

# Conventional Versus Nuclear: Assessing Comparative Deterrent Utilities

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***Executive Summary:***

The 2010 Nuclear Posture Review (NPR) finds that nuclear weapons should play a decreased role in the U.S. national security strategy. It also says that so long as these weapons exist, the U.S. will maintain a strong and credible deterrent. Implicit in the NPR's assumption that deterrence can be maintained while the role of nuclear weapons is simultaneously decreased is the notion that modern conventional capabilities can replace nuclear weapons in some deterrence roles. This paper assesses whether the dual goals presented by the NPR are simultaneously achievable, or does decreasing the role and number of nuclear weapons automatically weaken a credible U.S. deterrent? It evaluates the comparative deterrent utilities of today's conventional weapons (and tomorrow's projected conventional capabilities) and nuclear weapons in an effort to understand whether conventional capabilities can in fact provide an equivalent deterrent in some deterrence functions, as some suggest they can. The paper compares conventional and nuclear capabilities according to their physical and technical attributes, the types of targets they can reach and destroy, and their psychological effects on decision makers' calculations—all elements that contribute to a strong and credible deterrent according to deterrence theorists and policymakers.

Through its comparative analysis, this paper finds that despite technological advances in U.S. conventional capabilities, the two forms of weapons studied remain unique in their ability to deter. It finds that regardless of which metrics were used to assess the deterrence values of the two weapons—the physical weapons themselves, the targets they threaten, or the perceptions they engender—conventional capabilities do not always provide an equivalent deterrent to nuclear deterrence. The findings of this paper are not grounds on which to dismiss the deterrent utility of conventional weapons entirely. Rather, by recognizing and embracing the limitations of non-nuclear weapons the U.S. can use the knowledge it has about conventional munitions to increase their deterrent utility and thereby potentially use them as a tool by which to decrease the U.S.' reliance on nuclear weapons in the future.

***Introduction:***

In 2010, the Obama Administration conducted a Nuclear Posture Review (NPR) in order to re-assess the role of nuclear weapons in the United States national security strategy. The review determined that a large-scale nuclear exchange is no longer an imminent threat to U.S. security, and therefore advised that nuclear weapons play a decreased role in the U.S. national security strategy. It also determined that the number of nuclear weapons the U.S. possesses should be reduced. In the same breath, the NPR asserts, “as long as nuclear weapons exist, the United States will maintain a safe, secure, and effective arsenal, both to deter potential adversaries and to assure U.S. allies and other security partners that they can count on America's security commitments.”<sup>1</sup> The remainder of the review is predicated on these twin pillars: on the one hand decreasing the role of nuclear weapons while simultaneously maintaining and even strengthening a credible deterrent on the other.

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<sup>1</sup> Department of Defense, *Nuclear Posture Review Report*, (Washington, D.C., April 2010), 1.

For the generations of scholars and policymakers steeped in the Cold War understanding of deterrence theory and strategy, these dual goals presented in the NPR appear contradictory. From this perspective, deterrence is synonymous with nuclear weapons. Thus, for these scholars and policymakers, the idea of strengthening deterrence while decreasing the role of nuclear weapons does not compute. Equally puzzling to this group is the NPR's emphasis on conventional weapons as a deterrent. Implicit in the NPR's assumption that deterrence can be maintained while the role of nuclear weapons is simultaneously decreased is the notion that conventional capabilities can replace nuclear weapons in deterrence roles:

Although nuclear weapons have proved to be a key component of U.S. assurances to allies and partners, the United States has relied increasingly on non-nuclear elements to strengthen regional security architectures, including a forward U.S. conventional presence and effective theater ballistic missile defenses. As the role of nuclear weapons is reduced in the U.S. national security strategy, these non-nuclear elements will take on a greater share of the deterrence burden.<sup>2</sup>

The idea that conventional weapons can be used as equivalent instruments of deterrence to nuclear weapons in certain missions contradicts decades of scholarship and policymaking on these issues. Scholars and policymakers alike have emphasized the significant differences between nuclear and conventional deterrence, arguing that conventional cannot replicate nuclear deterrence.

This paper intends to unpack these issues in an effort to understand (1) does decreasing the role and number of nuclear weapons automatically weaken a credible U.S. deterrent because nuclear weapons are superior instruments of deterrence? Or, (2) given their recent advances, can conventional capabilities replace nuclear weapons in some or all of their deterrence functions? Gaining better insight into these issues is critically important for several reasons. First, the findings of this paper have significant implications for the nuclear disarmament movement that has gained resurgence among scholarly and policymaking circles. Some of these arguments for nuclear disarmament are predicated on the assumption that conventional weapons can replace nuclear weapons in most if not all of nuclear weapons' traditional deterrence roles. This study's conclusion: that there continues to be an inherent difference between conventional and nuclear deterrence, despite recent advances in conventional technology, undermines the very basis of many of these nuclear abolitionists' arguments for nuclear disarmament. As is, the argument for nuclear disarmament has its fair share of critics. The conclusion that nuclear deterrence cannot be equated to or replaced by conventional deterrence may make the argument for disarmament all the less convincing. The conclusions drawn in this paper have important policy implications for the future of the U.S. nuclear posture and security strategy; the types of capabilities the U.S. should possess and invest in to deter today and tomorrow's threats; and the ways in which it should communicate and demonstrate its capabilities to

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<sup>2</sup> DoD, NPR, 19.

both adversaries and allies and partners in the future. These issues will be discussed at length further in the paper.

***Background:***

Over the course of fifty plus years of the Cold War, U.S. nuclear deterrence in all of its varying incarnations (Mutually Assured Destruction, Flexible Response, etc.) became institutionalized in the minds of scholars and policymakers alike. “It came to seem intrinsic to international politics, and omnipresent, natural, and continuous recourse in a dangerous environment, something governments engaged in as a regular feature of their existence.”<sup>3</sup> It is important to note that it was not just any form of deterrence, but a specific form, nuclear deterrence, which came to define state relations and guarantee strategic stability. Logically, the scholarship of the Cold War era reflected this academic, political, and cultural preoccupation with nuclear deterrence.<sup>4</sup> For scholars, the centrality of nuclear deterrence in the policy sphere meant this was a topic, which would likely be relevant for the foreseeable future, so naturally it was studied extensively. The opposite was also true. The prevalence of scholarship on deterrence theory and tactics in the scholarly realm reinforced the stratagem’s importance in the eyes of policymakers. “The simultaneous rise of the Cold War and the nuclear era gave rise to a body of literature and a way of thinking in which deterrence became virtually synonymous with nuclear weapons.”<sup>5</sup> Nuclear weapons, it was determined by many<sup>6</sup>, were the sole guarantors of stability and therefore the key to establishing and maintaining a strong and credible deterrent against adversaries. That said, it is important to note the shift from a strategy of “Massive Retaliation” in which the U.S. relied solely on nuclear weapons to deter Soviet conventional and nuclear aggression to “Flexible Response, which included conventional and nuclear elements.”<sup>7</sup> Despite this shift in strategy, however, much of the scholarship maintained its beliefs about the “uniqueness” of nuclear weapons, and the U.S. defense posture remained overwhelmingly nuclear.

The end of the Cold War combined with significant technological advances in U.S. conventional capabilities spurred a new debate over the role of nuclear weapons in deterrence. On one end of the spectrum, scholars and policymakers argued that new conventional capabilities such as cruise missiles and precision guided munitions (also referred to as “smart” weapons) offered an alternative to nuclear weapons in providing a credible deterrent in some nuclear deterrence missions.<sup>8</sup> Conversely, others in the

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<sup>3</sup> Patrick M. Morgan, *Deterrence Now* (New York: Cambridge University Press, 2003), 3-4.

<sup>4</sup> Morgan, *Deterrence Now*, 1-41.

<sup>5</sup> Gary L. Guertner, “Deterrence and Conventional Military Forces,” *Washington Quarterly*, 16 (Winter 1993), 1.

<sup>6</sup> This viewpoint can be found in both the policymaking community, particularly the military establishment, and is also expressed in the literature.

<sup>7</sup> Gerson, “Conventional Deterrence,” 34.

<sup>8</sup> Seth Cropsey, “Life after Proliferation; The Only Credible Deterrent,” *Foreign Affairs*, (March/April 1994), 14-20; William J. Perry, “Desert Storm and Deterrence,” *Foreign Affairs*, 70, (Fall 1991), 66-82; Paul H. Nitze, “Is it Time to Junk Our Nukes?” *The Washington Post*, 16 January 1994, C1; Guertner, “Deterrence and Conventional,” 141-151.

academic and policy communities maintained the traditional view that nuclear weapons were unique in their ability to deter nuclear attack and some forms of conventional aggression.<sup>9</sup> Operation Desert Storm served as an important litmus test for these new conventional technologies. Ultimately, their successful use in the Gulf War bolstered the positions of those arguing for an increased reliance on conventional weapons as a deterrent against conventional and some forms of WMD attack. “Following the remarkable success of sophisticated conventional firepower in Operation Desert Storm, then Undersecretary of Defense William J. Perry declared, ‘this new conventional military capability adds a powerful dimension to the ability of the United States to deter war.’”<sup>10</sup> For those who espoused an increased reliance of conventional deterrence, Operation Desert Storm served as a “spectacular demonstration of the potential effectiveness of smart weapons used in a strategic role.”<sup>11</sup> Proponents attributed the speed and decisiveness with which the U.S. was able to defeat the Iraqis as well as the comparatively low number of coalition losses to the deployment of these new non-nuclear capabilities.

