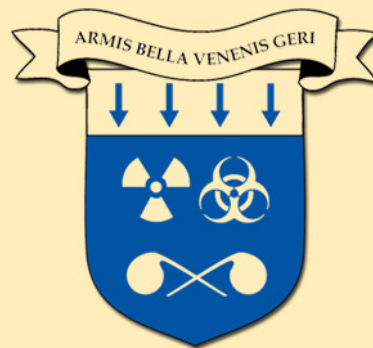


# Strategic Deterrence Research Papers

Academic Year 2016

Edited by  
Dr. Mel Deaile  
Mr. Al Mauroni



US Air Force  
Center for Unconventional Weapons Studies  
Maxwell Air Force Base, Alabama



**STRATEGIC DETERRENCE  
RESEARCH PAPERS**

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# Disclaimer

The opinions, conclusions, and recommendations expressed or implied in this publication are those of the author and do not necessarily reflect the views of Air University, the Air Force, or Department of Defense.

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# Preface

**D**uring the Academic Year 2016, the US Air Force Center for Unconventional Weapons Studies (CUWS) hosted a Deterrence Research Group elective for the Air War College and Air Command and Staff College. Sixteen students (eight from each school) with broad and diverse backgrounds participated in this course, engaging in critical thinking about the nature of strategic deterrence and the role of nuclear weapons under strategic deterrence policy. The class took two field trips: one to Los Alamos National Laboratory and Sandia National Laboratory to discuss the technical side of nuclear weapons, and the other to Washington DC to engage with the Office of the Secretary of Defense policy makers, Joint Staff and Air Staff offices, the State Department, and the Central Intelligence Agency.

Dr. Mel Deaile, Dr. Blake McMahon, Col Charles Patnaude, and Mr. Alan Felser were the teachers of this elective and faculty advisors for student research, in particular for the Air War College professional study papers. The topics of research ranged from nonproliferation agreements to maintaining deterrent capabilities across the globe. The results of the best student papers are presented in this book.





## CHAPTER 1

# Introduction

In May 2015, the US Air Force released its Strategic Master Plan, outlining the strategic vectors and imperatives set by the Air Force leadership. The intent of the plan was to provide direction to the continuous strategy, planning, and programming process. The first of the five strategic vectors mentioned in the Strategic Master Plan was to provide effective 21<sup>st</sup> century deterrence: “The nuclear mission remains the clear priority of Air Force leaders, but the Air Force also offers many additional capabilities to deter a wide range of actors.”

The deterrence vector consisted of two objectives—to provide strategic nuclear deterrence through an effective and credible nuclear enterprise, and to deter other strategic attacks (including chemical and biological weapons and the means to conduct attacks in space and cyberspace) through non-nuclear capabilities. Key to this vector is the observation that the core concepts of deterrence do not change—while some might deride the concept of deterrence as an outmoded doctrine of the Cold War, it is very much a relevant and necessary tool of government power in today’s complex national security environment. One mandate, then, is for the Air Force to develop unique capabilities to deter a wide range of actors, both nation-states and transnational violent extremist groups, using both lethal and non-lethal means. Key to the success of this effort is the education and development of senior leaders on how strategic deterrence can be applied against potential adversaries, including the development of tailored strategies that can be expertly wielded in crisis situations.

The Air University chartered a “deterrence research task force” in 2015 to support development of the deterrence vector in the Air Force Strategic Master Plan, and to ensure that the Airmen develop the necessary critical thinking skills to successfully address strategic deterrence issues.

The purpose of the deterrence research task force is to educate officers from the Air War College and Air Command and Staff College on deterrence strategy and nuclear weapons issues, and to develop critical research on operationally relevant policy issues. After nearly 70 years of thinking on nuclear deterrence—from Brodie through Schelling and Kahn, and on to new thinkers like Brad Roberts, Keith Payne, and Jeffery A. Larsen—policy-makers and Airmen of the 21<sup>st</sup> century will continue to use deterrence theory to frame their analysis and to make policy choices based on strategic stability or strategic deterrence and the extension of nuclear deterrence to friends and allies. Either theoretical frame will profoundly shape the adaptation of national security strategy, foreign policy, research and development, and budgetary decisions to manage an ever complex and volatile security environment.

The deterrence research task force works closely with the Air Force Global Strike Command to address strategic policy and operational issues, and to offer a launching point for a broader discourse on strategic deterrence, both within and without the command. In Academic Year 2016, the students developed a diverse set of topics that range across the deterrence spectrum. The seven monographs in this series interrogate the classic nuclear deterrence theories to apply the concepts of strategic stability, extended deterrence, nonproliferation and arms control, and C2 to analyze some of the current and future challenges confronting the Air Force.

Sean Conroy offers an analytical review of the implementation of UN Security Resolution 1540 toward identifying the key factors that are important to compliance, in particular the behavior of actors working within the regime. Christopher Russell examines the possible impact of reductions in the US nuclear arsenal as a result of the New Strategic Arms Reductions Talk (START), in particular the relationship between deterrence and nuclear stockpile levels. Robert Ewers looks to identify how nuclear weapons support the concept of strategic stability during what is now called the “Second Nuclear Age.” Allen Cohen seeks to identify the possible benefits and political implications of extending US nuclear deterrence to the Middle East, as currently exists in Europe. Daniel Lindsey examines the role of fighters designed for nuclear weapons employment (dual-capable aircraft) and the integration of their use in joint doctrine for nuclear weapons. Finally, Matt Caylor looks at the possible

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vulnerability of nuclear deterrence strategy to cyber attacks. These contributions to the deterrence literature enable us to start the vital discussions required to make certain the US Air Force maintains the necessary capabilities to ensure the success of deterrence policy and associated US national security objectives.



## CHAPTER 2

# Keeping up with the Neighbors: Nonproliferation and Implementation of UNSCR 1540

Sean F. Conroy

No threat poses as grave a danger to our security and well-being as the potential use of nuclear weapons and materials by irresponsible states or terrorists.

—2015 US National Security Strategy

This institution was founded because men and women who came before us had the foresight to know that our nations are more secure when we uphold basic laws and basic norms, and pursue a path of cooperation over conflict.

—President Barack Obama,  
remarks to the UN General Assembly, 28 September 2015

The international community has long sought to limit the spread of weapons of mass destruction (WMD). The most significant efforts have been codified as multilateral agreements signed by states—“security regimes” such as the Nuclear Non-Proliferation Treaty (NPT), the Convention on Toxin and Biological Weapons (BTWC), and the Chemical Weapons Convention (CWC).<sup>1</sup> Even though efforts to negotiate and ratify these agreements occur at the international level, their success depends on the behavior of actors within the domestic sphere. Non-state groups, and even individuals, have stated their desire to acquire WMD, and this possibility remains a key concern of US policy.<sup>2</sup> There is therefore a gap

between the obligations incurred by national governments and the potential actions of individuals and groups that have not made these commitments on their own. In order to bridge this gap, states can create domestic enablers to support international regimes. Among these domestic enablers is codification of the regime's tenets in domestic law.

In order to understand whether non-proliferation (NP) regimes are likely to be effective, we must identify the factors that allow for the domestic enforcement of these agreements. This effort is part of a larger project that seeks to answer the following question: *What predicts the success of the NP regime?* While this regime is comprised of a number of international agreements, this research examines one in particular: United Nations Security Council Resolution (UNSCR) 1540. This resolution is a rare mandate enforceable through the collective security authority found in Chapter VII of the UN Charter.<sup>3</sup> It also contains specific provisions mandating implementation in a way that should make their efforts easier to observe. The resolution applies to all states, and targets potential sub-national actors (e.g. terrorist groups) who may seek to acquire WMD. Consequently, it serves as a good case for examining the relationship between international legal responsibilities and domestic enforcement efforts.

This analysis uses novel quantitative data on regime implementation and compliance. The results reveal a significant link between the nature of a state's domestic politics and the breadth and depth of its commitments to an important non-proliferation effort. The implications for policy are clear: actors who seek to control the spread of WMD must be mindful of the domestic context in which these regimes are enforced. However, before analyzing UNSCR 1540, I examine security regimes more generally in order to highlight the benefits and challenges associated with these agreements.

Regimes are one way in which groups, including states, attempt to influence behavior across many different activities. As Stephen Krasner notes, regimes are "sets of implicit or explicit principles, norms, rules, and decision-making procedures around which actors' expectations converge in a given [issue] area of international relations."<sup>4</sup> Harald Müller observes that "a regime exists when all four elements can be identified and when the regime controls enough variables in a given issue area to affect (if obeyed) parties' behavior by channeling or terminating self-help with

regard to the regulated variables.”<sup>5</sup> Regimes attempt to influence state behavior across many different activities with the goal of predictability and cooperation; each regime consists of rules governing the behavior of the regime members. Both states and non-governmental organizations can be members of regimes, though the legal authority to enforce agreements rests predominately with states. This research considers the nonproliferation regime and the institutions—specifically the UN—that support it.

The actors that Krasner describes are sovereign nations.<sup>6</sup> Regimes are important because they enhance the operation of the international political system in the absence of a centralized government.<sup>7</sup> Regimes can thus cause friction within and among states because they limit state sovereignty by placing constraints on state action.<sup>8</sup> Regimes govern the actions of the members within the specific issue-area, serving as a political authority within the international system in that they represent a convergence of “principles about fact, causation, and rectitude, as well as political rights and obligations that are regarded as legitimate.”<sup>9</sup>

Regimes can also affect non-state actors because they “order and absorb the mobilized participation of new and old states as well as non-state actors.”<sup>10</sup> Regimes cover many areas in which non-state actors are among the primary participants. The ability of a regime to influence both states and non-state actors highlights the fact that regimes focus on specific issue-areas rather than merely providing broad guidance for state behavior: “The boundaries of issue areas are determined by the perceptions of the participating actors.”<sup>11</sup>

There are three types of regimes, each determined by the circumstances under which they were formed: spontaneous, negotiated, and imposed.<sup>12</sup> Spontaneous regimes simply reflect a convergence of expectations among members.<sup>13</sup> Negotiated and imposed regimes are the two types of regimes generally found in the security arena. The characteristics of a negotiated regime include high transaction costs in initial bargaining, and a tendency toward greater restrictiveness over time.<sup>14</sup> The nature of a negotiated regime is that of contract, which specifies the obligations of the parties across a domain of potential circumstances.

Hegemons, or even victors in a war, sometimes impose regimes. The hegemon’s influence is among the forces behind an “uninterested”

nation's accession to a regime.<sup>15</sup> The ability of a number of powerful states, such as those that comprise the permanent five (P-5) in the United Nations Security Council (UNSC), to impose conditions on other UN member states is similar. As Young observes, "where several actors share power as well as a strong interest in the activity...regimes are likely to emerge from bargains struck among small groups of key players."<sup>16</sup> This situation is the one encountered by the regime. A small number of actors on the UNSC—mostly the P-5—are those with the most influence in a regime that encompasses a large majority of the world's nations.

