

Redefining Deterrence: Nuclear Forensics and Administration Spending Priorities

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Abstract

The Obama Administration's budget for fiscal year 2017 included a like-for-like replacement of all legs of the US nuclear triad. This huge expenditure represents a reinforcement of traditional notions of deterrence between superpowers, without an analysis of whether or not these reflect the most pressing threats to national security. This paper will deal with several potential nuclear threats before turning to the current US responses to them in the context of deterrence theory. Particularly, the threat of nuclear terrorism is widely acknowledged by both scholars and high-ranking members of the Administration. Nuclear forensics can be used to attribute recovered nuclear material to its source, and prevent terrorists from acquiring it. However, the Administration's budget request focuses on updating capabilities useful only in a traditional definition of deterrence that requires force parity between the Soviet Union and the United States, without expanding investments in nuclear forensics.

About the Author

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Introduction

Many scholars have pointed to nuclear deterrence as the structure that held apart the two great nuclear arsenals of the Soviet Union and the US during the cold war. For years, national security was primarily defined in terms of Mutually Assured Destruction and force parity. However, after the fall of the Soviet Union and the terrorist attacks of 9/11, security analysts have begun to reevaluate the role of deterrence in the United States' national security. On February 9, the Obama Administration has released its fiscal year 2017 (FY2017) budget request, which included a like-for-like replacement of all legs of the US nuclear triad. A like-for-like replacement involves replacing each system with a system of same or greater capabilities. Despite a wide range of scholars and politicians who have recognized the need to redefine deterrence to reflect current threats to the United States, the current nuclear modernization plan is in opposition to these analyses and the Administration's own previously stated policy.

Nuclear threats in a modern world

Before examining the Obama Administration's FY2017 budget to analyze whether it addresses the most pressing nuclear threats to the United States, it is necessary to first examine these threats. While there is an immense diversity of threats posed by nuclear weapons, these can be divided into two major categories- the threats of a great power nuclear exchange and the threats posed by sub-state actors acquiring nuclear weapons. The types of nuclear force modernization that address each of these provisions are fundamentally opposed. Those policies that help to avert a great power nuclear conflict will increase the chances of a sub-state actor acquiring nuclear material. In a time of limited financial outflows, it is important to examine each of these threats to determine which should be emphasized in force modernization expenditures.

Great power nuclear relations

The threat of a great power nuclear conflict has defined US nuclear policy since 1949, when the Soviet Union tested its first atomic bomb. Policy makers believed that they could only protect the United States if it maintained a significant nuclear superiority over the Soviet Union. As relations between the countries eroded after World War II, their relationship became one of deterrence, rather than trust. Deterrence relies on a country's ability to retaliate in the event of a nuclear attack, so that if either country launched a nuclear weapon, it was assured of a nuclear strike in return. This policy later became known as "Mutually Assured Destruction" (MAD). This was also the birthplace of the nuclear "triad", which refers to the three platforms for the delivery of a nuclear weapon (bombers, intercontinental ballistic missiles, and submarine-launched ballistic missiles) that the US and Soviet Union used to ensure a second-strike capability. As the relationship thawed at the fall of the Soviet Union and the end of the Cold

War, both sides reduced their nuclear arsenals through various arms control agreements (most recently NewSTART).

Russia in recent years has become more aggressive internationally, and is pursuing a nuclear modernization program that many US scholars see as a continuation of the threat of great power nuclear conflict. New appeals to Russian nationalism and a recent conventional military buildup have led many Western scholars to view Russia as an adversary. In 2012, at a time of high oil prices, President Putin announced that if he were re-elected he would instigate the largest arms buildup in Russia since the Cold War (NTI, 2012). The plan called for \$772 billion (USD) to replenish the Russian arsenal, including building 400 new intercontinental ballistic missiles (ICBMs), and 8 new nuclear capable submarines (NTI, 2012). The overall Russian military budget has expanded significantly (over \$11 billion from 2014 to 2015), and there are ambitious plans to modernize over 70 percent of the military by 2020 (Einhorn et al, 2015).