In the two decades since the Gulf War, conventional capabilities have advanced further beyond the technologies deployed in Operation Desert Storm. As before, many in the policy and scholarly communities point to the most recent generation of technological innovations as evidence of conventional weapons’ increased or equivalent deterrence value in certain nuclear roles and missions.<sup>12</sup> Specifically missiles that fall under the Prompt Global Strike (PGS) mission as well as Massive Ordnance Penetrators (MOPS, “bunker busters”) and Massive Ordnance Air Blast bombs (MOABs) are hailed as the future of modern warfare and deterrence. Critics of conventional deterrence throughout the Cold War and beyond have pointed to the unmatched destructive power and delivery speed of nuclear weapons as a critical element of deterrence: two areas where conventional weapons simply could not compare to their nuclear counterparts. Nuclear weapons, for instance, travel at several times the speed of sound and can reach any target around the globe in an hour or less. By comparison, conventional weapons such as cruise missiles can take as long as 12 hours to reach certain long-distance targets.<sup>13</sup> There is a similar disparity in destructive power between the two types of weapons. Nuclear weapons can demolish societies and inflict incalculable damage. Conventional weapons, while powerful, cannot produce anywhere near the same level of damage. That is, until now, some suggest. New non-nuclear capabilities like CPGS and MOPs/MOABs are

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<sup>9</sup> Richard J. Harknett, “The Logic of Conventional Deterrence and the End of the Cold War,” *Security Studies*, 4 (Autumn, 1994): 89; William S. Huggins, “Deterrence After the Cold War: Conventional Arms and the Prevention of War,” *Airpower Journal* (Summer 1993) <http://www.airpower.au.af.mil/airchronicles/apj/apj93/sum93/huggins.htm>.

<sup>10</sup> Gerson, “Conventional Deterrence,” 35.

<sup>11</sup> The quote cited: Nitze, “Is it Time to,” 98. This sentiment is also expressed in the following articles: Perry, “Desert Storm”; Guertner, “Deterrence and Conventional,” 3-7.

<sup>12</sup> The following are but a few examples of this point of view: Elaine M. Grossman, “Senior U.S. General Sees High Nuclear Threshold,” *Global Security Newswire*, October 22, 2007; David E. Sanger and Thom Shanker, “U.S. Faces Choice on Weapons for Fast Strikes,” *New York Times*, April 22, 2010, online.

<sup>13</sup> Craig Whitlock, “U.S. Looks to Nonnuclear Weapons to Use as a Deterrent,” *The Washington Post*, April 8, 2010; United States Congress. Congressional Research Service, *Long Range Ballistic Missiles: Background and Issues*, by Amy M. Woolf, report R41464, 2, 7 (Washington, D.C., 2011).

designed to address these very disparities between conventional and nuclear weapons. As such, this next generation of non-nuclear weapons is attractive to conventional enthusiasts because they see these developments as bringing conventional weapons closer to their nuclear counterparts.

These changes in attitudes towards conventional weapons and nuclear deterrence are reflected in U.S. strategy, policymaking, doctrine, and nuclear posture. The Bush Administration “first raised the profile of long-range conventional strike missiles in the 2001 Nuclear Posture Review, when it introduced the ‘new triad’. This concept joined long-range nuclear-armed missiles with precision-strike conventional weapons in a category called offensive strike weapons.”<sup>14</sup> Prior to this shift, the U.S.’ long-range ballistic missiles (ICBMs and SLBMs) only carried nuclear warheads.<sup>15</sup> In 2006, the Navy announced plans to “deploy each of its 12 Trident submarines on patrol [...] with two conventional missiles equipped to carry four conventional warheads each. The remaining 22 missiles on each submarine would continue to carry nuclear warheads, the submarines would continue to patrol in areas that would allow them to reach targets specified in the nuclear war plan.”<sup>16</sup> Prior to this modification, all 24 missiles deployed on Trident submarines carried nuclear warheads. While a two-missile alteration may seem inconsequential, it is important to note that unlike other naval ships and submarines; the *Ohio* class Trident submarine was engineered “for one task—nuclear deterrence.”<sup>17</sup> As the most survivable leg of the nuclear triad, these submarines are a critical element of the U.S. nuclear deterrent. This alteration, therefore, indicates an important shift in strategic thinking in the post-Cold War policymaking community, which extends to the military’s very conception of the term “strategic deterrence”. Throughout the Cold War, U.S. military defined “strategic deterrence” as deterrence that could only be established by intercontinental nuclear weapons. In the years since the fall of the Soviet Union, the military has expanded the definition. Deterrence now, “requires a national strategy that integrates diplomatic, informational, military [conventional and nuclear], and economic powers” according to the Department of Defense.<sup>18</sup> This definition indicates a significant departure from the strictly nuclear conception of deterrence. These are but two examples of the post-Cold War shift in policy, which started to incorporate non-nuclear elements into the U.S. deterrence posture and thinking.

The current administration, more so than its predecessors, has moved away from the Cold War emphasis on nuclear deterrence, in favor of conventional capabilities as instruments for the U.S. deterrence posture. More specifically, it has identified the new conventional technologies, such as CPG and MOPs, as a means by which to reduce the role and number of nuclear weapons in the U.S. nuclear posture. This sentiment is perhaps most clearly articulated in the administration’s 2010 NPR mentioned above. The review

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<sup>14</sup> Woolf, *Conventional Prompt Global Strike*, 6.

<sup>15</sup> *Ibid*, 6.

<sup>16</sup> Woolf, *Conventional Prompt Global Strike*, 10.

<sup>17</sup> Commander W. Chinworth, “The Future of the Ohio Class Submarine” (Thesis, U.S. Army War College, 2006), 5.

<sup>18</sup> *Strategic Deterrence Joint Operating Concept* (Offutt Air Force Base, Neb.: United States Strategic Command, February 2004),3.

highlights the enlarged role of conventional weapons, which as the document states, will only become more significant as the role of nuclear weapons diminishes over time. It identifies the “development [of] non-nuclear prompt global strike capabilities” as one of its “key initiatives” going forward<sup>19</sup>. Officials throughout the administration have echoed the U.S.’ continued move towards non-nuclear capabilities as a means of decreasing the role and number of nuclear weapons. Speaking at the Second Annual Nuclear Deterrence Summit, then Under Secretary of State Ellen Tauscher reaffirms this view:

While nuclear weapons have a clear role, our deterrent extends beyond nuclear weapons. [...] It includes bolstering our conventional forces’ interoperability, their precision and reach. Our improving conventional capabilities make it possible to reduce our reliance on nuclear weapons for some targets and missions. As our conventional weapons become more precise, we do not have to cling to our nuclear weapons to accomplish our objectives.<sup>20</sup>

This expanded concept of deterrence extends to the military establishment. Senior military officials have expressed similar sentiments towards the future of conventional deterrence. Former vice Chairman of the Joint Chiefs of Staff, General James E. Cartwright for instance, has emphasized the strength of U.S. conventional capabilities and has argued in favor of their ability to take on roles traditionally reserved for nuclear weapons.<sup>21</sup> Given the current threat environment and panoply of potential adversaries, “deterrence,” Gen. Cartwright says, “can no longer be just nuclear weapons. It has to be broader.”<sup>22</sup>

Despite the increased attention given to conventional capabilities since the end of the Cold War, there have been few studies, which have thoroughly examined the utility of conventional weapons as instruments of deterrence in today’s threat environment. Fewer yet have appraised this topic in light of the newest technological advances in conventional weaponry. In fact, the number of studies researching conventional deterrence writ large can be counted on one hand. If the U.S. takes steps to implement the President’s goal of nuclear reductions and if the nuclear disarmament movement strengthens, it is likely that conventional capabilities and conventional deterrence will become all the more significant. With this in mind, this paper compares today’s (and future projected) conventional capabilities to the U.S. nuclear arsenal in an effort to understand whether the two capabilities are analogous in their ability to deter, as many suggest they are. The paper applies the findings of this comparison to the NPR to understand whether the document’s dual goals—decreasing the number and role of

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<sup>19</sup> DoD, NPR, 34.

<sup>20</sup> Ellen Tauscher, Remarks at the Second Annual Nuclear Deterrence Summit, 17 February 2010, <http://www.state.gov/t/us/136797.htm>.

<sup>21</sup> Gen. Cartwright’s view of conventional forces can be found in the following report published by a commission he chaired: “Global Zero U.S. Nuclear Policy Commission Report: Modernizing U.S. Nuclear Strategy, Force Structure and Posture.” Global Zero, May 2012. The following article discusses these views expressed by Cartwright as well: Elaine M. Grossman, “Senior U.S. General Sees High Nuclear Threshold,” *Global Security Newswire*, October 22, 2007.

<sup>22</sup> Whitlock, “U.S. Looks to Nonnuclear,” 2.

nuclear weapons while maintaining and strengthening deterrence—are realistically achievable aims. It closes with a discussion of some policy implications, which follow from the findings.