Ideally, regimes form around shared interests; cooperation in the management of such interests yields better results than could be obtained through individual policy pursuit.<sup>17</sup> When a regime forms around a security issue like non-proliferation, member nations make an assumption that every other member nation places the same value on the issue.<sup>18</sup> Discussion of the formation and content of regimes must therefore look at both the convergence of the power behind the regime formation and the legitimate social purpose for the regime.<sup>19</sup> In the case of the counter- and non-proliferation regimes, the social purpose of preventing the proliferation of WMD drew the sources of power together.<sup>20</sup> Collaboration among nations is a way to prevent any individual nation from maximizing strength by gaining access to and increasing their share of WMD. Thus, security regimes demand that individual nations give up security potential they could realize through WMD possession.

### **UNSCR 1540**

In September 2003, President George W. Bush spoke at the United Nations, advocating a deeper commitment to non-proliferation. He called for nations "to criminalize the proliferation of weapons of mass destruction, to enact strict export controls consistent with international standards and to secure any and all sensitive materials within their own borders."<sup>21</sup> The content of his speech mirrored the US-conceived Proliferation Security Initiative (PSI) and led to UNSCR 1540.

UNSCR 1540 is a unique Security Council initiative. First, this resolution is one of general applicability, rather than being narrowly focused on a single nation or event. It provides an umbrella over the other non-proliferation treaties—mentioning them by name—but does not



require a nation to accede to any treaty. UNSCR 1540 calls upon member nations to establish and enforce domestic legislation to counter the proliferation of WMD to non-state actors. This encroachment of state sovereignty is unique in that, rather than relying on the process by which a state accedes to a treaty and implements the treaty's provisions, the state's membership in the United Nations compels it to adopt the provisions.<sup>22</sup> Third, UNSCR 1540 specifically references terrorists and targets non-state actors. The UNSC adopted UNSCR 1540 under Chapter VII of the UN Charter, entitled *Action with Respect to Threats to the Peace, Breaches of the Peace, and Acts of Aggression*. Chapter VII is that part of the UN Charter authorizing the use of force to settle disputes.<sup>23</sup> UNSCR 1540 was only the second time that the UNSC used this authority for a functional threat (as opposed to a state-specific threat); the previous time was the UNSCR 1373, a post-9/11 counter-terrorism measure.<sup>24</sup>

Using Chapter VII was a source of conflict in the enabling debates; some nations voiced alarm that compliance through coercion was now a possibility.<sup>25</sup> The United States, Spain, France, Chile, New Zealand, Japan, and Mexico put forth the following argument: Chapter VII is the foundation for subsequent actions and the invocation of Chapter VII authority in the resolutions sends a serious political signal to the members of the United Nations General Assembly.<sup>26</sup>

What are the practical expectations of UNSCR 1540? First, each nation has reporting requirements; nations will report, fail to report, or fail to report with a reason.<sup>27</sup> Second, under UNSCR 1540 nations must adopt enabling legislation or report on its pre-existence. Again, they may simply do nothing. Finally, nations must enforce the legislation, which may not happen. None of the steps presupposes the others; a nation with pre-existing legislation may fail to report and yet enforce anyway. Using UNSCR 1540 as a framework for measuring regime compliance allows for clear definition of outcomes and, more importantly for this paper, provides a better measurement of regime success. In addition to requiring adoption of domestic enabling legislation, UNSCR 1540 contains reporting requirements, and a recognition of the norms contained in the NPT, CWC, and BTWC.

The literature strongly suggests that the nature of the domestic constituency, if supportive of the regime, contributes to increased compliance. In a review of international regime theory, Stephan Haggard

and Beth Simmons argue that “foreign policy is integrally related to domestic structures and processes.”<sup>28</sup> These same structures control the ability of the state to sustain compliance to regimes to which it has committed.<sup>29</sup> A later quantitative study by Simmons using compliance with the International Monetary Fund’s standards and obligations found that nations with principles based on rule-of-law were more likely to comply with the commitments inherent in regime membership.<sup>30</sup> In this study, domestic respect for laws translated to international respect for laws and fulfillment of regime requirements because nations wanted to avoid damaged reputations.<sup>31</sup>

Emilia Justyna Powell and Jeffrey Staton use the Convention against Torture as a lens through which to study compliance with the human rights regime.<sup>32</sup> They make a rule of law assumption that “states that possess judicial institutions that protect property rights are likely to have judicial institutions that protect rights generally.”<sup>33</sup> Their findings also support the premise that once a state commits to an international agreement, respect for rule of law, as evidenced by a judicial system with independence and enforceability to protect property rights, will increase the chances the state will comply with that agreement.<sup>34</sup>

UNSCR 1540 is one piece of the NP regime. This paper analyzes the assumption that domestic legislation will prove effective in non-proliferation efforts as member nations institutionalize its tenets. Respect for the rule of law is critical for the success of the NP regime. I predict that nations exhibiting a strong commitment to the rule of law will have increased compliance with both the NP regime and implementation of UNSCR 1540:

**H1a:** Countries that value the rule of law—strong court system, sound political institutions, plans for orderly succession, stable contract enforcement, and independent judiciaries—will exhibit increased compliance with the NP Regime.

**H1b:** Countries that value the rule of law—strong court system, sound political institutions, plans for orderly succession, stable contract enforcement, and independent judiciaries—will exhibit increased implementation with UNSCR 1540.

Nations that are members of a regime are in agreement on the principles and norms of the regime. The existence of UNSCR 1540 and

many agreements supporting nonproliferation indicates the presence of an international norm that disfavors proliferation of WMD.<sup>35</sup> Yet the regime does not exhibit a universal commitment to counter- and non-proliferation. Enforcement is nonexistent in some states and uneven in others, especially in comparison to other nations. This paper argues that increasing scores on NTI's Nuclear Materials Security Index (NTI Index) is a good proxy for institutionalization, and works to validate the idea that increased institutionalization helps predict regime success.

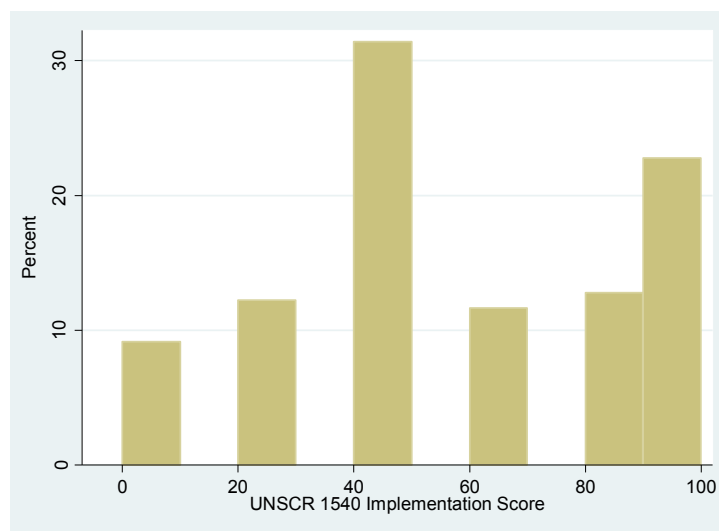
The hypotheses distinguish between compliance and implementation. Compliance with the principles and norms of a regime and institutionalizing the regime's tenets is possible without formally becoming a signatory to a regime. The opposite is also true: a nation can exhibit full implementation of the regime's rules and procedures without compliance with the principles and norms. These hypotheses therefore attempt to capture predictors of a nation's intent and actions more comprehensively.

### **Testing Compliance**

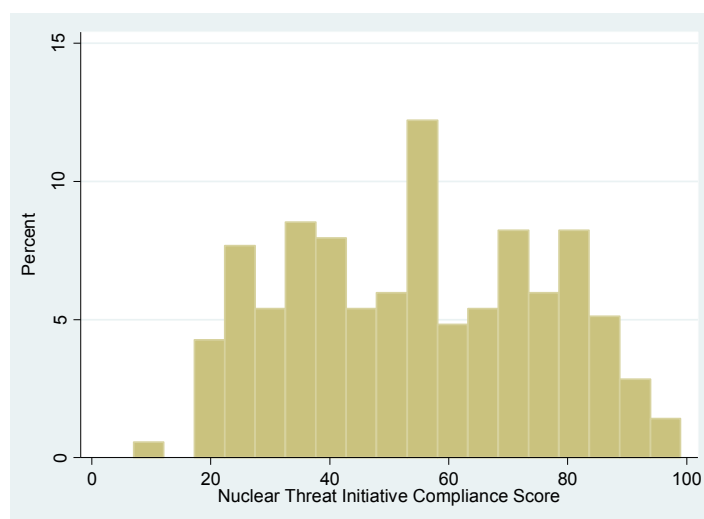
Based on the previously discussed characteristics of successful regimes, I have identified quantitative and qualitative predictors of NP Regime compliance. The dependent variable highlights the implementation of UNSCR 1540: increased barriers to proliferation due to an obligation for states to enact domestic legislation to counter proliferation of WMD to non-state actors. Regression analysis is used to identify the factors that predict changes in compliance with nonproliferation norms across the domain of states in the international system. The NTI Index serves as a proxy for a nation's compliance with the NP regime. Compliance encompasses the measures that states take to ensure effectiveness of international accords in domestic law.<sup>36</sup> Increasing compliance levels are evidence of institutionalization of the principles and norms of the NP regime.<sup>37</sup> The NTI Index separates 176 nations into two categories: 25 states with one kilogram or more of weapons grade nuclear materials and 151 states with less than one kilogram. For the 25 states with one kilogram or more, the NTI Index assesses the following: (1) Quantities and Sites, (2) Security and Control Measures, (3) Global Norms, (4) Domestic Commitments and Capacity, and (5) Risk

Environment. For the 151 nations below the threshold level of nuclear material, the NTI Index only measures the last three categories. This score is qualitative (except for amount of nuclear material), and is derived from 19 indicators and 56 sub-indicators within the five categories. Appendix A contains a complete breakout of indicators and sub-indicators. Lending to strength and standardization, in a further attempt to remove human error, the sub-indicators are generally binary. Scores can range from 0 to 100, though no nation is at either of those extremes. The NTI Index covers 2012 and 2014.<sup>38</sup> Figure 1 illustrates the distribution of the NTI Index.

Among the 19 indicators in the NTI Index is UNSCR 1540 Implementation (in the Domestic Commitments and Capacity category), which includes UNSCR 1540 reporting and the Extent of UNSCR 1540 Implementation as sub-indicators. Consequently, I coded a second dependent variable based on this indicator (NTI\_1540\_n). This variable is ordered with values from 0 to 100 in intervals of 10. Hypothesis 1b uses a different dependent variable, a narrow look at the implementation of UNSCR 1540—one of the 19 components of the greater NP regime. Hypotheses 1b predicts increased UNSCR 1540 implementation due to increased rule of law. Figure 2 depicts the distribution of the dependent variable based on UNSCR 1540 Implementation.