The motivations behind this military buildup are beyond the scope of this analysis but several common interpretations are relevant. Many analysts cite growing Russian nationalism as a key cause for its rearmament. The desire to be viewed as a superpower and to exert the influence on the world that it did as the Soviet Union leads to a reassertion of Russia's role as a nuclear power (Pfier, 2015). In addition, despite these modernization efforts, Russia's conventional forces remain behind those of NATO. Emphasizing its nuclear capabilities allows Russia to compensate for a deficient conventional capability compared to NATO (Pfier, 2015). Other authors have also highlighted Russia's conventional weaknesses but have pointed to China, rather than NATO, as Russia's new competitor (Podvig, 2015).

This investment in military technology should be viewed not as a buildup of a new nuclear threat to the United States, but rather as a supplement to a declining nuclear force. The fall of the Soviet Union and the ensuing financial disasters led to drastic cuts in Russia's previously high military expenditures. These conventional weaknesses were in many ways countered by an expanded role for nuclear weapons in Russia's defense. In 2000, the new Russian military doctrine reemphasized nuclear weapons and attempted to lower the nuclear threshold in a conventional conflict. This has been seen as a means of ensuring national security while reducing the amount spent on conventional armed forces (Podvig, 2015). This policy was amended in 2010 to specify that nuclear weapons would only be used in a conventional conflict if there was an existential threat to the state (Podvig, 2015). By this time, the Russian economy had improved, allowing it to make greater investments in conventional weaponry. These policies indicate little change from traditional ideas of deterrence, and certainly no reason for alarm.

Existing arms control agreements are another assurance of the small likelihood of a great power nuclear conflict. Russia still abides by the NewSTART treaty, which limits its number of deployed warheads. These limits mean that the development of new ICBMs or other nuclear-capable technology will be met with the decommissioning of older delivery vehicles (Pfier, 2015). Before current modernization programs, Russia had significantly lower numbers of ICBMs, nuclear capable bombers, and nuclear submarines than the Soviet Union did in 1990 (Lieber and Press, 2006). Many of these old delivery vehicles are near, or past the end of, their intended service lifetime (Pfier, 2015); plagued by persistent maintenance and readiness problems, they have, in the past, cast doubt upon the very existence of a Russian deterrent force (Lieber and Press, 2006). From this perspective, the Russian force modernization can be thought of as ensuring the country's second-strike capability, rather than a new aggressive stance.

Despite the residual presence of a Cold War mentality among both Americans and Russians, as long as both sides adhere to the arms reduction treaties, there is little reason for the alarmist stance that many news outlets have taken on this issue (see Einhorn et al, 2015 for an example of such an article in the *New York Times*).

While Russia does have a nuclear arsenal capable of immense destruction, the likelihood of a great power nuclear conflict is incredibly low. Policy makers in countries all over the world find it difficult to even consider using a nuclear weapon (Cimbala, 1998, p. 22). More importantly, force parity is not required for deterrence, which means that it is not necessary for the United States to modernize and expand its nuclear program as Russia does. Increasingly, analysts and top policy makers have begun to question the need for a large nuclear deterrent force (Cimbala, 1998). As soon as the USSR developed nuclear weapons in 1949, the United States believed it had little advantage, despite possessing a substantially larger nuclear arsenal (Cimbala, 1998, p. 29). Maintaining nuclear superiority did not lead to better diplomacy or coercion for the United States during the early stages of the Cold War (Pelopidas, 2015). Especially in light of other threats to the United States, the perception that force parity is necessary for security has serious opportunity costs.