***Deterrence:***

The topic of deterrence has been the subject of significant study. Countless tomes have been produced, each detailing the intricacies of deterrence in theory and in practice. Given the centrality of deterrence as a tool of statecraft throughout the Cold War, “the basic concepts associated with strategies of deterrence are, to say the least, a well-worn topic.” That said, a brief discussion of these concepts is warranted as my comparison of nuclear and conventional forms of deterrence involves these basic tenets of deterrence logic and deterrence as a national security stratagem. The “fathers” of deterrence theory Glenn Snyder, Herman Kahn, and Thomas Schelling respectively define deterrence at its most basic conception as:

- “discouraging the enemy from taking action by posing for him a prospect of cost and risk outweighing his prospective gain.”<sup>23</sup>
- “specifying all alternatives available to the enemy, and then the various threats and promises we can make to influence his choice among these alternatives.”<sup>24</sup>
- “the exploitation of potential force. It is concerned with persuading a potential enemy that he should in his own interest avoid certain courses of activity.”<sup>25</sup>

Similarly, the Department of Defense defines deterrence as: “the prevention from action by fear of the consequences. Deterrence is a state of mind brought about by the existence of a credible threat of unacceptable counteraction.”<sup>26</sup> All of the aforementioned definitions include several fundamental principles of deterrence: the communication of a threat and the calculation of risks versus benefits. Put simply, deterrence involves “the use of threats to discourage action on the part of another.”<sup>27</sup> The threat being communicated by the party seeking to deter must be seen as credible in the eyes of the aggressor in order for deterrence to be effective. Credibility, therefore, is an indispensable element in the strategy of deterrence.

Various conceptions of credibility exist. For the purposes of this study, I will use the definition put forth by French nuclear strategist Pierre Gallois: “the product of two factors one of which, purely technical, represents the operational value of the military means of retaliation and the other, subjective, expresses the will of the menaced nation to

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<sup>23</sup> Glenn H. Snyder, *Deterrence and Defense: Toward a Theory of National Security* (Princeton, NJ: Princeton University Press, 1961), 3.

<sup>24</sup> Herman Kahn, *On Thermonuclear War* (New Brunswick, NJ: Transaction Publishers, 1960), 126.

<sup>25</sup> Thomas Schelling, *The Strategy of Conflict* (Cambridge, MA: Harvard University Press, 1960), 9.

<sup>26</sup> Department of Defense, *Dictionary of Military and Associated Terms* (Washington, D.C., 2012), 139.

<sup>27</sup> John Stone, “Conventional Deterrence and the Challenge of Credibility,” *Contemporary Security Policy* 33, no.1 (2012), 109.

use force.”<sup>28</sup> That is to say, a deterrent threat is credible only if the potential aggressor believes that decision-makers are committed to executing the threat if the communicated threshold is crossed, *and* that the deterring state actually possesses the capabilities to do so.

It is particularly important to highlight the distinction between these two elements that make up credibility (political will and capability), as they are relevant to the larger discussion of this paper—the comparison of conventional and nuclear deterrence. Conventional and nuclear deterrence are respectively better at fulfilling one of the two elements needed for credibility. There is little debate as to whether the U.S. or another nuclear state would launch a conventional response if its interests were seriously threatened. Conversely, the “pertinent question for credible nuclear deterrence is [...] whether one will use nuclear weapons.”<sup>29</sup> Considering both nuclear taboo<sup>30</sup> and the risk of retaliation in kind (if the aggressor or its allies possessed nuclear weapons), it is less convincing that the U.S. leadership would have the political resolve to launch a nuclear attack. The converse is true with regard to the second variable in credibility—capability. The destructive power of nuclear weapons is largely unquestioned, and equally important, widely understood. The same cannot be said for conventional weapons. “Due to the contestable nature of conventional weapons, it is a state’s capability to inflict costs that is more likely to be questioned by a challenger” than is its will to use the capability.<sup>31</sup> In short, states are more likely to use conventional weapons, but their adversaries may not believe the capabilities are potent enough to impose devastating costs. There is little doubt that a nuclear response would be massively destructive, but some argue that nuclear threats lack credibility because their owners are more hesitant to actually make good on these threats.

Another important distinction between conventional and nuclear deterrence must be noted. Scholars of deterrence theory differentiate between two types of deterrent threats: the threat to punish and the threat to deny.<sup>32</sup> These are also frequently referred to as deterrence by punishment and deterrence by denial or battlefield denial.<sup>33</sup> Deterrence by punishment is such that the threat communicated by the deterring party (if carried out) will inflict incalculable punishment—whether in the form of devastating losses to a state’s population, leadership, or destruction of infrastructure, military capabilities, and economy—onto the aggressor state.<sup>34</sup> By contrast, if a state is attempting to deter by

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<sup>28</sup> Pierre Gallois, *Strategie de l’age nucleaire* (Paris: Calmann-Levy, 1960) 151-2, quoted in John Stone, “Conventional Deterrence,” 110.

<sup>29</sup> Gerson, “Conventional Deterrence,” 42.

<sup>30</sup> Nina Tannenwald, *The Nuclear Taboo: United States and the Non-Use of Nuclear Weapons Since 1945* (Cambridge: Cambridge University Press, 2007).

<sup>31</sup> Harknett, “The Logic of,” 89; concept discussed in Gerson, “Conventional Deterrence,” 42-44.

<sup>32</sup> Originally discussed in classical deterrence theory scholarship in texts such as Snyder, *Deterrence and Defense*, 14; Schelling, *Strategy of Conflict*. Also discussed in scholarship focused on conventional deterrence such as: John J. Mearsheimer, *Conventional Deterrence* (Ithaca, NY: Cornell University Press, 1983), 14-15; Gerson, “Conventional Deterrence,” 42; Harknett, “The Logic of.”

<sup>33</sup> Term “battlefield denial” is used in Mearsheimer, *Conventional Deterrence*, 15.

<sup>34</sup> Defined in: Snyder, *Deterrence and Defense*, 14-16; Mearsheimer, *Conventional Deterrence*, 14-15; Gearson, “Conventional Deterrence,” 40.

denial, they must “convince the aggressor that it cannot accomplish its objectives within an acceptable time frame and cost.”<sup>35</sup> In other words, the aggressor must believe that attempts at achieving their goals will be thwarted. Some scholars limit this to the denial of goals on the battlefield, while others suggest that it can be expanded to include the denial of economic, political or diplomatic goals. The distinction between these two forms of deterrence is particularly relevant to this study because deterrence by denial is traditionally linked to conventional weapons whereas deterrence via punishment (as of the last sixty plus years) has been primarily associated with nuclear weapons.<sup>36</sup> This follows logically given the respective weapons’ capabilities.

Nuclear weapons’ devastating effects make them a good tool for deterrence by punishment but less so for denial. Conventional weapons conversely, scholars and policymakers have said, are not well equipped to deter via the threat of punishment. Why? Before the existence of nuclear weapons, deterring an adversary’s behavior by the threat of frustrating its aims and actions was the deterrence strategy du jour. Less important was the ability to prevent action by the threat of overwhelming pain. Nuclear weapons shifted this balance in favor of deterrence by punishment.<sup>37</sup> Yet, some of the newer conventional capabilities such as the Massive Ordnance Air Blast bombs were designed with an eye towards increasing conventional weapons’ blast effect, a function of deterrence by punishment, not denial.

Keeping these theoretical foundations in mind, the paper will now examine the comparative deterrent utilities of conventional and nuclear capabilities using three alternative perspectives: their physical and technical attributes, a target based approach, and perceptions of nuclear and conventional weapons.

### ***Comparing Nuclear and Conventional Deterrence:***

Much of nuclear strategy throughout the Cold War was shaped by one guiding principle—determining how many weapons were needed to successfully deter the Soviets. Strategists created complex calculations into which they would input the projected yield, precision levels of weapons, and desired targets, and would receive an estimate of the number of nuclear weapons allegedly necessary to deter Soviet aggression.<sup>38</sup> The Soviet Union has since fallen and the Cold War no longer exists and yet, this quantitative approach continues to drive thinking on deterrence requirements today. Technical properties of weapons are still used as the primary metrics by which to evaluate the quantity of nuclear weapons that are needed.<sup>39</sup> The debate over nuclear versus conventional deterrence has followed the same logic. Scholars and policymakers

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<sup>35</sup> Mearsheimer, *Conventional Deterrence*, 15.

<sup>36</sup> Ibid.

<sup>37</sup> Snyder, *Deterrence and Defense*, 8.

<sup>38</sup> McNamara knee of the curve calculation cited in: James Acton, *Deterrence During Disarmament: Deep Nuclear Reductions and International Security* (Washington, D.C.: Adelphi Paper, 2011).

<sup>39</sup> Keith B. Payne, “Future of Deterrence the Art of Defining How Much is Enough,” *Comparative Strategy* 29 (2010); this focus on capabilities when discussing deterrent utility of conventional weapons is discussed in: Richard K. Betts, “Conventional Deterrence: Predictive Uncertainty and Policy Confidence,” *World Politics* 37 (1985) 153-179.

postulate *which* weapons are needed to deter, according to their respective physical attributes,<sup>40</sup> and largely ignore the more subtle psychological elements of deterrence. While the technical capacities of the weapons are only one of several deterrence requirements, (and arguably the less significant of the deterrence requirements) it nevertheless merits discussion because it remains the dominant approach in the scholarship and policy thinking in assessing deterrence values.