**Figure 1: Distribution of the NTI Index**



**Figure 2: Distribution of the UNSCR 1540 Implementation Variable**

The variables that predict compliance—as expressed in the NTI Index—encompass two categories. These measures include both a rule of law indicator and regional proportional compliance.

The rule of law indicator is Contract Intensive Money (RoLCIM). Clague, et al. studied the relationship between contract enforceability and national economic performance. They define CIM as “the ratio of non-currency money to the total money supply.”<sup>39</sup> In a study of human rights treaty compliance, Powell and Staton use a Contract Intensive Money (CIM) measure, as well as three measures developed from the US Department of State’s annual human rights reports. The CIM measure illustrates the trust that a nation places in the judiciary to enforce property rights such as those envisioned in a contract.<sup>40</sup> CIM measures cash-to-contract obligations and determines a rule of law ratio based on the risk investors are willing to assume. Higher numbers represent a greater trust from “citizens, domestic and international businesses and banks,” in the governmental system to enforce banking obligations.<sup>41</sup> Hard currency is less necessary for investment protection in states with a high CIM score. This measure directly relates to the Powell and Staton study that found norm compliance in rule of law states containing a judiciary that strongly enforced property rights.<sup>42</sup>

I created this variable using the same methods as Clague, et al. Using the International Monetary Fund's (IMF) International Financial Statistics (IFS), I created the CIM measure used in this analysis by subtracting M1 from M2 then dividing by M2 [(M2-M1)/M2.] The US Federal Reserve defines M1 as the most liquid component of the money supply, as it primarily consists of cash and other on-demand forms of money.<sup>43</sup> M2 includes elements of money that are less liquid, such as savings deposits, money markets, and mutual funds that are not as suitable for rapid exchange.<sup>44</sup> The variable derived from these measures of money directly relates to the rule of law and the confidence investors have in the enforcement of contract. In countries with weaker rule of law indicators, individuals will be more reliant on cash.

In addition, I test the effect of Competitiveness of Participation (ParComp), a variable from the Polity IV dataset. This variable measures the level of participation by parties and individuals opposed to the ruling regime the governmental system allows. It is coded from 1 to 5, which corresponds to the following categories that indicate national government situations spanning from no competitiveness through regular participation by enduring political groups: repressed, suppressed, factional, transitional, or competitive.<sup>45</sup> Patricia Weitsman and George Shambaugh used the ParComp variable in a study of governmental risk-taking between 1816 and 1992. They found a strong association between conservative governmental decision-making and democracies—specifically those democracies with highly competitive political systems.<sup>46</sup> De Mesquita, et al. found a significant relationship between increased participation and competition and compliance with human rights norms.<sup>47</sup> I predict that increased competitive participation within a nation's government will predict increased compliance with the nonproliferation norm and specifically with UNSCR 1540 implementation.

In studying the commitment and compliance with the International Monetary Fund's Article VIII requirement for unrestricted exchange (essentially disallowing restriction on things like imports or cash outflow), Beth Simmons found that across both the international system and the region, commitment increased as the proportion of committed states increased.<sup>48</sup> I use the Proportion of Regional compliance measure to control for the effects of regional influence. These variables—calculated from different data for each DV—predict that as the compliance

percentage of states in a region rises, additional states will also comply. Essentially, a high percentage of adhering nations will yield additional adherence through increased institutionalization, locking in the principles and norms of the NP regime. I predict that regional compliance in the NP regime, specifically in implementing UNCSR 1540, will have a positive effect within the region. As a result, I develop another measure that averages the compliance or implementation scores for each major region in the world (North America, South America, Europe, Africa, Middle East-North Africa, and Asia-Pacific).

This dataset contains information on 180 countries—the vast majority of the world’s nations. With this dataset, I am trying to determine which factors influence members of the risk set to comply with the mandates of UNSCR 1540. What follows is the regression form of the models:

$$\mathbf{H1a: Compliance}_{(NP\ Regime)} = \beta_0 + \beta_{Rule\ of\ Law} + \beta_{Competitive\ Participation} + \beta_{Regional\ Compliance} + e$$

$$\mathbf{H1b: Compliance}_{(UNSCR\ 1540\ Implementation)} = \beta_0 + \beta_{Rule\ of\ Law} + \beta_{Competitive\ Participation} + \beta_{Regional\ Compliance} + e$$

Appendix B summarizes all of the variables and sources within this paper, illustrating problems encountered with using temporal proximity to the observations. The rule of law measure, contract intensive money, suffers from lags in reporting and calculations within a nation’s monetary system. In time, these data will improve through reporting and investigation. This model captures the essential predictors of regime implementation and allows the researcher to identify a nation’s shortcomings when that nation fails to comply with the tenets of the regime. With a better understanding, one can credibly determine whether a regime is, or has the potential to be, successful.

## Analysis

I ran a number of regression analyses on the data. Because the dataset is small, I chose to run them with a bootstrap in order to increase the reliability of the results.<sup>49</sup> Both analyses exhibited solid goodness-of-fit indicators; however, this result may be from the effect of the regional

compliance control variable. Table 1 summarizes the results from the regression analysis.

**Table 1: Regression Results**

Variable	H1a: NTI Index					H1b: 1540 Implementation Score				
	Coeff	Std Error	P> z	95% Conf Interval		Coeff	Std Error	P> z	95% Conf Interval	
Contract Intensive Money	13.101	4.614	.005	4.058	22.144	4.432	6.099	.467	-7.522	16.386
Competitiveness within Govt	.264	.064	.000	.139	.388	.297	.113	.008	.076	.517
Regional Compliance Mean	.966	.041	.000	.886	1.047	1.112	.062	.000	.991	1.233
Constant	-2.526	3.627	.486	-9.635	4.583	-4.667	5.511	.397	-15.469	6.136
Goodness of Fit	R <sup>2</sup> = .580		Adjusted R <sup>2</sup> = .574			R <sup>2</sup> = .613		Adjusted R <sup>2</sup> = .608		

Hypothesis 1a uses compliance with the NP regime as a dependent variable (NTI Index). This hypothesis predicts that as a nation exhibits a greater respect for the rule of law, compliance with the NP regime will increase. The results from the regression analysis lend support to this hypothesis and indicate a strong relationship between compliance with the NP regime and all three variables: rule of law, political competitiveness, and regional proportional compliance. In those nations that have a strong judiciary and enforcement processes such that monetary transactions need not be cash only, we can expect a high compliance with the NP regime. Nations that must depend on cash transactions—since credit lacks enforceability—will exhibit lower rates of non-proliferation compliance. There is also a strong relationship between compliance and the political competitiveness within a government, indicating that democracies with a high competitive participation score will tend to comply with the NP regime. The control variable of regional compliance indicates a strong regional relationship among nations. Nations tend to mirror their region and either increase NP regime compliance with their neighbors or remain



low as a region. These findings are consistent with prior uses of these variables. A nation that exhibits strong rule of law tendencies through an enforceable banking system should tend to comply with international norms. The risks of non-compliance, including sanctions, are too costly.

Despite the strength of the relationship between contract intensive money and non-proliferation compliance, this variable does not have a statistically significant impact on UNSCR 1540 implementation (see Table 1/H1b). The fact that money is safe, and contracts are enforceable in functioning courts, does not predict implementation with the specifics of UNSCR 1540. However, the competitive political participation and regional mean variables retain significance. These results indicate that a nation could be respectful of the rule of law and be a competitive participatory democracy, yet fail to implement UNSCR 1540, the same as its neighbors.

## **Discussion and Conclusions**

This paper began with a look at the NP regime and a relatively new part of it, UNSCR 1540, which is a mandate for UN member nations to enact and enforce domestic legislation criminalizing the proliferation of WMD and dual-use technologies by non-state actors. The proliferation of WMD by non-state actors presents a threat to all nations, and to the system as a whole. Successful nonproliferation efforts benefit all. This paper contains a new approach to measuring and finding the factors important to compliance. Using the Nuclear Threat Initiative Index and select subcategories, the analyses focus on the role of rule of law and the competitiveness of participation, with regional implementation as a control.

The results of this paper indicate a strong relationship between each of these indicators and a nation's compliance with the overall NP regime. As nations become more stable in monetary transactions, their compliance will increase. For most nations, stable transactions and good governance leads to additional international transactions—potentially opening markets and opportunities for trade. Similarly, a political system that includes and encourages competition among many participants supports compliance with the NP regime.

Using the specific implementation of UNSCR 1540 as a dependent variable yielded surprising results: the rule of law measure was insignificant, yielding explanatory power to the presence of a participatory government and the regional compliance. This result indicates that a nation can institutionalize the non-proliferation norms, yet fail to comply with the specifics of implementation. Using Krasner's definition as a lens to observe these results reveals nations in concert with the principles and norms, but not complying with the rules and decision-making procedures.<sup>50</sup> Of course, compliance with the latter two categories is easier to measure.

While these results are positive, the data and analysis are not without criticism. The years studied are 2012 and 2014. For many nations, the 2014 data are either preliminary or incomplete. The IMF continues to refine the information based on their normalizing and verification procedures following receipt. Additionally, the Eurozone is not as homogenous as the data make it appear. The 19 members of the Eurozone report similar rule of law measures, which though accurate, does not reveal anything about the differences among these nations. The NTI Index itself has differences in that there are additional subcategories in the scores for the 25 current nations, and 31 nations in 2012 that possess 1 kilogram or more of weapons grade nuclear material. Breaking out the Eurozone and the nuclear nations and conducting analyses on them and the remaining nations will potentially reveal differences in analysis results.

The results in this paper lend support to liberal theories of peace and the international system. Regimes dilute the central power of a state and limit the effect of self-interested decision-making without directly challenging sovereignty.<sup>51</sup> The passing of UNSCR 1540 drives directly toward domestic politics and, necessarily, a liberal view of the international system. Liberal institutionalists believe that regimes bridge the differences between states and encourage increased dialogue. UNSCR 1540 specifically does not demand accession to any treaty; however, the mandate for domestic legislation limits the sovereignty of some nations and places them on the path to compliance with the NP regime. This paper contributes to liberal theories of international relations because the results tie domestic actions to system cooperation for a common good.

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## Notes

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11. Manfred Efinger and Michael Zürn, "Explaining Conflict Management in East-West Relations: A Quantitative Test of Problem-Structural Typologies," in *International Regimes in East-West Politics*, ed. Volker Rittberger (London: Pinter, 1990), 68.
12. Oran R. Young, "Regime Dynamics: The Rise and Fall of International Regimes," in *International Regimes*, ed. Stephen D. Krasner (Ithaca, NY: Cornell University Press, 1983), 97.
13. *Ibid.*, 98.
14. *Ibid.*, 105.
15. Keohane, *After Hegemony*, 50-51, 77 (see n. 7). Keohane recognizes that hegemons are not always necessary for regime formation, noting that "even if no hegemon exists, a small number of strong actors may be able to accomplish...[the] task together."
16. Young, "International Regimes," 355 (see n. 6).
17. Keohane, *After Hegemony*, 79, 80 (see n. 7).
18. Robert Jervis, "Security Regimes," in *International Regimes*, ed. Stephen D. Krasner (Ithaca, NY: Cornell University Press, 1983), 177.
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31. *Ibid.*, 820.

