allies in Northeast Asia*. Fairfax, VA: National Institute Press, 2010, 1.

⁹¹ Per Knopf, “The *fourth wave* reflects a change from a focus on relatively symmetrical situations of mutual deterrence to a greater concern with what have come to be called asymmetric threats. The most important result has been to reveal the value of adopting a broader concept of deterrence that is not exclusively military in nature.”

for continued study, debate, and testing of deterrence concepts as world leaders contemplate fundamental changes to nuclear policies.

Conclusion

U.S. leadership is committed to reducing nuclear weapons with the end goal of their complete elimination. Although strategists have proposed various structures and methods to enable deeper reductions to current stockpiles, too often reduction quantities are the primary focus. Attempts to determine the ‘right’ number of weapons ignores the dynamic nature of the problem where reductions themselves can alter the calculus resulting in unforeseen reactions and consequences. Alternatively, a chronological continuum emphasizes the *reduction process* versus independent, number-centric milestones. In effect, a continuum aligns all sides of the nuclear community, from status quo supporters to total disarmament advocates, to the same framework. No doubt any proposal must be examined to ensure the internal logic supports the stated deterrence objectives and necessary conditions for credibility. Further, empirical data supporting these proposals is generally lacking, reinforcing the need for continuous research and testing. But by aligning proposals along a continuum, the community can finally get past the emotional baggage caused by the subject material and objectively study, discuss, and debate U.S. nuclear policy.

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