#### *Analysis of Physical and Technical Attributes*

Since their inception, nuclear weapons have been considered unique in their ability to deter because of two technical attributes that make them particularly well suited for deterrence. These are speed of delivery and weapons effects (which include blast, fire, and radiation). Nuclear weapons allow states to counter threats with an almost immediate and devastating response; something existing conventional weapons are less capable of achieving. Even so, many conventional deterrence enthusiasts point to the strength of U.S. conventional forces as well as advances in U.S. non-nuclear capabilities as evidence that conventional weapons could replace nuclear deterrence in some deterrence missions. Others in the administration and academia place serious stock in future technologies such as the Conventional Prompt Global Strike to make a case for the increased value of conventional weapons as instruments of deterrence in the future. Upon closer inspection, however, this paper finds that even these technological advances in conventional capabilities do not equalize the two weapons' deterrent utilities.

It is no secret that nuclear weapons are awesomely destructive. This characteristic is part of what makes atomic weapons well suited for deterrence purposes. Deterrence of any kind, as noted above, involves dissuading a potential aggressor from attacking by convincing them that the risks triggered by acting will outweigh any potential benefits. Using this logic, nuclear weapons are valuable instruments of deterrence because the costs they inflict are exceedingly high. One of the smaller warheads in the current U.S. arsenal, the W76, has a yield of 100 kilotons.<sup>41</sup> As a point of comparison, the nuclear weapon deployed in the bombing of Hiroshima possessed a yield of 15 kilotons.<sup>42</sup> It killed one fourth of Hiroshima's population (approximately 70,000 people) in the initial blast. Another quarter of the population died shortly thereafter as a result of injuries sustained from the weapon's blast. The "blast totally destroyed everything within a radius of 1 mile."<sup>43</sup> The structures that were not decimated by the initial blast were destroyed by resulting fires. The nuclear "explosion almost completely destroyed Hiroshima's identity as a city."<sup>44</sup> While devastating, the effects of Hiroshima pale in comparison to the potential effects of today's nuclear warheads which are not only more powerful, but

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<sup>40</sup> Interview with Dr. Keith B. Payne, July 19, 2012.

<sup>41</sup> Hans M. Kristensen and Robert S. Norris, "U.S. Nuclear Forces 2012," *Bulletin of the Atomic Scientists*, <http://bos.sagepub.com/content/68/3/84.full>, table 1.

<sup>42</sup> John Malik, "The Yields of the Hiroshima and Nagasaki Nuclear Explosions," Los Alamos National Laboratory, September 1985, 1.

<sup>43</sup> United States Government, *The Atomic Bombings of Hiroshima and Nagasaki*, released October, 1996, 7.

<sup>44</sup> *Ibid.*

significantly more precise. It is difficult to conceive of a benefit that would outweigh this magnitude of costs for a potential aggressor.

By comparison, conventional weapons, while powerful, cannot match this level of destruction. The Massive Ordnance Air Blast (MOAB) bomb, first tested in 2003, is currently the largest non-nuclear weapon in the U.S. arsenal.<sup>45</sup> As such, it has been touted as a possible substitute for nuclear weapons in some nuclear deterrence missions. Those who consider blast yields an integral part of deterrence look to the MOAB's comparatively large yield as evidence of conventional weapons' increased deterrent value. When compared to other conventional warheads, the MOAB is considerably more destructive. Yet, when measured against nuclear yields, the MOAB's explosive power simply pails in comparison. It has a blast yield of approximately 11 tons.<sup>46</sup> The W76 warhead (one of the U.S.' smallest nuclear warheads) which has a yield of 100 kilotons (or 100,000 tons) is nearly ten thousand times more powerful than the MOAB. Thus, despite the technological advances to conventional weapons, when it comes to sheer blast potential, nuclear weapons remain in a class of their own.

That said, nuclear weapons are said to be unique not only because of their ability to destroy so much but also because of their ability to destroy so much, so quickly. The timing of the response also matters. As John Stone notes, "in principle, [...] no one category of weapons is more destructive than any other. Given sufficient time [...] one can achieve virtually anything that is possible for the most powerful nuclear weapons by other, less sophisticated means."<sup>47</sup> Carthage, he reminds, was decimated by the Romans using armaments nowhere near the sophistication of today's capabilities. Conventional weapons, while not nearly as destructive as nuclear weapons, possess the potential to impose massive costs on virtually any adversary if provided enough time. The various wars of the twentieth century stand as a testament to this. The World Wars resulted in a combined 110 million casualties.<sup>48</sup> Hundreds of European cities and industrial and military infrastructures were razed. The economies of many states needed to be rebuilt as a result. A more recent example can be found in the Gulf War. In a United Nations report to the Security Council, the Under Secretary General details the conditions in Iraq after Operation Desert Storm

The recent conflict has wrought near-apocalyptic results upon the economic infrastructure of what had been, until January 1991, a rather highly urbanized and mechanized society. Now, most means of life support have been destroyed or rendered tenuous.<sup>49</sup>

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<sup>45</sup> "GBU 43-B MOAB (Massive Ordnance Air Blast) Bombs-Precision and Guided Munitions," *Jane's Air-Launched Weapons*, January 21, 2010.

<sup>46</sup> Global Security.org, "GBU-43/B 'Mother of All Bombs' MOAB- Massive Ordnance Air Blast Bomb," <http://www.globalsecurity.org/military/systems/munitions/moab.htm> (accessed August 2, 2012).

<sup>47</sup> Stone, *Conventional Deterrence*, 112.

<sup>48</sup> This is an approximate figure, Keith B. Payne, "Maintaining Flexible and Resilient Capabilities for Nuclear Deterrence," *Strategic Studies Quarterly* (Summer 2011), 9.

<sup>49</sup> United Nations, "Report to the Secretary General on Humanitarian Needs in Kuwait and Iraq," 20 March 1995, cited in Stone, "Conventional Deterrence," 113.

If conventional capabilities can impose costs on the scale of nuclear weapons over time, why have they traditionally been considered inferior instruments of deterrence? The key, as noted before, is timing. For “the purposes of deterrence [...] what matters in practice is the ability to compress the generation of violence in time. The more readily one can achieve this, the more feasible it is to swamp defensive [...] thereby presenting an aggressor with the chilling prospect of suffering immediate and terrible costs that will certainly eclipse any political gains he might hope to make.”<sup>50</sup> Nuclear weapons have stood alone as the armament most capable of delivering insufferable costs in such a condensed period of time—a central reason as to why they have been considered the optimal tool for deterrence throughout the Cold War and beyond. While a conventional response can take days and weeks if not months to plan and execute, the Intercontinental Ballistic Missiles (ICBMs)<sup>51</sup> that carry nuclear warheads can reach any target in the world within minutes or hours of launch.<sup>52</sup>

The Conventional Prompt Global Strike (CPGS) program is said to address the discrepancy in timing between conventional and nuclear weapons, partially in the hopes that reducing the delivery time will increase conventional weapons’ deterrent utility. Though it is often discussed as a single weapons system, CGPS is in fact a myriad of various weapons systems that are being designed, developed, or re-worked under the CGPS umbrella—all with the goal of a quick conventional long-range strike capability. These “include bombers, cruise missiles, and ballistic missiles” from across the services. These efforts to close the timing gap between conventional and nuclear weapons have experienced mixed results. In November 2011, the Army and the Defense Advanced Research Projects Agency (DARPA) successfully flight-tested the Advanced Hypersonic Weapon (AHW), a “first-of-its-kind glide vehicle, designed to fly within the earth’s atmosphere at hypersonic speed and long-range.”<sup>53</sup> The vehicle traveled approximately 2,400 miles from its launch site in Kauai, Hawaii to the Reagan Test Site in Kwajalein Atoll at Mach 5 speeds. This indicates the weapon platform reached target in roughly 30 minutes. It should be noted that, however, that the successful test flight of the AHW, is an aberration, not the norm. Many more tests of other CGPS platforms have resulted in failure rather than success. The most recent example was the failed test of the Air Force’s X-51A Waverider, the third test failure of its kind.<sup>54</sup> Moreover, neither of the aforementioned platforms nor other CGPS weapons systems are close to deployment.

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<sup>50</sup> Quote from Stone, “Conventional Deterrence,” 112. This issue is also discussed in Harknett, “The Logic of,” 91-92; also expressed in Rhodes, “Conventional Deterrence,” 230.

<sup>51</sup> It is important to note that ICBMs are only one of several platforms in the U.S. nuclear triad used to deliver nuclear warheads.

<sup>52</sup> Woolf, *Long Range*, 3; “Air Force Space Command Prompt Global Strike Capability Request for Information” 29 January 2006 cited in: Federation of American Scientists’ “Global Strike: A Chronology of the Pentagon’s New Offensive Strike Plan” Hans M. Kristensen, March 15, 2005, 15; Whitlock, “U.S. Looks to”.