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33. Emilia Justyna Powell and Jeffrey K. Staton, "Domestic Judicial Institutions and Human Rights Treaty Violation," *International Studies Quarterly* 53, no. 1 (March 2009): 159.

34. *Ibid.*, 167.

35. Keohane, *After Hegemony*, 58 (see n. 7).

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38. Southland and Pitts-Kiefer, *NTI Nuclear Materials*, 2, 9, 37-39, 56-58 (see n. 3). The Domestic Commitments and Capability category specifically includes UNSCR 1540 Implementation, Domestic Nuclear Materials Security Legislation, Safeguards Adherence and Compliance, and Independent Regulatory Agency.

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## **Appendix A**

### **NTI Index Categories, Indicators, and Sub-indicators**

#### **1. QUANTITIES AND SITES**

##### **1.1. Quantities of Nuclear Materials**

###### **1.1.1. Quantities of nuclear materials**

##### **1.2. Sites and Transportation**

###### **1.2.1. Number of sites**

###### **1.2.2. Bulk processing facility**

###### **1.2.3. Frequency of materials transport**

##### **1.3. Material Production and Elimination Trends**

###### **1.3.1. Material production and elimination trends**

#### **2. SECURITY AND CONTROL MEASURES**

##### **2.1. On-site Physical Protection**

###### **2.1.1. Mandatory physical protection**

###### **2.1.2. On-site reviews of security**

###### **2.1.3. Design basis threat**

###### **2.1.4. Security responsibilities and accountabilities**

###### **2.1.5. Performance-based program**

##### **2.2. Control and Accounting Procedures**

###### **2.2.1. Legal and regulatory basis for material control and accounting (MC&A)**

###### **2.2.2. Measurement methods**

###### **2.2.3. Inventory record**

###### **2.2.4. Material balance area(s)**

###### **2.2.5. Control measures**



**2.3. Insider Threat Prevention**

**2.3.1. Personnel vetting**

**2.3.2. Frequency of personnel vetting**

**2.3.3. Reporting**

**2.3.4. Surveillance**

**2.4. Physical Security During Transport**

**2.5. Response Capabilities**

**2.5.1. Emergency response capabilities**

**2.5.2. Armed response capabilities**

**2.5.3. Law enforcement response training**

**2.5.4. Nuclear infrastructure protection plan**

**3. GLOBAL NORMS**

**3.1. International Legal Commitments**

**3.1.1. Convention on the Physical Protection of Nuclear Material (CPPNM)**

**3.1.2. 2005 Amendment to the CPPNM**

**3.1.3. International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT)**

**3.2. Voluntary Commitments**

**3.2.1. International Atomic Energy Agency (IAEA) membership**

**3.2.2. Proliferation Security Initiative (PSI) membership**

**3.2.3. Global Initiative to Combat Nuclear Terrorism (GICNT) membership**

**3.2.4. G-8 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction membership**

**3.2.5. World Institute for Nuclear Security (WINS) contributions**

**3.2.6. IAEA Nuclear Security Fund contributions**

**3.2.7. Bilateral or multilateral assistance**

**3.2.8. Centers of Excellence**

**3.3. International Assurances**

**3.3.1. Published regulations and reports**

**3.3.2. Public declarations and reports about nuclear materials**

**3.3.3. Invitation(s) for review of security arrangements. 1\* Physical security during transport**

**4. DOMESTIC COMMITMENTS AND CAPACITY**

**4.1. United Nations Security Council Resolution (UNSCR) 1540 Implementation**

**4.1.1. UNSCR 1540 reporting**

**4.1.2. Extent of UNSCR 1540 implementation**

**4.2. Domestic Nuclear Materials Security Legislation**

**4.2.1. CPPNM implementation authority**

**4.2.2. National legal framework for CPPNM**

**4.3. Safeguards Adherence and Compliance**

**4.3.1. IAEA safeguards agreement (excluding Additional Protocol)**

**4.3.2. IAEA Additional Protocol**

**4.3.3. Facility exclusion from safeguards**

**4.3.4. Safeguards violations**

**4.4. Independent Regulatory Agency**

**4.4.1. Independent regulatory agency**

**5. RISK ENVIRONMENT**

**5.1. Political Stability**

**5.1.1. Social unrest**

**5.1.2. Orderly transfers of power**

**5.1.3. International disputes or tensions**

**5.1.4. Armed conflict**

**5.1.5. Violent demonstrations or violent civil or labor unrest**

**5.2. Effective Governance**

**5.2.1. Effectiveness of the political system**

**5.2.2. Quality of the bureaucracy**

**5.3. Pervasiveness of Corruption**

**5.3.1. Pervasiveness of corruption**

**5.4. Groups Interested in Illicitly Acquiring Materials**

**5.4.1. Groups interested in illicitly acquiring materials**

## Appendix B

### Variable Descriptions and Summary Statistic

Name	Description	Expected Direction	Source	Obs	Mean	Std Dev	Min	Max
<b>Dependent Variables</b>								
<b>NTI Nuclear Materials Security Index (NTI_Index)</b>	An ordinal measure with possibilities from 0 to 100 that evaluates legal, institutional, and implementation factors of a country's compliance with the NP regime		Nuclear Threat Initiative Database	352	54.792	21.233	7	99
<b>UNSCR 1540 Implementation (NTI_1540_n)</b>	An ordinal measure from 0 to 100 in increments of 10; includes the sub-indicators of UNSCR 1540 reporting and Extent of UNSCR 1540 implementation		Nuclear Threat Initiative Database	360	55	32.320	0	100
<b>Independent and Control Variables</b>								
<b>Contract Intensive Money (RoLCIM)</b>	This ratio measure between 0 and 1 shows the strength of law and order within a nation as a function demand for cash transactions	Positive	International Monetary Fund's <i>International Financial Statistics</i>	230	.489	.204	.024	.891
<b>Competitiveness of Participation (parcomp)</b>	This ordinal measure identifies the competitiveness of the political system. It is coded from 1 (repressed) to 5 (competitive)	Positive	Polity IV Democracy Index	334	.341	15.531	1	5
<b>Proportion of Regional Compliance NTI Index (regNTimean)</b>	This ratio variable is coded 0 to 1 in percentages	Positive	Self-generated based on the sample, year, and COW regions.	352	54.793	15.056	39.128	80.233
<b>Proportion of Regional Compliance UNSCR Compliance (regNTI1540mean)</b>	This ratio variable is coded 0 to 1 in percentages	Positive	Self-generated based on the sample, year, and COW regions.	360	53.495	22.461	24.583	91.111

## CHAPTER 3

# **The Future of Strategic Arms Control: Maintain our Weight, Trim the Fat, or Reduce Muscle Mass?**

Christopher J. Russell

Negotiations of further reductions to the nuclear arsenals of the United States and Russia are on a strategic pause because relations between the two countries are at their lowest point since the end of the Cold War. Recent Russian aggression in Crimea, Eastern Ukraine, and the Baltic region, and disagreements over military operations in Syria raise concern as to whether future arms control negotiations between the two countries are even possible. Equally concerning is a video released by Russian television in March 2015 showing Russian leader Vladimir Putin stating his readiness to use nuclear weapons if the West tried to stop him from seizing Crimea.<sup>1</sup> Given these events, both Russia and the United States must continue to assess their ability to deter each other and other emerging threats, while contemplating further reductions to their nuclear forces.

The New START Treaty (NST) entered into force in February 2011, calling for reductions and limitations to Russian and US strategic offensive nuclear assets. The NST will expire in 2021, forcing both countries to consider the future of nuclear arms control. The fundamental issue facing future negotiations with Russia is striking the balance between possessing a military force capable of threatening Russia while making concessions that meet the security interests of both parties. At some point, reducing nuclear weapons stockpiles will undermine a nation's ability to deter its adversaries from an attack. No country wants to

reduce their warfighting capabilities to a level that puts state survival at risk.

The focus of this research is on the relationship between deterrence and nuclear stockpile levels. This paper will analyze three nuclear arms control options for senior leaders to consider post-NST expiration, including 1) maintaining current stockpile levels and extending the terms of NST, 2) negotiating a modest reduction to stockpile levels and deployed launchers, or 3) making significant reductions to nuclear arsenals. Any reductions to US nuclear forces must factor in the ability to deter Russia from further aggression, the ability to execute a wide array of war plans, and the ability to deter other nuclear-state actors, as well as cost, risk, and the impact on assuring allies through extended deterrence.

My research reveals the United States will still deter its adversaries even if a modest reduction is made following the expiration of NST in 2021. A modest reduction is defined as reducing a small amount of deployed launchers and reducing the number of non-deployed warheads, while preserving the number of deployed warheads at 1,550 as outlined in the NST, and continuing the “nuclear umbrella” provided through extended deterrence in Europe. Any reduction to US nuclear forces must proceed with caution and must be met with a proportional bilateral commitment.

### **Deterrence Theories, Force Structure Debates, and Arms Control**

“Then the atomic bomb came and changed everything.”

—Bernard Brodie<sup>2</sup>

As the Cold War becomes a more distant memory, some policymakers have questioned the continued need for nuclear weapons. Some nuclear critics worry that these weapons are destabilizing and view their possession and proliferation as a disruption to international order. These critics believe it will only be a matter of time before nuclear weapons are used.<sup>3</sup> On the other side of this issue are policymakers who argue that nuclear weapons are stabilizing, and point to the record of strategic stability among nuclear-armed states. Given this debate, it is important that today’s US policymakers share a common understanding on how nuclear weapons have shaped deterrence strategy, how that strategy

has translated into force structure decisions, and how to apply these ongoing debates in the context of future arms control decisions.

In the opening quote of this section, Bernard Brodie is describing how the advent of the atomic weapon changed everything in warfare, and how the “strategic” bomber became the dominant form of warfare.<sup>4</sup> Prior to the atomic weapon, the “strategic” bomber required multiple sorties dropping multiple bombs in order to achieve desired weapon effects in a target area. However, with the invention of the nuclear weapon, the owner of a nuclear bomb now had the capability to destroy an entire city with one weapon, significantly altering the character of warfare. Because of the catastrophic capability of this new weapon, presidents, policy makers, military leaders, and scholars scrambled to develop strategies to best utilize atomic weapons to achieve national security objectives.

The Truman administration solicited ideas from strategic thinkers like Brodie in developing strategies regarding the best way to incorporate this new weapon into preserving national security interests. Brodie argues that the key to deterring the Soviet Union from attacking the United States with nuclear weapons is to possess the capability to launch a retaliatory strike. In order to launch a successful retaliatory strike, the nuclear forces must be survivable and adequate enough to deliver a devastating blow. An enemy who understands how powerful the second strike capability would be will resist striking in the first place, thus preventing a war.<sup>5</sup> This idea was the basic premise of nuclear deterrence theory during the Cold War and is still relevant today for two reasons: (1) if the United States were to maintain its current inventory of 1,550 deployed warheads and 4,500 non-deployed nuclear warheads, it would continue to have a second strike capability, and given the logic of Brodie, would still be able to maintain the ability to deter its adversaries, and (2) if significant cuts were made to stockpile levels in follow-on arms reduction treaties, the United States may not possess the ability to launch a retaliatory strike, thereby weakening its ability to deter. Consequently, these theories about deterrence through retribution have fed directly into the debates on assembling the appropriate nuclear force structure.