The threat of nuclear terrorism

In 2009, President Obama gave a historic speech in Prague about the prospects for a world free of nuclear weapons. He declared that, with the fall of the Soviet Union, the greatest threat to the United States had changed from that of a bipolar nuclear conflict to that of nuclear terrorism. The 2010 Nuclear Posture Review echoed him, stating, “today’s most immediate and extreme danger is nuclear terrorism” (Nuclear Posture Review Report, p. iv). In the words of

President Obama, after the Cold War “the threat of global nuclear war has gone down, but the risk of a nuclear attack has gone up” (White House, 2009). In response to this threat, the early days of the Obama Administration included a reevaluation of the role of nuclear weapons in the national security of the United States. President Obama stated in Prague that the United States, “will reduce the role of nuclear weapons in our national security strategy, and urge others to do the same,” (White House, 2009). The 2010 Nuclear Posture Review put combatting nuclear terrorism as the first among its priorities, followed by reducing the role of nuclear weapons in US national security strategy (Nuclear Posture Review Report). Although deterrence is mentioned as a priority, it is in the context of reassuring regional allies, and not in terms of mutually assured destruction.

This threat, which resonated strongly in the United States after the terror attacks of 9/11, is fundamentally different than the threat posed by the potential for a great power conflict. Deterrence and an increase in the number and capabilities of nuclear weapons can, according to some, help reduce the risk of a great power nuclear conflict. However, even the most ardent proponents of the nuclear peace theory do not believe that an increase in the United States’ nuclear arsenal will serve to dissuade a nuclear attack from a terrorist group. As Graham Allison states in his seminal book on nuclear terrorism, al-Qaeda has “no return address”, which means that there is no way to ensure retribution, or implement the logic of deterrence (Allison, 2004 p. 2). An increase in the size of nuclear arsenals actually increases the chance that terrorists will be able to buy, build, or steal a nuclear weapon. Therefore, traditional deterrence can increase the risk of nuclear terrorism. The solution to one perceived threat (great power conflict) only exacerbates the risk of the other (nuclear terrorism).

Responses and US weapons modernization

Faced with this paradox, the United States' recent nuclear modernization can be qualitatively examined to determine how it affects these two perceived threats. The Obama Administration's policy, despite its verbal commitments to countering nuclear terrorism, has maintained a position of traditional deterrence against Russia. The US nuclear modernization program is estimated to cost approximately \$348 billion between FY 2015 and FY 2024, according to the Congressional Budget Office. However, independent estimates calculate the cost to be as high as \$1 trillion (Reif, 2015). These investments are primarily in delivery systems and warheads, which do little to decrease the likelihood of a great power nuclear conflict, and less to combat nuclear terrorism. The modernization program includes redesigning the Minuteman III missile, rebuilding the Ohio class nuclear submarine, and developing a new class of nuclear bombers and cruise missiles (Reif, 2015). This program is primarily a like-for-like replacement, which surprised many onlookers, given the Obama Administration's previous statements on nuclear disarmament. The Arms Control Association's analysis states that a credible deterrent force could be maintained by reducing the US arsenal to one third of NewSTART levels (Reif, 2015).

The development of the new bomber forces in particular has raised questions about the US' willingness to disarm. The bomber wing of the nuclear triad was the weakest before the most recent military modernization plan was announced, but significant investment will be made under the current plan to increase these capabilities. The plan replaces the Air Force's fleet of old B-52 bombers with a new fleet of dual-capable bombers (costing over approximately \$41 billion in Research and Development, and an additional \$500 million per unit), and the development of

a new nuclear tipped cruise missile (another \$25 billion) (Reif, 2015). Previously, analysts had assumed that the bomber force was a prime candidate for force reductions. Not only were the bombers old and limited in number, they have limited military usefulness when facing adequate air defenses (Johnson et al, 2009). While the development of a new bomber force may have some tactical applications, it represents an enormous expenditure, without adding any specific capabilities to the US nuclear forces.