<sup>53</sup> U.S. Army, “Army Successfully Launches Advanced Hypersonic Weapon Demonstrator,” United States Armed Forces, [http://www.army.mil/article/69855/Army\\_successfully\\_launches\\_Advanced\\_Hypersonic\\_Weapon\\_demonstrator/](http://www.army.mil/article/69855/Army_successfully_launches_Advanced_Hypersonic_Weapon_demonstrator/) (accessed August 3, 2012).

<sup>54</sup> Woolf, *Long Range*, 33; Robert Beckhausen and Noah Shachtman, “Military’s Mach 5 Missile Fails, Again,” *WIRED*, August 15, 2012, <http://www.wired.com/dangerroom/2012/08/x-51a/>.

With this in mind, it seems somewhat premature for the 2010 NPR and other assessments to place such an emphasis on CPGS capabilities as a replacement for nuclear weapons in some deterrence missions.

It is clear that U.S. conventional capabilities—even with recent technological advances—are incomparable to nuclear weapons in their ability to destroy overwhelmingly and quickly. However, weapons’ yields and speed of delivery are but one way of assessing the comparative deterrent utilities of conventional and nuclear weapons. The two weapons’ deterrent values can also be examined by comparing the types of targets each is able to threaten. This kind of target-based formula was used throughout the Cold War to calculate and establish deterrence requirements as well.<sup>55</sup> For much of the Cold War era, deterrence was conceived as a function of nuclear weapons’ ability to “threaten the types of targets presumed important for deterrence.”<sup>56</sup> This logic continues to drive much of the thinking on deterrence requirements today, and in fact, has been used as evidence in favor of conventional deterrence taking the place of nuclear deterrence in some missions. Given its historical and current significance, it is important to examine the question posed in this paper from the target-based perspective as well.

### *Target-Based Assessment*

The operative question when using a target-based approach to evaluate the deterrent utility of conventional versus nuclear weapons is: are there targets that are important for deterrence purposes, which conventional weapons cannot destroy, but nuclear weapons have the ability to devastate? More specifically, are there targets that may be of significance to potential adversaries, which the U.S. may need to credibly threaten in order to deter these adversaries that can be destroyed by nuclear weapons but not by current U.S. non-nuclear capabilities? This is a challenging question to answer definitively. Why? Unlike the Cold War era, when strategists on either side of the Iron Curtain had a general understanding of the adversary’s valued targets, we now know very little about our adversaries, their perceptions of our deterrent, and the targets they value most. According to the target-based approach, without a deep understanding of the adversary, it is difficult to identify the exact targets that need to be threatened in order to dissuade a potential aggressor from acting. Nevertheless, there are some targets that are of likely importance for deterrence and bear mention, as they may be impervious to current U.S. conventional capabilities.

First are Iran’s hardened nuclear facilities. Several of Iran’s nuclear facilities are buried deep below the earth’s surface, and protected by layers of hardened materials such as reinforced concrete. As for their value, Tehran has invested considerable time, capital, and funding to construct and protect these sites. The fact that these facilities are buried and hardened suggests that they are of significance to Iran, and therefore may be an important target to be able to threaten if the U.S. seeks to deter Iran. Iran’s two known hardened facilities include Natanz and Fordow (Qom). The Natanz facility is “26 feet

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<sup>55</sup> Interview with Dr. Payne; Payne, Keith B. “The Future of Nuclear Deterrence.” Lecture, The Second Annual Nuclear Deterrence Summit, Alexandria, VA, February 17, 2010.

<sup>56</sup> Payne, “Future of Deterrence,” 218.

underground and protected by a concrete wall [which measures] 8 feet thick.”<sup>57</sup> In 2004 the roof of the facility was hardened with reinforced concrete and covered with 72 feet (21.9 m) of dirt.<sup>58</sup> The Fordow facility presents an even greater challenge as it was constructed under a small mountain near the holy city of Qom. Its main enrichment hall is buried deep below the surface of the mountain, and is “protected by an estimated 295 feet (89.9m) of rock.”<sup>59</sup> With this kind of protection, both facilities present a serious challenge for traditional conventional munitions. Historically, nuclear weapons have been the only capabilities in the U.S. arsenal able to threaten deeply buried targets like those in Iran. The U.S. has therefore been looking for alternatives to “going nuclear,” hence the U.S. military’s significant investment in its development of bunker-buster (i.e. earth penetrating) weapons.

Earth penetrator weapons are intended to destroy deeply embedded targets by “burrow[ing] into the ground some tens of feet before detonating, greatly increasing their ability to destroy buried targets.”<sup>60</sup> The U.S. has developed bunker-buster technologies with the explicit goal of being able to target hardened and concealed WMD facilities such as the Iranian Natanz and Fordow sites. Its most advanced earth penetrating technology, the GBU 57/B Massive Ordnance Penetrator (MOP), which was operationally deployed in July 2012 is said to provide the U.S. with a viable non-nuclear alternative against deeply buried and hardened targets. The 30,000 pound weapon is designed to penetrate 200 feet (60.9m) through 5,000 pounds per square inch (psi) reinforced concrete before detonating.<sup>61</sup> If these approximations are accurate, it is likely that the new MOP weapons could destroy or seriously damage the Natanz nuclear facility.

Experts in the field are significantly more skeptical about the MOP’s potential to destroy the Fordow site which lies three times deeper underground.<sup>62</sup> Some have described this facility as “impenetrable”; others describe the mission to destroy Fordow conventionally, even with the use of a MOP, as “impossible”<sup>63</sup>. There are several reasons compounding the difficulty of destroying the Fordow facility with conventional munitions. First, the U.S. does not know the exact location or size of the facility. Because the facility was built in secret, the U.S. has very little information on the exact depth of its centrifuge chamber, the size of the chamber, its location within the mountain, and the location of potential entrances or air chambers. Yet, this information is crucial when planning a mission using earth-penetrating technologies given the level of precision involved. In his assessment of Israel’s ability to strike Natanz and Fordow, Austin Long, describes the “unprecedented level of precision” needed to successfully strike Fordow, and discusses

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<sup>57</sup> Todd Lindeman and Bill Webster, “Targeting Iran’s Nuclear Facilities,” *Washington Post*, February 28, 2012, online.

<sup>58</sup> *Ibid.*

<sup>59</sup> *Ibid.*

<sup>60</sup> U.S. Congress, Congressional Research Service, *Bunker Busters’: Robust Nuclear Earth Penetrator Issues, FY2005-FY2007*, by Jonathan Medalia, CRS Report for Congress, 1-21 (Washington, D.C., 2006).

<sup>61</sup> Lindeman and Webster, “Targeting Iran’s.”

<sup>62</sup> “Iran Nuclear Sites May Be Beyond Reach of ‘Bunker Busters,” *Reuters*, January 12, 2012, online, <http://www.reuters.com/article/2012/01/12/us-iran-nuclear-strike-idUSTRE80B22020120112>.

<sup>63</sup> *Ibid.*

some related challenges. While Long examines the strike from an Israeli perspective, the difficulties are similar. The weapons “dropped from miles away and thousands of feet in the air” Long says “must arrive at very close to the same angle in order to create a pathway each subsequent weapon can follow. Otherwise much of the penetrating power of the bombs will be wasted.”<sup>64</sup> The other complication is the “spoil problem.” This refers to the potential for rubble from previous explosions to barricade the passageway for later penetrators, thereby inhibiting their ability to penetrate as deeply as intended.<sup>65</sup> As noted by skeptics, these aforementioned challenges are not negated by MOPs. Thus even with this new technology, it remains unclear as to whether the U.S. has the potential to destroy deeply buried targets like the Fordow facility using non-nuclear capabilities.

It is important to note that the Fordow facility is but one of several thousand hard and deeply buried targets worldwide, which are of strategic importance to the U.S., but may well be impervious to conventional weapons. The “Department of Defense (DOD) estimates that there are 10,000 known or suspected hard and deeply buried targets (HDBTs) worldwide as identified by the Defense Intelligence Agency. Of that number, about 20 percent have major strategic function. A U.S. military requirement exists for capabilities to hold these HDBTs at risk.”<sup>66</sup> Moreover, the number of HDBT facilities is increasing by roughly 10 percent each year.<sup>67</sup> These targets are intended to conceal WMD development and production facilities (as in the case of the Iranian sites); house WMDs and other weapons; protect political leadership; safeguard military infrastructure against attack; and shelter command and control capabilities.<sup>68</sup> The structures include deeply buried tunnel facilities as well as hardened surface structures such as bunkers. It is estimated that “many of the underground command, control and communications complexes and missile tunnels are between 100 and 400 meters (328-1312ft) deep, with the majority less than 250 meters (820ft) deep. A few are as deep as 500 meters or even 700 meters (1640-2296ft), in competent granite or limestone rock.”<sup>69</sup> Some of the facilities are “hardened to withstand pressures of about 1 kilobar (14,503 psi).”

The complex underground network of tunnels said to house and provide transport to some of China’s nuclear arsenal is an example of a deeply buried target with strategic significance to the U.S. China’s “Underground Great Wall” as it is referred to by the Chinese government, is comprised of 3,000 miles of tunnels which are buried hundreds of meters underground in the country’s more mountainous areas.<sup>70</sup> Given the depth and

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<sup>64</sup> Austin Long, “Can They?” *Tablet*, November 18, 2011, <http://www.tabletmag.com/jewish-news-and-politics/83631/can-they>.