President Eisenhower and his administration developed the first concrete nuclear strategy against the Soviet Union when he approved National Security Council Paper Number 162/2 (NSC-162/2). In doing so, his administration set the course for the US nuclear force structure and

doctrine. The three priorities outlined in NSC-162/2 were 1) to create an offensive striking power centered on a “massive retaliation” capability, 2) to forward deploy tactical nuclear weapons (TNWs) in Western Europe, and 3) to defend the offensive striking force, the base, and the people.<sup>6</sup> In order to meet these objectives, force structure improvements were required. By the end of 1953, the Air Force’s Strategic Air Command possessed 1,000 nuclear capable bombers, and those numbers continued to grow as the defense budget expanded in the 1950s.<sup>7</sup> Nuclear stockpiles also increased during the 1950s; when Eisenhower took over from Truman, there were approximately 1,000 nuclear weapons in the inventory, and that number grew to nearly 18,000 by the end of the decade.<sup>8</sup> This increase was the beginning of a nuclear stockpile overkill that would eventually reach its peak of over 31,000 warheads in 1967.<sup>9</sup>

The Kennedy administration ushered in a new military strategy. Concluding that the “Massive Retaliation” strategy was too rigid and the destruction was too appalling to imagine, President Kennedy and Secretary of Defense Robert McNamara developed a “flexible response” strategy designed to provide the president with “flexible” nuclear options with increased conventional capabilities to deal with any number of military crises in Europe.<sup>10</sup> As the new administration wrestled with how best to employ nuclear and conventional forces in war, debates on how best to build a force credible enough to deter the Soviet Union from attacking America continued throughout the Cold War.

In one camp were the “minimalists,” who opposed building up an oversized nuclear force in an effort to create a sense of vulnerability. Dr. Thomas Schelling, a leading scholar on deterrence theory during the Cold War, set forth the idea of a “stable balance of terror” where the United States would possess a moderate level of capabilities necessary to threaten the Soviet society with destruction.<sup>11</sup> He argued against building up a large offensive and defensive infrastructure, since it was not fiscally feasible and more importantly, would actually be destabilizing. Instead, if both sides were not able to adequately protect their interests from nuclear attack, their vulnerability would actually make them more cautious when faced with the decision to employ nuclear weapons. Schelling’s ideas were later codified in US doctrine under the well-known term “Mutually Assured Destruction,” or MAD.<sup>12</sup> In the other camp were the



“maximizers,” including military strategist Herman Kahn and military icon General Curtis LeMay.

Kahn, and others in his camp, believed in nuclear supremacy—having an asymmetric advantage over the enemy by building up a massive offensive and defensive capability in order to guarantee survival and victory.<sup>13</sup> Kahn’s nuclear supremacy camp was about winning the nuclear war, while Schelling’s “minimalist” camp was focused on deterring these wars from happening in the first place. While both Schelling and Kahn offer insightful views on deterrence and how force structure can affect enemy decision-making, strategists such as Dr. Keith Payne believe we need to abandon Cold War thinking about nuclear deterrence because it is no longer applicable in today’s strategic environment.

Dr. Payne argues that many of the deterrence concepts of the Cold War are ill suited for deterring contemporary threats.<sup>14</sup> While the concepts developed during the Cold War were designed to deter the Soviet Union in a bipolar world, the landscape today is different. In addition to Russia, China is a nuclear power that continues to build a nuclear triad, and whose arsenal of 190 weapons is formidable.<sup>15</sup> North Korea threatens to use nuclear weapons against the United States and South Korea. Iran persistently seeks a nuclear weapon in hopes of becoming a regional hegemon. While this list of state actors is short, nuclear proliferation and the strengthening of non-state actors poses problems in nuclear deterrence not seen during the Cold War. No matter what side of the argument policy makers are on, there is the lingering question of the ideal size of the nuclear arsenal.

In a June 2013 speech at the Brandenburg Gate in Berlin, President Obama told the audience that after a comprehensive review, he believed America could continue to maintain a strong and credible strategic deterrent while reducing the deployed nuclear arsenal by one-third beyond the NST levels.<sup>16</sup> Reducing the arsenal by one-third roughly equates to around 1,000 deployed nuclear warheads. Given Obama’s comments on future arms control reductions and previous theories on deterrence, this paper will analyze several options senior leaders should consider during future arms reduction negotiations.

## **Research Methodology and Hypothesis**

This research addresses a topic proposed by Air Force Global Strike Command (AFGSC) regarding the future of strategic arms control following the expiration of NST in 2021. According to the AFGSC staff, “the researcher should look at the deterrence provided by stockpile levels below NST, to include nuclear warhead levels down to 200, and what level, if ever, does it make sense to abandon a strategic triad?” To address this topic, I will use a qualitative approach to develop and analyze three courses of action (COAs), compare them against each other using evaluation criteria, and then offer a recommendation for future arms control reductions post-NST.

The three COAs use a fitness metaphor to describe potential options for the US government. COA 1 is labeled “Maintain our Weight” and analyzes the advantages and disadvantages of maintaining the stipulations outlined under the current NST. COA 2 is labeled “Trim the Fat” and looks at reducing the US nuclear arsenal at a modest level following NST expiration. Finally, COA 3 is labeled “Reduce Muscle Mass” and addresses cutting the nuclear arsenal significantly, including a reduction to 200 deployed nuclear weapons.

As previously mentioned, the focus of this research is on the relationship between deterrence and nuclear stockpile levels. Deterrence through the possession of a large nuclear stockpile, combined with a flexible and diverse nuclear triad, worked during the Cold War, as evidenced by the fact that neither side initiated a war against the other. While we may no longer have or need a nuclear force as large as the Cold War arsenal, our nuclear deterrent still depends on maintaining adequate strategic forces. The basic calculus remains the same, even if the environment in which we must deter has changed. The key debate is about what force size will be adequate in the modern threat environment. Given these circumstances, my core hypothesis is that the United States will continue to maintain a strong and credible deterrent force, even if modest reductions are made to its nuclear force after the expiration of the NST in 2021, as long as the United States maintains a diverse and flexible triad, continues to possess an arsenal large enough to coerce multiple adversaries, and continues to provide assurance to European allies through an extended deterrence “nuclear umbrella.”

## **COA Analysis**

This section provides practical analysis for AFGSC to consider as commanders contemplate future policy options. While there may be other options available, or combinations of the following COAs, each one is designed to be distinguishable so they can be compared against each other.

### ***Option 1: Maintain Our Weight***

The NST will expire in 2021, leaving the future of nuclear arms control as an important question for discussion. One option is for the United States to “maintain its weight,” meaning maintain the provisions outlined in the current NST and extend the treaty, say five years. The following analysis will examine the advantages and disadvantages of selecting this COA while weaving in theories of deterrence.

The first advantage to extending the NST is that such a strategy would allow time to assess whether the current stockpile levels and nuclear force structure are adequate in deterring Russia and other nuclear adversaries. The deadline to meet the stipulations of NST is 5 February 2018. With the NST expiring in February 2021, only three years remain to assess whether or not current stockpile levels are adequately deterring Russia. Today’s strategic environment is uncertain, and caution must be exercised before making a decision to reduce an arsenal that has protected the United States from nuclear war.

Another advantage is that delaying further reductions allows the United States to maintain a strong and credible deterrent in the face of multiple nuclear states operating in an uncertain environment. Currently, Russia is displaying more aggressive behavior, North Korean leader Kim Jong-Un is increasingly unpredictable, and China is growing more assertive in the Western Pacific. These developments are creating an environment where decreasing strategic nuclear weapons may not be in the best interest of the United States. Dr. Keith Payne adds insight to this point, believing that the uncertainty of today’s dynamic geopolitical environment requires the United States to possess as many options as possible to threaten a diverse array of threat actors.<sup>17</sup> Payne goes on to argue that “there is no number of nuclear weapons that can be linked predictably to the reliable functioning of deterrence.”<sup>18</sup> Given Payne’s

argument about the uncertainty of today's environment and the difficulty in predicting whether deterrence will work against adversaries in a multipolar world, it seems prudent to maintain current stockpile levels.

A third advantage in maintaining current US stockpile levels is maintaining the capacity to execute US war plans.<sup>19</sup> Being able to execute war plans, yet still being vulnerable to a nuclear attack, aligns with Schelling's "balance of terror" theory that proved successful during the Cold War. Finally, current stockpile levels afford the ability to continue assuring US allies by providing a "nuclear umbrella." If further cuts are made to nuclear stockpiles, the United States jeopardizes assuring its allies through extended deterrence and may motivate countries to seek nuclear weapons through other means.

Several disadvantages exist if the United States and Russia cannot reach an agreement on further nuclear reductions post-NST. First, the issue of reducing Russia's superior TNWs advantage is further delayed. While exact numbers are not disclosed, estimates number Russia's TNW stockpiles at approximately 2,000.<sup>20</sup> If the United States possesses around 200 deployed nuclear weapons in Europe, Russia enjoys a 10:1 TNW advantage over the United States and its nuclear umbrella allies. While the number of strategic weapons and deployed launchers continues to decrease under the current treaty, the issue of Russia's asymmetric advantage of TNW still evades nuclear treaty restrictions.

Second, it will be more difficult for the United States to convince other nuclear actors such as China, India, and Pakistan to reduce or limit their nuclear programs. Currently, no treaties exist that limit these programs, and maintaining the status quo of NST may limit the ability to pursue other bilateral or multilateral agreements. China continues to expand its nuclear arsenal by developing nuclear submarines and Intercontinental Ballistic Missiles (ICBMs), a trend that is worrisome and will continue if the United States and Russia cannot continue stockpile reductions.

A third disadvantage is missing an opportunity to cut costs. The nuclear enterprise is expensive. According to an October 2014 report by the *Arms Control Association*, the United States plans to spend \$355 billion to maintain and rebuild its nuclear arsenal over the next decade.<sup>21</sup> Fighting wars is an expensive endeavor, but these numbers reveal that preventing wars is also expensive. Finally, with no future arms reductions,

President Obama's goal of a world free of nuclear weapons will remain stagnant for years to come.

***Option 2: Trim the Fat—A Modest Reduction Option***

As we transform our military, we can discard cold war relics and reduce our own nuclear forces to reflect today's needs.