The modernization plan includes only \$8 billion dollars for “force improvement” in personnel and logistics, an area of the US nuclear forces that has been consistently weak (Reif, 2015). For years, Scott Sagan and others have raised questions about the efficacy of the command and control structures and personnel of the nuclear arsenal (Cohen and Sagan, 1993; Schlosser, 2013). Schlosser’s recent book on this topic highlights the underappreciated danger inherent in maintaining a sizeable nuclear arsenal by examining a number of nuclear accidents and near-catastrophes in the last 50 years (Schlosser, 2013). For instance, on multiple occasions, personnel working with nuclear weapons have been caught abusing illegal drugs (“Finger on the Trigger”, 2015) or cheating on proficiency tests (Cooper, 2014). The appropriations for the nuclear modernization plan include very little funding or emphasis on solving these problems, instead favoring an emphasis on traditional deterrence policies.

Perhaps the most glaring omission of the nuclear modernization program is the lack of funding and programs focused on reducing the risk of nuclear terrorism. While nuclear terrorism was highlighted in the 2010 Quadrennial Defense Review as a key step to ensuring US nuclear security, it has not received funding or support on the same magnitude as deterrence. Congress has passed several bills that include mandatory funding and the reporting of progress in nuclear

forensic capabilities including the Nuclear Forensic and Attribution Act (“Text of the Nuclear Forensic and Attribution Act”, 2010). Despite a high level of interest in this field, the current nuclear modernization program continues outdated notions of deterrence and great-power nuclear relations, without more deeply analyzing the usefulness of deterrence in our current situation.

Creating a New Deterrent through Nuclear Attribution

If the United States expands its definition of a deterrent force to include countering nuclear terrorism, it will allow its nuclear modernization program to more fully match the stated priorities of the administration. Early scholarship in this field discarded the idea of deterring nuclear terrorism. As terrorist groups often have no clear location or leadership structure, it becomes difficult to punish or deter them effectively (Allison, 2004). Terrorist groups that have little concern for the lives of their membership will not be easily dissuaded by threats of violence (Talmadge, 2007). However, it is possible to use the logic of deterrence to prevent terrorists acquiring the material required to construct a nuclear weapon.

It is widely accepted that a terrorist organization cannot produce its own nuclear explosive material (NEM). A uranium bomb relies on a complicated, expensive, and highly visible enrichment procedure that is believed to only be achievable by states. The plutonium used in nuclear weapons is extracted from low burn-up nuclear reactor fuel and is also commonly considered to be secure from non-state actors (Talmadge, 2007). Therefore, the nuclear material necessary to create a bomb must at one point have been created by a state and either given freely, bought, or stolen by a terrorist organization (Allison, 2004). Deterrence, therefore, can be applied to states capable of creating nuclear material to persuade them that it is in their interest to not allow terrorists to acquire nuclear material, either on purpose or by accident.

Nuclear attribution, a subset of nuclear forensics that allows recovered nuclear material to be traced back to its source, is the key to a modernized idea of deterrence. It works by comparing the isotopic characteristics of the nuclear material to pinpoint a source location (Kristo and Turney, 2012). These analytic tools fall into one of three main categories- bulk analysis tools, which analyze the overall isotopic composition of the sample; imaging tools, which provide detailed images of the material to confirm homogeneity; and microanalysis tools, which classify the constituents of the sample (International Atomic Energy Agency, 2006, p. 25-26). For example, by using scanning electron microscopes, it is possible to determine the dimensions of a sample's source, in order to determine whether or not there is more material on the nuclear black market (Kristo and Turney, 2012). The data that scientists gain from this analysis can then be compared to data on locations, processes associated with the formation of nuclear material, and other seizures of illicitly trafficked material in order to attribute the nuclear material to a geographic location.

One of the main challenges that nuclear attribution faces today is a lack of information on various locations around the globe. Many scientists have advocated for the establishment of an international library where information on nuclear materials from around the world could be kept for comparison (Kristo and Turney, 2012; Decker, 2011; International Atomic Energy Agency, 2006). Such an institution would increase both accuracy and impartiality of results by allowing scientists to collaborate on attribution of nuclear-explosive material. The IAEA established the Illicit Trafficking Database (ITDB) in 1995, which reports incidents of nuclear material trafficking (International Atomic Energy Agency, 2006). If the powers of this body were to be expanded to include sharing of data on the isotopic characteristics of various nuclear processing

locations around the globe, it would be easier to attribute nuclear materials to their sources, and develop an effective deterrent.