<sup>65</sup> *Ibid.*

<sup>66</sup> The National Academies, National Research Council, Committee on the Effects of Nuclear Earth-Penetrator and Other Weapons, *Effects of Nuclear Earth Penetrator and Other Weapons*. (Washington, D.C., 2005), 9.

<sup>67</sup> *Ibid.*, 15.

<sup>68</sup> *Ibid.*

<sup>69</sup> The National Academies, *Effects of Nuclear*, 14.

<sup>70</sup> Hui Zhang, “China’s Underground Great Wall: Subterranean Ballistic Missiles,” *The Power & Policy Blog*, the Belfer Center for Science and International Affairs, Harvard Kennedy School of Government, posted January 31, 2012, [http://belfercenter.ksg.harvard.edu/publication/21991/chinas\\_underground\\_great\\_wall.html?breadcrumb=](http://belfercenter.ksg.harvard.edu/publication/21991/chinas_underground_great_wall.html?breadcrumb=)

concealment of these tunnels, the Chinese facilities are simply impenetrable by conventional weapons. The same can be said for other facilities identified by the DOD, which are discussed above. Even with the MOP, the U.S. stands little chance of damaging, let alone destroying, these deeply buried targets. As noted above, the MOP has the ability to penetrate 61 meters through 5,000 psi reinforced concrete, and 7.6 meters through 10,000 psi reinforced concrete.<sup>71</sup> This means that the MOP is only able to penetrate one fifth of the depth of the shallowest of the deeply buried targets when functioning at its best. In fact, some of the more deeply buried facilities may even be out of reach to current U.S. nuclear capabilities designated for HDBT missions. While hailed as a major achievement in earth-penetrating technology, there remain strategically significant targets, which remain impervious to even the most advanced bunker busters. Ultimately, when using a strictly target-based approach to assess the comparative deterrence value of non-nuclear capabilities, conventional weapons fail to provide an equivalent deterrent, as they are unable to threaten certain strategically significant targets.

The assessments using blast yields, timing, and target-based metrics to appraise deterrent value discussed thus far largely ignore the psychological and perceptive elements so crucial to establishing credible deterrence. Yet, these elements are critical to the establishment of a credible deterrent. The following section examines whether “conventional warheads lack the deterrent capabilities of nuclear warheads, even if they could damage many targets, because they lack the psychological effects associated with nuclear weapons. According to General Kevin Chilton, the current commander of U.S. Strategic Command, [these] would not be weapon[s] that ‘engenders fear, compared to the threat of a nuclear strike.’”<sup>72</sup> The appraisal that follows finds General Chilton’s statement to be true.

### *Analysis of Perceptions*

Thus far, this paper has examined the comparative deterrent utilities of conventional and nuclear weapons by measuring the tangible physical capabilities of the respective weapons and their functional ability to target, penetrate, and destroy. Yet, deterrence, it should be noted, is as much a function of the *perceived* threat as it is the actual tangible threat. In other words, the adversary’s understanding and conceptualization of the potential threat is as important in deterring them from action as is the threat itself.<sup>73</sup> With this in mind, the remainder of this paper’s appraisal will focus specifically on the differences in perceptions between nuclear and conventional deterrence and communication of the threat in each.

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<sup>70</sup> Experts’ (accessed August 10, 2012); Todd Lindeman, Gene Thorp and Bill Webster, “Evidence of China’s Nuclear Storage System,” *The Washington Post*, November 29, 2011, online.

<sup>71</sup> Lindeman and Webster, “Targeting Iran’s.”

<sup>72</sup> Carlo Munoz, “Chilton: Conventional PGS Cannot Replace Nuclear Deterrent Role,” *Inside the Air Force*, January 22, 2010 cited in Woolf, CRS report, 7.

<sup>73</sup> Department of Defense, *Deterrence Operations: Joint Operating Concept Version 2.0*, (Washington, D.C., 2006), 1-76.

Whether the result of their overwhelming centrality in U.S. policymaking throughout the Cold War or their significant role in popular culture, nuclear weapons have become emblazoned in the national and international consciousness as the most powerful weapons to exist. Fundamental to this near-universal recognition of nuclear weapons is a shared understanding of their effects. *Dr. Strangelove*<sup>74</sup> and Cold War era fallout shelters all paint a clear portrait of nuclear weapons' ability to inflict catastrophic consequences on the state unlucky enough to be their target. When stopped on the street it is likely that an average adult may not know which states currently possess nuclear capabilities. But, when asked to describe nuclear weapons, it is likely that most would recall images which illustrate the disastrous consequences precipitated by a nuclear attack—a mushroom cloud, the devastation of Hiroshima and Nagasaki, razed cities, and the effects of radiation poisoning. Much like the citizen on the street, chances are, most policymakers also possess a clear conceptualization of nuclear weapons and their effects. They understand that a nuclear attack would impose immense costs on their state.

The same cannot be said for conventional capabilities. Unlike with nuclear weapons, there is no shared conceptualization of conventional capabilities.<sup>75</sup> While nuclear weapons generally engender thoughts of mushroom clouds and Armageddon, conventional capabilities by contrast, do not elicit a shared conceptualization of their effects. The ubiquitous understanding of the destruction brought on by a nuclear attack is critically important to the successful functioning of deterrence. To understand why, it is instructive to revisit the basic logic of deterrence—potential aggressors are only deterred if they perceive the costs as outweighing any possible gains. For a rational decision-maker there are few imaginable gains that could exceed the costs imposed by a nuclear attack. Thus, nuclear weapons function particularly well as instruments of deterrence because of the magnitude of imposed costs and because these costs are generally understood. This is not the case with conventional weapons. “Not everyone will be equally impressed by any given conventional capability, and thus, not everyone will be deterred to the same extent by the threat of its employment against them.”<sup>76</sup> The perceptual ambiguity associated with non-nuclear weapons is therefore problematic when states are attempting to establish a strong and credible deterrent using conventional capabilities.

Understanding the underlying reasons behind this perceptual disparity between nuclear and non-nuclear weapons is critical if conventional weapons are to successfully take on an increased role in the U.S. deterrence posture. There are several that bear mention. First, nuclear capabilities are comprised of one form of weapon—nuclear weapons. Whether the threat is a 15 or 100-kiloton weapon, a “nuclear response” equates to incalculable damage in the eyes of the threatened state. Conversely, the U.S. and other powerful states possess an array of varying conventional capabilities. Thus, when threatening to retaliate with a “conventional response” it is unclear which conventional

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<sup>74</sup> *Dr. Strangelove or: how I Learned to Stop Worrying and Love the Bomb*, Directed by Stanley Kubrick. 1964.

<sup>75</sup> Edward Rhodes, “Conventional Deterrence,” *Comparative Strategy* 19 (2007); Stone, “Conventional Deterrence.”

<sup>76</sup> Stone, “Conventional Deterrence,” 117.

weapons will be used, how many will be used, how quickly they will be mobilized, etc. This is further complicated by the speed and frequency with which the U.S. advances, designs, and deploys new conventional technologies. Additionally, states' individual cultures, political systems, and other such factors can affect their policymakers' perceptions of conventional threats. Ultimately, "in the absence of culture-flattening fears associated with nuclear warfare, the role of local beliefs and values in the interpretation of threats becomes far more important."<sup>77</sup>

Perceptual differences of conventional and nuclear weapons are also a result of the differing ways in which each capability has been communicated to adversaries, allies, and partners. Policymakers understand that nuclear weapons are awesomely destructive because they have been shown this to be true. The nuclear bombings at Hiroshima and Nagasaki (in addition to hundreds of nuclear tests throughout the Cold War) showcased the destructive power of the U.S. nuclear arsenal. By contrast, the U.S. has done little to familiarize potential adversaries with its conventional capabilities, and yet, communication of a state's capabilities is a critical element of a successful deterrent, particularly with conventional weapons. Why is the communication of the threat more important in the case of conventional weapons? Given their incalculable destructive power, nuclear weapons speak for themselves. It is less important for them to be sold because "their massive destructive potential ensure[s] that they talk very eloquently in the language, and to the particular concerns of anyone who care[s] to contemplate them."<sup>78</sup> By contrast, states must work harder to express the potency of their conventional capabilities because perceptions of these weapons are hazier. This is particularly true with the case of new technologies like the MOAB or CPGS weapons. For the purposes of deterrence, it is not enough to develop and deploy a weapon. Rather, it must be marketed to its target audience. The more the potential of a capability is communicated, the clearer its perception will be in the mind of the adversary.

Because the above discussion of the "perceptions" of deterrence may appear highly theoretical, it is important to delineate how these perceptions play into real-world deterrence settings. There is significant evidence illustrating this conceptual difference between conventional and nuclear capabilities in the eyes of policymakers, and the effect this difference has on deterrence.<sup>79</sup> In unclassified and declassified statements, policymakers have alluded to or even directly spoken of instances in which their states were deterred from action only when faced with the prospect of nuclear war, compared to the threat of conventional war. For instance, when discussing India's decision to forego a full military response to the Pakistani terrorist attack on the Indian parliament, former Indian army Chief General Shankar Roychowdhury said: "Do nuclear weapons deter? Of course they do. Pakistan's nuclear weapons deterred India from attacking that country after the Mumbai strikes. [...] It was due to Pakistan's possession of nuclear weapons that India stopped short of a military retaliation following the attack on Parliament in

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<sup>77</sup> Ibid, 118.