—George W. Bush, February 2001<sup>22</sup>

According to a 2012 Pentagon strategy document, the Department of Defense has stated that “it is possible that our deterrence goals can be achieved with a smaller nuclear force, which would reduce the number of weapons in our inventory as well as their role in US national security strategy.”<sup>23</sup> While written in 2012, and before the recent rise in Russian aggression, this document does offer insight that further reductions could be achieved while still maintaining the ability for the United States to deter its adversaries. Using the Pentagon document as a primer, this option seeks a modest reduction in nuclear assets following NST. While there are numerous options available in future treaty agreements, the following criteria are defined as “trimming the fat.” This option proposes maintaining the same number of deployed warheads of 1,550 and concentrates on reducing non-deployed stockpiles, reducing the number of deployed launchers, maintaining TNWs in Europe, and maintaining progress toward a European missile defense capability. The assumption with this option is that any approach to nuclear reductions would be met with a bilateral agreement. Before proceeding with the advantages and disadvantages of this option, a short discussion about whether reducing the non-deployed stockpile and number of deployed launchers is warranted.

The primary arm of the triad that would be targeted for reduction of deployed launchers in this COA is the submarine leg. The US Navy currently has 14 Ohio class submarines with a planned purchase of 12 new replacement subs, also referred to as the SSBN(X). Each SSBN(X) is expected to carry 16 Submarine Launched Ballistic Missiles (SLBMs), for a maximum of 192 deployed SLBMs across a fleet of 12 submarines.<sup>24</sup> Each Trident II D-5 SLBM has the capacity to carry up to 8 warheads yielding a potential to carry over 1,500 warheads. Under NST, the US Navy plans to deploy 1,000 nuclear warheads on strategic submarines.<sup>25</sup>

This COA proposes to reduce the purchase number of SSBN(X) from 12 to 10, with 8 deployed at any given time, which would still allow 1,000 warheads to be deployed if all 8 warheads were mated with the D-5 missile, which currently is mated with four or five. At an estimated \$7.2 billion each for an SSBN(X), this plan would yield a savings of over \$14 billion.<sup>26</sup> This cost savings marks the first advantage of this COA.

This option also proposes reducing the number of non-deployed nuclear warheads. Russia and the United States currently possess 90 percent of the world's nuclear weapons.<sup>27</sup> According to an *Arms Control Association* report, the United States has approximately 4,500 warheads in its stockpile inventory.<sup>28</sup> While this paper does not identify a specific number, the idea behind cutting the non-deployed warheads is to conduct a reduction in proportion to Russia such that both countries would achieve an equal number of warheads in its non-deployed stockpile arsenal and still maintain the ability to provide security.

By maintaining the same number of deployed nuclear warheads, the United States would still have a flexible and diverse deterrent capability through its nuclear triad, and still retain the ability to execute its war plans. This option also provides maneuvering space to deal with emerging threats given the uncertainty of the post-9/11 environment. This option still affords the capability to continue US extended deterrence and assure European allies. Additionally, this option could also provide leverage in extending negotiations to China in an effort to limit their nuclear program.

A disadvantage to this option is that it assumes risk in the submarine leg of the triad. The final number of submarines would go from 14 in today's inventory to 10 in the future. While loading up future SSBN(X)'s with 8 warheads per missile solves the deployed warhead math problem, it does reduce the number of submarines on station at any given time, which may reduce the ability to cover the target list currently assigned to the US Navy.

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***Option 3: Reduce Muscle Mass—A Significant Arms Reduction Option***

“We seek the total elimination one day of nuclear weapons from the face of the Earth.”

—Ronald Reagan, 1985 Inaugural Address<sup>29</sup>

At some point, if the United States desires a world free of nuclear weapons, significant reductions will need to be made to stockpile levels. While a significant reduction is unlikely to occur in the next round of negotiations due to the uncertainty in today’s strategic environment, this option offers a way to get to a lower number. Criteria for this option include significantly reducing the number of deployed nuclear weapons to 200, reducing the number of deployed launchers, while maintaining the “nuclear umbrella” capability in Europe and the European missile defense program.

The first advantage to this option is cost savings. As mentioned earlier, the United States plans to spend \$355 billion over the next decade and an estimated \$1 trillion over the next 30 years to maintain and rebuild its nuclear arsenal.<sup>30</sup> In a fiscally constrained environment where defense budgets are declining and US debt is approaching \$19 trillion, a significant reduction in the US nuclear enterprise could create substantial cost savings.<sup>31</sup> If the United States agreed on a reduction to 200 deployed warheads, adjustments would most certainly occur in most if not all of the legs of the triad, including possibly eliminating one.

Reducing the number of deployed weapons to 200 would drive a reduction in deployed launchers. Of the \$355 billion budgeted for the nuclear enterprise over the next decade, the ICBM leg of the triad will receive \$100–\$200 billion, the submarine leg \$100 billion, and the bomber leg \$80 billion, with the remaining budget targeted for the B-61 life extension program and the new air-launched cruise missiles.<sup>32</sup> In determining where to reduce force structure to get to 200 deployed warheads, the decision makers must balance cost with capability.

While eliminating the ICBM leg would significantly reduce program costs, it would also mean solving the targeting problem for the enemy. The dispersion of the silos, and their deepened, hardened nature makes destroying them difficult. Another unique capability of ICBMs is they are

on alert all of the time, unlike the strategic bombers. With a time of flight of approximately 30 minutes, ICBMs afford the President a rapid response capability in the event of an attack against America. The number of deployed ICBMs would need to be below 200 in order to preserve the other two legs of the triad, keeping the flexibility afforded by the nuclear triad while reducing program costs.

The second most expensive element of the triad is forecasted to be the nuclear submarine leg. The US Navy plans to replace the Ohio-class submarines with 12 new submarines, with first procurement beginning in 2021 and final delivery by 2042.<sup>33</sup> The nuclear submarines are virtually undetectable, making their survival almost guaranteed in the event of a nuclear strike. If the enemy cannot locate the submarine, they may be deterred from launching a strike for fear of retaliation by a nuclear submarine. As with the earlier reduction in ICBM weapons to a number less than 200—say 100 for example—the SLBMs could be reduced to 100, resulting in eliminating the bomber leg, or maintaining 20–40 nuclear bombers and adjusting another leg of the triad. Eliminating the bomber leg does not buy a lot of cost savings, since they would still be kept for conventional capabilities; however, military leaders would lose the “recall ability” enjoyed by this leg, along with payload options, variable yields, and signaling opportunities. Having said that, if one were to reduce or eliminate the bomber leg, COA 3 seeks to maintain the “nuclear umbrella” provided by F-15E Dual Capable Aircraft and soon the F-35A, which will provide a stealth capability to penetrate contested environments.

Arguably the biggest question to debate in COA 3 is if a significant reduction is made, can the United States continue to deter its adversaries? The United States assumes significant risk with COA 3. The counter-force strategy adopted during the Cold War would no longer be executable. The United States would need to transition to a counter-value strategy in hopes the enemy would stand down if a nuclear exchange was imminent. With this strategy, the United States might find it challenging to assure allies in the event they were attacked by nuclear weapons. Additionally, with a reduced nuclear enterprise the survivability of the retaliation force is highly unlikely, with the exception of submarines.

The number of weapons required for adequate deterrence is debatable and unknowable. If forced to target rogue states such as North Korea or Iran, the number of weapons required to target their national interests is



somewhere in the single digits. A low number of weapons possessed by the United States may be enough to deter their aggressive behavior. But will 200 deployed nuclear weapons be enough to deter major nuclear powers such as Russia and China? Think about it in terms of an adversary's ability to target the United States with a few weapons: How many weapons would it take to deter the United States from launching a nuclear attack? I would argue it is a pretty low number because the thought of just one nuclear weapon detonating over one US city is horrific. It is this logic that supports reducing our non-deployed stockpiles and deployed warheads to a much lower number.

### **COA Comparison**

The following criteria are used to compare the COAs: 1) does the option still deter Russia, 2) can the President still execute the war plans, 3) can the United States deter other nuclear-state actors, 4) can the United States maintain extended deterrence through theater TNWs, 5) does the United States induce unacceptable risk, and 6) are there any significant cost savings associated with the option. The table in Appendix A depicts an assessment of each COA with the associated evaluation criteria. A "+" symbol indicates that the COA meets the selected criteria, while a "-" symbol indicates the COA does not meet the criteria. Each criterion is weighted by a factor of 1, with "+" receiving a point value and "-" receiving no point value. Each COA column will be added to reveal a total score.

Based on comparing COAs against the weighted evaluation criteria, COA 2 edges out COA 1 by a score of 6 points to 5 points. While the evaluation categories and weighting are subjective, for the purposes of this paper, it appears that COA 1 and COA 2 are more viable options for civilian and military leaders to consider in the next round of NST negotiations. The analysis indicates that COA 3 incurs the most risk because this option fails to adequately deter Russia due to the strategic offensive force being very small. Additionally, COA 3 fails to allow execution of all US war plans. Selecting COA 3 requires a new nuclear targeting strategy focusing on counter-value targets versus counter-force targets. While COA 2 assumes some level of risk by reducing the number of deployed submarines, the risk is mitigated by still maintaining a flexible

and diverse nuclear triad, therefore still receiving a “+” assessment. Given the outcome of the COA Analysis and COA Comparison, the following recommendations are made for commanders to consider.

### **Recommendations and Conclusion**

Based on the analysis and literature reviewed during this project, I recommend COA 2. This option strikes a balance between maintaining a credible deterrent force and making progress toward a smaller nuclear stockpile. With this option, the United States preserves the 1,550 deployed warheads as stipulated in the NST and preserves the triad, which is the backbone of US nuclear deterrence. Additionally, this option seeks to preserve the TNWs deployed in Europe as an assurance to US allies, while also deterring Russian aggression. Any future arms control agreement would only be reached through a bilateral agreement where Russia would reduce their nuclear program. While COA 2 may not be dramatic enough to bring other nuclear states to the negotiating table, it does signal a commitment by two countries that still possess 90 percent of the world’s nuclear arsenal.

Given this recommendation, I am also mindful that my research was collected through unclassified means with no access to classified data, no access to US war plans, and no access to war gaming results. Results from war gaming exercises, where an array of future scenarios are tested, may alter the findings in this research project. However, any future negotiations must address the following: 1) full transparency in stockpile levels, including TNWs, 2) proportional reductions such that they achieve the same levels, 3) Russia’s superior TNW stockpile levels must be addressed and reduced, and finally, 4) capitalize on the opportunity to address other international issues. This final recommendation merely highlights the tremendous opportunity with arms control negotiations, because they provide a forum to not only discuss nuclear arms, but also the opportunity to address other important matters pertaining to national security.

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**Appendix A**  
**COA Comparison**

<b>Evaluation Criteria</b>	<b>COA 1: Maintain</b>	<b>COA 2: Trim Fat</b>	<b>COA 3: Reduce Muscle</b>
Deter Russia (1)	+	+	-
Execute OPLANs (1)	+	+	-
Deter other nuclear actors (1)	+	+	+
Maintain extended deterrence (1)	+	+	+
Risk (1)	+	+	-
Cost (1)	-	+	+
<b>Total (6):</b>	<b>5</b>	<b>6</b>	<b>3</b>

## CHAPTER 4

# Ensuring Strategic Stability in the Second Nuclear Age

Robert T. Ewers

The 2010 Nuclear Posture Review (NPR) discussed strategic stability as a goal that future nuclear reductions must support: “Any future nuclear reductions must continue to strengthen deterrence of potential regional adversaries, strategic stability vis-à-vis Russia and China, and assurance of our allies and partners.”<sup>1</sup> However, the NPR neither defined nor identified ways to achieve or strengthen strategic stability.