Once nuclear material is attributed to a source, the United States can determine where non-state actors obtained nuclear material, and hold those states responsible. The IAEA gives states the responsibility for combating illegal trafficking of nuclear material (International Atomic Energy Agency, 2006). If states were to face fiscal or military consequences for nuclear material taken from their territory by non-state actors, they would have increased incentive to secure loose nuclear material (Kristo and Turney, 2012). Former US National Security Advisor Stephen Hadley has previously stated that the United States “will hold any state, terrorist group, or other non-state actor fully accountable for supporting or enabling terrorist efforts to obtain or use weapons of mass destruction, whether by facilitating, financing, or providing expertise or safe haven for such efforts” (Van de Velde, 2009, p. 691). However, there has been little follow through on this statement. Nuclear forensics can create a new kind of deterrence where states are held accountable for their nuclear material, and security can be achieved with a minimal arsenal.

Looking Forward: Policy priorities

Although the highest levels of the Obama Administration and Congress hold nuclear forensics forth as a policy priority, it is viewed as in addition to, rather than a vital part of, deterrence. By expanding the definition of deterrence beyond Cold War notions of force parity, the United States can ensure that its investments in its nuclear forces and infrastructure reflect the most relevant of current threats. The perceived necessity of a like- for-like deterrent is a direct product of an outdated concept of deterrence that fails to address what the administration itself defines as the greatest risk to US national security. Spending up to a trillion dollars to

modernize the nuclear triad will not address the threat of nuclear terrorism. It is uncertain it will even be effective in increasing the US deterrent, which has already almost removed the chances of a great power nuclear conflict.

Policy makers and authors are unsure about the effects of a powerful nuclear arsenal. Some, like Winston Churchill, have referred to nuclear weapons as the “means of preserving peace”¹ (Booth and Baylis, 1989, p. 239), while others including former Secretary of Defense Robert McNamara have famously stated that “nuclear weapons serve no military purpose whatsoever” (McNamara, 1983 p. 79). The latter group of scholars contend that “nuclear weapons neither crucially define a fundamental stability nor threaten severely to disturb it” (Mueller, 1988 p. 55). Therefore, the undeniable influence of nuclear weapons in security planning and strategy, they would argue, is misplaced (Wilson, 2008; Booth and Baylis, 1983; Pelopidas, 2015)². Due to the destructive power of nuclear weapons, force imbalances become almost meaningless because even an inferior nuclear arsenal can act as a deterrent. While this is still under debate, with new quantitative studies highlighting both stability and instability in the international system connected to nuclear weapons (Rauchhaus 2015), it is not clear that a modernized nuclear triad is necessary or desirable to increase US national security³.

A critical examination of Obama Administration’s FY2017 budget request shows a fundamental disconnect between the threats which face the US (as stated by the Administration itself and

¹ This is known as the “Nuclear Peace hypothesis”. For more read Waltz 1981 and 1990

² These scholars argue that the “Long Peace” after WWII was neither particularly long nor particularly peaceful. It is impossible to prove that without nuclear weapons a war would have broken out (ie proving the counterfactual). This period without a great power conflict can be linked instead to increasing economic connectedness or a period of war weariness (Wilson, 2008)

³ Examples of times when deterrence failed to reduce conflict include Israel and the Six Day War (Cohen, 1988) and border wars between Russia and China and China and India (Pelopidas, 2015)

outside sources) and its spending priorities. Despite a prominent emphasis on nuclear material security and nuclear terrorism during its first term in office, the Obama Administration has failed to critically evaluate the role of the nuclear triad in coming decades. The move to a like-for-like replacement of all triad capabilities comes at the expense of real improvements in nuclear forensics capabilities, which have the potential to become a new form of deterrent relevant to the post-Cold War world.

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