<sup>78</sup> Stone, "Conventional Deterrence," 117.

<sup>79</sup> Examples discussed in interview with Dr. Payne.

2001.”<sup>80</sup> India’s restraint in the case of the Mumbai attacks is unique when considered in the larger context of Indo-Pakistani history. Much of these neighbors’ relations have been characterized by violent conflicts precipitated by catalyzing incidents similar to the Mumbai attack. That is, until both nations developed nuclear weapons capabilities, after which, the level of conflict has notably abated. The historic record in conjunction with Roychowdhury’s comments suggests that Pakistan’s nuclear deterrent has weighed heavily in (at least some of) the calculations of Indian actions towards their northern neighbor.

The Gulf War offers similar evidence of the effect of nuclear deterrence on decision-makers’ actions (and inactions). Four years following Operation Desert Storm, Iraqi officials admitted to U.N. Ambassador Rolf Ekeus “in December 1990 they loaded three types of biological agents into roughly 200 missile warheads and aircraft bombs that were then distributed to air bases and a missile site.”<sup>81</sup> When asked why the WMDs were deployed but never used, officials including former Iraqi foreign minister Tariq Aziz, cited the Bush administration’s threat that it would counter any use of chemical or biological weapons with a devastating response. More specifically, Aziz pointed to a meeting between the U.S. and Iraqis in which then Secretary of State James Baker “hinted at a U.S. response that would set Iraq back years reducing its industry to rubble.”<sup>82</sup> The Iraqis took this to mean a nuclear attack when in reality the U.S. had already decided against pursuing any nuclear actions.<sup>83</sup> Separate statements made by other former Iraqi officials substantiate Aziz’s admittances. In a 1996 interview focused on the Gulf War, former head of Iraqi military intelligence General Wafic al Sammarai affirmed that “some of the Scud missiles were loaded with chemical warheads, but they were not used. [...] we didn’t use them because the other side had a deterrent force.” Gen. al Sammarai speculated: “I do not think that Saddam was capable of taking a decision to use chemical weapons or biological weapons, [...] because the warning was quite severe, and quite effective. The allied troops were certain to use nuclear arms and the price [would have been] too dear and too high.”<sup>84</sup> Similarly, former Iraqi minister of military industry and Saddam Hussein’s son-in-law, General Hussein Kamal, reinforced Aziz and al Sammarai’s identification of nuclear weapons as the motivating factor for forgoing Iraq’s plans to use chemical weapons.<sup>85</sup> “There was no decision to use chemical weapons,” he said “for fear of retaliation. [We] realized that if chemical weapons were used, retaliation would be nuclear.”<sup>86</sup> While ultimately inaccurate, the Iraqi *perception* of a nuclear threat was sufficient to convince Saddam’s government to abandon its chemical

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<sup>80</sup> Quoted in “Pak’s N-Bomb Prevented Indian Retaliation after 26/11,” Department of State, *ISN News*, 10 March 2009.

<sup>81</sup> R. Jeffrey Smith, “U.N. Says Iraqis Prepared Germ Weapons in Gulf War; Baghdad Balked, Fearing U.S. Nuclear Retaliation,” *Washington Post*, August 25, 1995, A-1.

<sup>82</sup> Smith, “U.N. Says.”

<sup>83</sup> Ibid; Payne, “Maintaining Flexible,” 9-10.

<sup>84</sup> Statement by Gen. Wafic al Sammarai in “Frontline no. 1407: The Gulf War, Part I,,” January 9, 1996, transcript, <http://www.pbs.org/wgbh/pages/frontline/gulf/oral/samarrai/1.html>.

<sup>85</sup> Payne, “Maintaining Flexible,” 9-10.

<sup>86</sup> Quoted in “General Hussein Kamal UNSCOM/IAEA briefing,” August 22, 1995, Amman, Jordan, [http://www.globalsecurity.org/wmd/library/news/iraq/un/unscom-iaea\\_kamal-brief.htm](http://www.globalsecurity.org/wmd/library/news/iraq/un/unscom-iaea_kamal-brief.htm)

and biological intentions. Beyond the Indian and Iraqi cases, other examples offer additional evidence illustrating the specific influence of nuclear deterrence on decision-makers' calculations. The fear of nuclear retaliation, for instance, had a profound influence on the decisions of Kennedy, Khrushchev, and Brezhnev in the Cold War when all three found themselves on the brink of major conflict.<sup>87</sup>

All of the aforementioned cases are particularly significant because they offer a unique insight into the calculations conducted by policymakers when they are faced with conventional versus nuclear threats. Policymakers' calculations highlight the differences in decision-makers' perceptions of conventional and nuclear deterrents, and demonstrate the effects these differing perceptions have on state behavior. The fact that these policymakers all make specific reference to the introduction of a *nuclear* threat as *the* motivating factor in their decisions to forgo contemplated actions is instructive. It strongly suggests that a purely conventional threat on the part of the U.S. would not have deterred the use of chemical weapons on the part of the Iraqis nor a full-scale conventional attack in the case of India. Moreover, all of the officials cited above allude to the fact that the devastating costs precipitated by nuclear retaliation were simply too high when compared to potential gains—a level of costs that could not have been delivered by a purely conventional response. This too implies a difference in the perception of conventional and nuclear threats.

### ***Summary***

What has the above assessment revealed? This paper's side-by-side examination of conventional and nuclear deterrence draws several important conclusions. First, regardless of which metrics are used to assess the deterrence values of conventional and nuclear weapon—the physical weapons themselves, the targets they threaten, or the perceptions they engender—conventional capabilities do not provide an equivalent deterrent to nuclear deterrence in all scenarios. In all of the areas that matter in the establishment of a strong and credible deterrent, conventional weapons fall short. In order for deterrence to frustrate an adversary's aims, the costs imposed by the communicated threat must outweigh any possible gains. Nuclear weapons impose incalculably devastating costs in a compressed window of time, which is the principal reason why they have served as such valuable instruments of deterrence. Despite the recent technological advances intended to augment the blast effects and speed of conventional capabilities, nuclear weapons continue to stand alone in their ability to imperil the very existence of a state in a near-instantaneous attack. But, weapons-effects are only one element involved in establishing a strong and credible deterrent. Yet, alternative perspectives used to assess deterrence values yield similar conclusion. The target-based Cold War school of thought tells us that to be able to provide a strong and credible deterrent, the weapons being used to deter must be able to destroy certain targets, which have important deterrence value. A close appraisal of targets reveals that there are some targets which are likely important for deterrence, but cannot be destroyed by conventional weapons alone. Thus, according to this perspective, conventional weapons

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<sup>87</sup> Ned Lebow and Janice Stein, *We All Lost the Cold War*, (Princeton, NJ: Princeton University Press, 1994) cited in Payne, "Maintaining Flexible," 9.

fail to pass the test. The same can be said for the third perspective used—the enemy’s perceptions of the threat. The adversary must see the threat as one in which the costs outweigh the benefits. With nuclear weapons, there is little room for interpretation—for rational decision makers, the prospect of nuclear war exceeds any other fathomable aims. This was substantiated by the Iraqi and Indian cases. In both instances, the threat of nuclear retaliation was enough to dissuade both states from acting, whereas the prospect of a conventional response was not. These above conclusions have important policy implications for U.S. national security strategy as well as its strategic posture.

### ***Policy Implications***

#### *Implications for the NPR Goals and Administration Policy*

As noted earlier, the 2010 NPR rests on twin goals—on the one hand it states that the U.S. will work towards decreasing the role and number of nuclear weapons in U.S. national security strategy, while maintaining and even strengthening the U.S. deterrent on the other. Implicit in these two seemingly contradictory goals is the assumption that as the role of nuclear weapons decreases, the role of conventional capabilities will simultaneously increase and non-nuclear weapons will thereby replace nuclear weapons in deterrence missions traditionally reserved for nuclear capabilities. The NPR concludes, “the growth of unrivaled U.S. conventional military capabilities [...] enables [the U.S.] to fulfill its objectives, at significantly lower nuclear force levels with reduced reliance on nuclear weapons.”<sup>88</sup> What is more, the U.S., it states, can do so “without jeopardizing our traditional deterrence and reassurance goals.”<sup>89</sup> Yet this paper finds that by all measurable standards, conventional weapons are less equipped than nuclear weapons to create a strong and credible deterrent (using the traditional metrics employed to measure “strong” and “credible” deterrents). More importantly, it finds that the two forms of deterrence are inherently very different. As such, the findings of this paper call into question the fundamental assumptions on which the NPR is based. They suggest that decreasing the role of nuclear weapons in favor of conventional capabilities *does* in fact jeopardize deterrence in some deterrence missions.