The concept of stability is best explained through elementary physics. An object is in static equilibrium when all forces acting on it are canceled or balanced by other forces; the system is stable if it recovers from a disturbance and unstable if it does not. Beyond the realm of physics, there is no widely accepted definition of strategic stability, yet use of the term has grown since the advent of nuclear weapons. Strategic stability terminology ranges from the absence of incentives to launch a preemptive nuclear strike or build up nuclear forces, to the absence of armed conflict between nuclear-armed states, to the relationships between states to enhance regional or global security.<sup>2</sup> Furthermore, the stability equation has become increasingly complex and uncertain since the Cold War ended. The world changed from a balanced bipolar world to a “second nuclear age” typified by the increasing multiplicity of nuclear actors threatening a rebalance of power among nuclear-armed states as the United States and Russia further reduce nuclear weapons. The strategic complexity of the second nuclear age drives the requirement to understand strategic stability and how to achieve and maintain it in the 21st century.

This paper argues that the United States must seek a balanced systems approach to ensure strategic stability in a nuclear multiplicity environment among its nuclear-armed peers, near peers, and nonpeers. This paper will not address the broadest use of the term “strategic stability” to define relationships between states to provide global security, nor will it address the other common use of how to avoid any armed conflict between nuclear states. Instead, it will focus on the nuclear component to strategic stability, since the nuclear element is the last one to fail between nuclear-armed states should all other stability components break down. Through this lens, this paper first analyzes what strategic stability meant during the Cold War and identifies common elements of strategic stability strategies. The second part of the paper recalculates strategic stability for the 21st century. Before proposing a new posture, this second part asserts that strategic stability remains a relevant strategy for the United States in the contemporary nuclear-armed world. Second, the concept of stability is redefined among the three categories of nuclear actors the United States must balance in the second nuclear age—nuclear-armed peers, near peers, and nonpeers. Finally, using the common strategic stability elements identified in the first part of the paper and applying them systematically to the new stability framework, the second part proposes a balanced posture to ensure strategic stability during the second nuclear age.

### **Defining Strategic Stability**

Strategic stability is common terminology, yet lacks a common understanding. There are no clear, concise definitions for what strategic stability has meant in the past, and its use today varies from the nuclear realm to the state of affairs between two or more nations.<sup>3</sup> Cold War and post-Cold War literature presents numerous concepts of strategic stability, including first-strike stability, crisis stability, arms race stability, deterrence stability, and global, international, and regional stability. However, strategic stability takes on a different shape when viewed through the lens of strategy through ends, ways, and means. In strategy, states employ diplomatic, military, economic, and informational instruments of national power to achieve political objectives. If the objective (ends) is strategic stability, then nuclear deterrence, extended deterrence, and arms control were the strategic concepts (ways) the United



States employed during the Cold War—not to suggest the United States did not apply the instruments of national power toward strategic stability, but these were the predominant ways. The resources (means) include the first atomic weapons, thermonuclear weapons, long-range bombers, intercontinental ballistic missiles, warning and defensive systems, and the nuclear command and control that integrate them. Throughout the fifty-year Cold War, the strategic concepts and resources constantly evolved in response to changes in technology, shifting theories in deterrence, and international relations. After the Cold War, and a de-emphasis on nuclear weapons in US policy, the ways to maintain strategic stability shifted as other instruments of power took an increasing role. Viewing strategic stability through the lens of an evolving strategy offers an explanation as to why strategic stability is so difficult to define and why the terminology has expanded and varied with time. To define strategic stability in a contemporary sense, it is useful to examine its origins and search for common elements over time.

### **Cold War Origins**

A few key strategists laid the foundation for strategic stability before the term was coined. In 1946, Bernard Brodie argued that nuclear weapons threatened cities, and attacks would be deterred as long as the attacker believed there was a good chance of nuclear retaliation.<sup>4</sup> Thus, stability centered on the threat the atomic bomb presented, as no promise of victory was beneficial if devastating retaliation was certain. In contrast, William Borden, a contemporary of Brodie's at Yale, argued that atomic weapons should be given primacy at the outset of war to disarm the enemy's nuclear forces.<sup>5</sup> Together, the Yale team of Brodie and Borden created the paradox of strategic stability—the vulnerability of surprise attack, combined with the assured ability to retaliate in kind.<sup>6</sup> This paradox provided a balance of deterrence, or deterrence stability.

The concept of strategic stability evolved from this starting point. The ability to retaliate forced the concept of damage limitation to ensure a second strike capability. In 1959, Albert Wohlstetter reasoned that survivable nuclear forces guaranteed retaliation in response to a first strike.<sup>7</sup> Likewise, Herman Kahn called for less vulnerability through passive and active strategic defenses to increase the cost of an adversary's

first strike and act as a hedge to guarantee retaliation should deterrence fail.<sup>8</sup> In contrast, Thomas Schelling expanded on Wohlstetter's concept of a survivable retaliatory force. The key, according to Schelling, was that each nation's vulnerability to nuclear attack increased their confidence in the ability to launch a devastating retaliatory strike.<sup>9</sup> This mutual vulnerability became the central characteristic of strategic stability, and forces that reduced vulnerability, like the defenses Kahn advocated, were viewed as destabilizing. "The best defense is an assured offense" became the means of deterring a nuclear attack. As offensive stockpiles grew to maintain the credibility of a retaliatory strike, there was a growing concern that the arms race lessened strategic stability. Thus, equality became a strategic stability characteristic, as rough parity in nuclear capabilities would provide neither side a significant advantage and would encourage restraint on both sides.<sup>10</sup> In summary, strategic stability during the Cold War was a balance between parity in nuclear capabilities, survivable retaliatory forces, and mutual vulnerability. These characteristics provide the baseline to identify the elements of strategic stability.

### **Elements of Strategic Stability**

The elements of strategic stability are derived from its characteristics of parity, retaliatory forces, and mutual vulnerability. First, the relative size of the nuclear arsenals is explored for significance to parity. Greater numbers of nuclear weapons make it more difficult for an adversary to destroy deployed nuclear weapons in a surprise attack, and also more likely to face a retaliatory strike from surviving nuclear forces. Additionally, the greater number of surviving weapons also provides targeting redundancy to ensure retaliatory strikes on planned targets. In contrast, lower numbers of nuclear weapons increase the adversary's incentive for a surprise preemptive attack in order to reduce the number of surviving forces and lower the probability of retaliatory strikes against planned targets. Lower numbers of nuclear weapons have a negative second-order effect. Specifically, if a nation fears a preemptive strike is likely against their smaller nuclear force, they will be more inclined to launch their nuclear forces before their adversary destroys them. The size of the nuclear arsenal matters, and is consequently the first element of strategic stability.

Second, targeting strategies are examined for retaliatory forces under strategic stability. Survivable nuclear forces are essential to ensure a second-strike capability against the adversary's vital targets. When more nuclear forces are available, nations hold military targets at risk through a counterforce targeting strategy to prevent escalation and inflict an unacceptable cost to the adversary. When fewer nuclear forces are available, nations hold cities at risk as countervalue targets to threaten the industrial and economic power of the adversary. The targeting strategy depends on the anticipated quantity of surviving nuclear forces available for a retaliatory strike. Therefore, the second nuclear element is the targeting strategy.

Lastly, the mutual vulnerability characteristic is analyzed to determine a nation's ability to limit damage from a nuclear attack. A nation can maintain its security through defensive or offensive means should deterrence fail. A defensive posture limits potential damage by raising the potential cost and the uncertainty of benefit during an attack. The defensive forces impose a cost to the adversary through the penalty of denial, which reinforces the deterrence equation.<sup>11</sup> On the other hand, a nation can deploy offensive weapons to punish the adversary after an attack. Increasing survivability through hardening, basing, and deployment constructs ensures available forces for a second strike and reestablishes stability through graduated escalation steps.

In summary, three elements of strategic stability derived from its characteristics are the number of weapons, the targeting strategy, and the defensive posture. Understanding strategic stability's characteristics and elements provides the baseline to recalculate strategic stability for the post-Cold War period of the 21st century.

### **Recalculating Strategic Stability**

The greatest challenge of the Cold War period was maintaining strategic stability despite leaps in technology, the arms race to maintain parity, and limited conventional conflicts fought on the periphery. Since the end of the Cold War, the relative quantity of nuclear weapons has greatly decreased in proportion to the decreasing bilateral threat. Despite the reduced emphasis on nuclear weapons, the world's geopolitics has steadily become more tumultuous, causing fluctuations in nuclear policy

and strategic stability. This section will explore current US policy, arguing that nuclear weapons remain a central component to US national defense, and will examine US threats in the second nuclear age from nuclear-armed peers, near peers, and nonpeers. Then, the concept of a stability triangle to balance strategic stability across all nuclear actors is presented. The section concludes with a new balanced strategic stability posture derived from examining the nuclear actors and the elements of strategic stability.

Nuclear weapons still play a central role in ensuring US strategic stability. The 2009 Congressional Commission on the Strategic Posture of the United States acknowledged that “as long as other nations have nuclear weapons, the U.S. must continue to safeguard its security by maintaining an appropriately effective nuclear deterrent force.”<sup>12</sup> Additionally, the 2010 NPR names one of the key objectives of the nuclear force as maintaining “strategic deterrence and stability at reduced nuclear force levels.”<sup>13</sup> In 2013, President Obama issued new guidance to align US nuclear policies to the 21st century, affirming that the United States will maintain a credible deterrent that guarantees the defense of the United States and its allies and partners by convincing potential adversaries that the cost of attacking far exceeds any potential benefit.<sup>14</sup> More recently, the 2014 Quadrennial Defense Review (QDR) addressed this issue:

Nuclear forces continue to play a limited but critical role in the Nation’s strategy to address threats posed by states that possess nuclear weapons and states that are not in compliance with their nuclear nonproliferation obligations. Against such potential adversaries, our nuclear forces deter strategic attack on the homeland and provide the means for effective responses should deterrence fail. Our nuclear forces contribute to deterring aggression against U.S. and allied interests in multiple regions, assuring U.S. allies that our extended deterrence guarantees are credible, and demonstrating that we can defeat or counter aggression if deterrence fails. U.S. nuclear forces also help convince potential adversaries that they cannot successfully escalate their way out of failed conventional aggression against the United States or our allies and partners.<sup>15</sup>

The essence of US policy is that nuclear weapons have an enduring role in providing strategic stability by deterring nuclear attacks and ensuring the ability to retaliate despite the reduced emphasis on our nuclear capabilities. The 2010 NPR acknowledges a changed world and asserts the threat of nuclear war has decreased, yet “the risk of nuclear attack has increased.”<sup>16</sup> This increased threat comes from new variables added to the strategic stability equation.