#### *Implications for the Nuclear Disarmament Movement*

This paper’s findings also have important implications for the current nuclear disarmament movement. While the logic behind the NPR’s dual goals may prove flawed, the document nevertheless recognizes the utility of nuclear weapons in certain missions such as deterring a nuclear attack. By contrast, those who ascribe to the current push for nuclear disarmament advocate for the complete elimination of nuclear weapons in all of their deterrence roles. Some wish to abolish nuclear weapons because of their potential to inflict catastrophic casualties on the human race.<sup>90</sup> Others use the logic employed by the

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<sup>88</sup> DoD, NPR, 6.

<sup>89</sup> Ibid.

<sup>90</sup> The moral argument calling for nuclear disarmament is widely cited. The following are but a few examples: Sverre Lodgaard, “Towards a Nuclear Weapon-Free World,” *Daedalus* (Fall 2009); Shultz et al.,

administration and the NPR, citing the strength of U.S. conventional forces and recent technological advances made to U.S. conventional capabilities as a solution to the deterrence problem.<sup>91</sup> If conventional deterrence is able to effectively take the place of nuclear deterrence, the argument goes, then the utility of nuclear weapons decreases as can our reliance on them. Nuclear abolitionists see this as a win-win scenario—deterrence is maintained and nuclear weapons can be phased out of the U.S. defense posture. The conclusions of this paper, however, challenge the logic driving this argument. Nuclear weapons are *sui generis*, and do establish a unique form of deterrence. To assume that the U.S. can maintain an equivalent deterrent with conventional capabilities is therefore misguided.

Both the NPR and disarmament movement's treatment of the issue is indicative of an attitude toward conventional weapons, which has taken hold since the end of the Cold War. This is the notion that conventional weapons and conventional deterrence can be used as replacements for nuclear weapons and the related assumption that the two forms of deterrence are therefore interchangeable in some instances. This perspective is inherently flawed and therefore problematic because it ignores the fundamental differences between nuclear and conventional deterrence, which are explored in this paper. An extension of this flawed logic is the presumption that nuclear deterrence strategies, which worked to maintain strategic stability throughout the Cold War, can be used as a template for conventional deterrence strategies today.<sup>92</sup> Again, this view is misguided. The forces that stabilized relations between the U.S. and Soviet Union cannot be replicated by simply placing conventional weapons in once-nuclear missions. Conventional weapons will not function as nuclear weapons did in creating an equivalent deterrent by virtue of the fact that they have been enhanced to be more powerful and faster. Instead, it is critical to treat nuclear and conventional deterrence as two distinct forms of deterrence. Part of this understanding is knowing how and when conventional deterrence works, and when it does not. This means that in some missions, against some adversaries, the two weapons' roles may overlap, while in others they may not.

### ***Policy Prescriptions/ Looking Ahead***

What do the conclusions drawn by this paper imply for the path forward? “Where does conventional deterrence strategy go from here?”<sup>93</sup> Will any future moves by this Administration or any other which decreases the number and role of nuclear weapons automatically weaken the U.S. deterrent? Is a posture that includes nuclear weapons an inevitable destiny? I would argue that the findings of this paper are not grounds on which to dismiss the deterrent utility of conventional weapons entirely. Yes, this paper has found that conventional and nuclear capabilities are innately different. Nor are conventional capabilities equal instruments of deterrence as determined by this study. Nevertheless, by recognizing and embracing the limitations of non-nuclear weapons, we

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“A World Free of Nuclear Weapons.” *Wall Street Journal*, January 4, 2007; advocacy groups such as the Council for a Livable World.

<sup>91</sup> Cite people who make the argument for abolition because of conventional weapons

<sup>92</sup> Harknett, “Logic of,” 105.

<sup>93</sup> *Ibid.*

can use the knowledge about conventional weapons to increase their deterrent utility and thereby potentially use them as a tool by which to decrease the U.S.' reliance on nuclear weapons in the future.

Thus far, proposals debating ways to narrow the gap between conventional and nuclear weapons have typically focused on making the munitions bigger, more precise, and faster.<sup>94</sup> I would argue this is perhaps the wrong approach. As previously discussed, we have far to go before conventional capabilities match nuclear weapons in terms of their yield. More to the point, why would we seek conventional munitions with yields anywhere close to nuclear yields? This would defeat the very purpose of nuclear abolition by replacing one awesomely destructive weapon with another.<sup>95</sup> Rather than focus efforts on enhancing the power of non-nuclear capabilities, it would be more prudent for the U.S. to instead develop a marketing strategy for the conventional capabilities that it currently possess and those it will develop in the future. If the U.S. seeks to enhance the value of its conventional deterrent, it needs to communicate the power of its conventional capabilities overtly and often. A marketing strategy could involve both rhetoric promoting U.S. conventional capabilities as well as military maneuvers and field demonstrations, which convey the lethality and speed of these non-nuclear weapons.<sup>96</sup> It is particularly important for the U.S. to acquaint potential adversaries with new weapons or those of its weapons, which are deployed with less frequency.<sup>97</sup>

Efforts to convey the U.S.' conventional deterrent must convince potential adversaries that a conventional response would be both immediate and costly. The immediacy of the response is critical. Why? Conventional deterrence fails when adversaries believe they can achieve a *fait accompli*. Thus, the U.S. can further bolster its conventional deterrent by persuading potential enemies that quick and decisive victories against the U.S. are not a possibility. The CPGS weapons, when ready to be deployed, will be an important factor in enhancing this element of conventional deterrence because they will extend the U.S.' reach in a compressed period of time and will thereby allow the U.S. to more easily deny adversaries a quick victory. Until then, the U.S. should take steps to enhance its local and regional presence. This will demonstrate to adversaries that the U.S. can and will respond quickly to threats anywhere in the world.

Nuclear weapons have been called great "equalizers" because they tend to deter adversaries irrespective of the adversary's culture, political system, etc. All states are said to similarly perceive nuclear threats. Throughout the Cold War, with a national security strategy dominated by nuclear deterrence, it was less important to understand these kinds of nuances about one's adversaries. By contrast, a state's culture, leadership, political

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<sup>94</sup> This emphasis on technology is discussed in: Elaine M. Grossman, "Conventional Arms No Substitute for Nuclear Strategic Command Official," *Global Security Newswire*, February 29, 2012, online; Cropsey "Life After Proliferation"; Keith B. Payne, *The Great American Gamble* (Fairfax, VA: National Institute Press, 2008), 233-4.

<sup>95</sup> Interview with Dr. Adam Lowther, Air Defense University, June 2012.

<sup>96</sup> Rhodes, "Conventional Deterrence," Stone, "Conventional Deterrence," 117.

<sup>97</sup> Stone, "Conventional Deterrence," 117 references this point made in Rhodes, "Conventional Deterrence," 235.

system, and intentions can affect the way that it perceives a conventional threat.<sup>98</sup> With this in mind, any U.S. strategy that involves an increased reliance on conventional deterrence must be accompanied by serious efforts to gain a deeper understanding of its adversaries. If the U.S. does not have a clear sense of its adversaries' goals and sensitivities, how can it expect to create an effective deterrent? In other words, how can the U.S. expect to deter if it does not know what deters? It cannot. And yet, at present, the U.S. knows less about its opponents than ever before.<sup>99</sup> The U.S.' singular focus on a unitary adversary throughout the Cold War—the Soviet Union—simplified deterrence calculations for U.S. strategists. Both the U.S. and USSR had a general sense of each other's capabilities, intentions, and targets of value, which offered insight as to how to deter the other. Today's complex international system in which the U.S. faces a diversity of threats but knows little about its adversaries' aims, motivations, and capabilities, is one in which understanding deterrence requirements is becoming increasingly difficult. What is more, the ambiguities of the post-Cold War world exacerbate the inherent flaws of conventional deterrence explored in this paper.<sup>100</sup> Thus, it is imperative that the U.S. work towards gaining a more subtle understanding of its potential adversaries with the goal of strengthening conventional weapons' value as tools of deterrence.

While critical, the policy suggestions presented above cannot be implemented overnight. It takes time to shape adversaries' perceptions of one's capabilities, and build an understanding of their goals and motivations. What, then, do the findings of this paper mean for the *current* U.S. deterrence posture? Given the multiplicity of threats facing the U.S. and its superficial understanding of its adversaries it is important for the U.S. to maintain a wide range of capabilities, both nuclear and non-nuclear. In the meantime, it is imprudent for the U.S. to undercut its deterrent by paring down its broad spectrum of deterrent capabilities, particularly at a time when each individual adversary may require a different combination of the U.S.' deterrent capabilities in order to be thwarted. As long as we are not certain what deters the U.S.' adversaries of today and tomorrow, the U.S. should continue to develop and maintain its diverse spectrum of capabilities. Even if the U.S. undertakes efforts to bolster its conventional deterrent (such as those prescribed above), in the end, nuclear deterrence will likely remain unique. Thus, if the current multifaceted threat environment persists and the U.S. wishes to maintain a stable and credible deterrent, nuclear weapons it seems will need to play some role in the U.S. force posture.

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<sup>98</sup> Rhodes, "Conventional Deterrence," 234-236.

<sup>99</sup> Ford, Christopher. "Arms Control and Deterrence Beyond." Remarks, 2011 USSTRATCOM Deterrence Symposium, Omaha, Nebraska, August 3, 2011; Payne, "The Future of Deterrence."; Harknett, "The Logic of," 105-107.

<sup>100</sup> Harknett, "The Logic of," 105-107.