### **Strategic Stability in the Second Nuclear Age**

If the Cold War was the first nuclear age, then Paul Bracken defines the second nuclear age of the post-Cold War era as one of “shifting great powers, rising regional powers, and great uncertainty about the shape of world order.”<sup>17</sup> In this second nuclear age, “North Korea, Pakistan, and India have joined the nuclear club. Israel, long in the club, is coming out of the closet. Others, such as Iran, are trying to join it. China and Russia, for their part, are improving their arsenals for twenty-first-century conditions. Other countries are thinking about going nuclear, too.”<sup>18</sup> Strategic stability mechanisms between the United States and Russia will still apply in the near future, yet applying them as a blanket policy against the United States’ nuclear peers, near peers, and nonpeers in the second nuclear age may be inappropriate and dangerous.<sup>19</sup>

Cold War strategic stability mechanisms assumed a bipolar system with a rough parity of weapons and offensive strike capabilities, and also limited defenses to prevent damage from nuclear strikes between two superpowers. This “balance of terror” reduced the incentive to strike first for both nations. However, the second nuclear age brings three new variables to the strategic stability equation: nuclear multiplicity, increased stability complexity with China, and threats from rogue regimes and nonstate actors. While there may be additional variables, these three provide a starting point in understanding how strategic stability calculations have changed. First, the second nuclear age ushers in a multiplicity of great and small nuclear powers and introduces Herman Kahn’s “moment of maximum danger” before reaching a stable multipolar world.<sup>20</sup> During this transition, many nuclear weapon states perceive security threats from two or more nuclear-armed states, which adds to the system complexity.<sup>21</sup> In physics, a system with three points is more stable

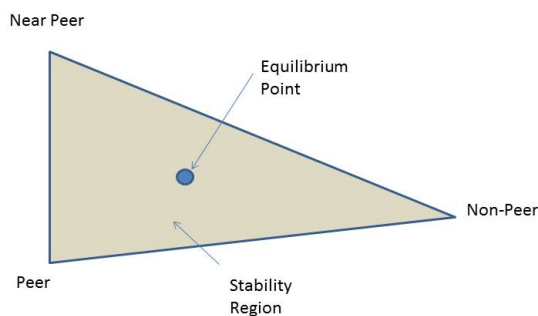
than one with only two, but in the realm of nuclear weapons, a scenario with three actors is more complex and less stable. Instead of the security dilemma experienced in bilateral competition, three actors form a security trilemma where the actions of one state to protect itself from one of the other two results in the third state feeling less secure.<sup>22</sup> Second, the United States and Russia may have bilaterally reduced stockpiles from thousands of weapons to only 1,550 each; however, “less is not just less; less is different.”<sup>23</sup> China’s stockpiles, once dwarfed by the large stockpiles and capabilities of the superpowers and thus negated from the strategic stability equation, must now be factored into the calculations. Third, with the arrival of the second nuclear age comes a pressing nuclear threat to the United States from rogue regimes and nonstate actors.<sup>24</sup> Due to US conventional superiority, nuclear actors are reasoning how the deliberate use of nuclear weapons can be used to control conflicts with the United States.<sup>25</sup> The 2014 QDR acknowledges dynamic and unpredictable challenges from regimes in Iran and North Korea. The 2015 National Security Strategy claims that “no threat poses as grave a danger to our security and well-being as the potential use of nuclear weapons and materials by irresponsible states or terrorists.”<sup>26</sup> The new strategic system includes nuclear peers, near peers, and nonpeers, and they should also be included in strategic stability calculations, since they all have a dynamic pull on the system.

### **Stability Triangle**

In today’s contemporary nuclear relationship, the United States only has one peer (Russia), and one near peer (China). The actors and their classifications will most likely change as the effects of further unilateral or bilateral stockpile reductions between the United States and Russia play out in the second nuclear age, but the categories will remain fixed. The peer category is illustrated by the three Cold War strategic stability mechanisms: parity in nuclear capabilities, survivable retaliatory forces, and mutual vulnerability. Conversely, the near peer category is portrayed by an imbalance in parity in favor of the United States, yet retains the assured ability to deliver unacceptable damage in retaliation by the near peer. Even with the development of limited US defenses, it is still possible that a handful of the near peer’s nuclear weapons will get through the

defenses. In contrast, the nonpeer does not have a survivable retaliatory force, and the stockpile difference is extreme. Nevertheless, strategic stability can still be achieved within the system.

As Figure 1 shows, this system can be thought of as a triangular relationship between the three actors, much like the relationship and the inherent security trilemma between nuclear-armed states discussed previously. The system is in equilibrium when US security needs are balanced between the three nuclear actors. Disruptions to the system are stable as long as the relative position of stability remains within the stable region inside the triangle. However, this model suggests that as the United States orients its security needs more toward the near peer or the nonpeer actors, the relative position of stability moves closer towards those actors inside the triangle. Due to the shape of the triangle, the system becomes less stable when the relative position of stability is closer to the edges. Nonetheless, the model suggests that the United States can balance the three types of actors and maintain strategic stability. Using the elements of strategic stability identified earlier, we can explore the stability region.



**Figure 1: Stability Triangle**

## **A Balanced Strategic Posture**

This section takes the elements of strategic stability—number of weapons, targeting strategy, and defensive posture—from the first part of the paper and evaluates them against the three categories of US nuclear actors—peers, near peers, and nonpeers—from the stability triangle model. Achieving equilibrium between the three actors is difficult, and maintaining it is nearly impossible. Yet the fundamental principle from the stability triangle model shows that as long as forces acting on the system stay within the stable region of the triangle, then strategic stability can be maintained. The boundaries of the stability triangle are explored by examining the extremes for each element against each nuclear actor. For example, the number of weapons is analyzed at lower and higher numbers for peers, near peers, and nonpeers. Similarly, countervalue and counterforce targeting concepts, and limited and robust defenses are evaluated for each nuclear actor category. Table 1 summarizes the following analysis.

The nuclear peer relationship draws directly from the Cold War strategic stability lessons. As long as rough parity in nuclear weapons and capabilities is maintained, strategic stability is reinforced. Additionally, increased nuclear stockpiles reduce an adversary's initiative to launch a first strike in an attempt to destroy a retaliatory response. As a result, having more weapons is more stable than having fewer weapons and enhances strategic stability in the peer category. Countervalue targeting, or holding targets the adversary values (i.e., city populations) at risk, is more stable than counterforce targeting concepts (holding military and industrial targets at risk). Counterforce is a means of threatening a limited nuclear response and showing restraint by striking military forces. However, the advantage in counterforce targeting goes to the side that strikes first, and limits potential damage from a retaliatory strike by destroying portions of the adversary's nuclear force, which creates instability, since each side feels pressured to use their nuclear arsenal before losing it to a preemptive strike. Countervalue, on the other hand, ensures that forces will be available for retaliatory strikes, and holding cities at risk ensures unacceptable damage to the adversary. While countervalue targeting enhances strategic stability, the American public has had long-standing issues with this targeting concept, as it violates legal and moral norms and



raises questions of credibility in holding a country's population at risk.<sup>27</sup> As a result, the United States has rejected the stability of countervalue targeting for offensive damage limitation against military targets through counterforce targeting.

The last element for consideration in the peer relationship is defenses. Strategic stability is enhanced through defensive strategies using offensive damage limitation versus deployed active defenses. The offensive capability assures a retaliatory response to a nuclear attack, and the mutual vulnerability of both sides upholds the credibility of the threat. The downside to offensive damage limitation is that it favors the side that strikes first by reducing the number of available warheads for use in a retaliatory strike, and thus limits the potential damage to the aggressor. Active defenses such as missile defense systems destroy incoming nuclear forces and degrade stability by further reducing the effectiveness of a retaliatory strike through denial. However, it is likely some weapons will still get through the defenses. An adversary could increase this likelihood by increasing the number of weapons launched against the defenses using multiple weapon systems, or by using multiple weapons on any system to saturate the defenses. Additionally, the adversary could develop new weapons or capabilities to strike vulnerabilities in the system. The recently revealed Russian nuclear torpedo is a prime example.<sup>28</sup>

The near peer relationship also draws from experience in the Cold War, but the relationship may change significantly in the second nuclear age. If the United States and Russia continue to draw down their nuclear stockpiles, there will be a transition point where the lower numbers may place an increasing emphasis on China's nuclear capabilities. When the difference between China and the two nuclear superpowers becomes just a few hundred weapons, China may vertically proliferate their stockpile to reach nuclear parity, which will create additional complexity by establishing a trilemma in the peer category. Additionally, China may become more aggressive in its relations with the United States and Russia by engaging in the Cold War coercion tactics of nuclear brinkmanship. Thus, a higher number of US weapons enhances strategic stability in the near peer category, as it maintains the status quo, keeps the effort and cost high for vertical proliferation, and still allows China to maintain their nuclear capability for retaliatory purposes. Second, countervalue targeting enhances strategic stability for the near peer category. The counterforce

targeting strategy is less stable for the same reasons as the peer category. Presumably, due to China's smaller arsenal relative to the US stockpile and no "first use policy," it is likely they have adopted a countervalue targeting policy for their weapons against the United States or other opponents. Lastly, like the peer category, strategic stability is enhanced through defensive strategies using offensive damage in the near peer category. The deployment of active defenses, such as missile defenses, degrades stability for the near peer. Due to the near peer's smaller stockpile, US active defenses increase the incentive for a preemptive strike on the near peer to reduce their retaliatory forces and, depending on the capability of the US defensive force, deny some or all of the near peer's surviving weapons from hitting their targets in a retaliatory strike. Still, there is no guarantee that all the near peer's retaliatory forces would be defeated. The survivability and effectiveness of the near peer's retaliatory force is a function of the US and near peer offensive and defensive strike forces availability, responsiveness, reliability, and accuracy. Yet, in a large exchange, it is expected the stronger side would prevail unless the near peer developed and deployed more weapons, or other asymmetric forces and capabilities were developed.

The last category to examine is the nonpeer relationship. The number of weapons the United States holds is insignificant due to the numerical differences between the stockpiles. If a country has only a few nuclear weapons, it makes little difference if the United States has hundreds or thousands. Despite this fact, lower numbers of nuclear weapons would degrade stability. The arms control and Global Zero proponents have argued that the more the United States relies on nuclear forces to uphold its security, the more likely other states will be to proliferate. Yet a state with a small arsenal may vertically proliferate to increase their own arsenal if the United States and Russia continue to reduce their stockpiles bilaterally. There would be significant advantages for those countries to grow closer in parity with the United States or Russia and exert influence or coercion on the international community. Additionally, holding nonpeer cities at risk with a countervalue targeting strategy erodes strategic stability. Under this condition, it would be regarded as highly immoral to annihilate the population centers due to the actions of leadership, over which the population itself likely has no means of control. Also, this tactic would violate the just war doctrine for conduct in war (*jus in bello*) and

the principles of distinction and proportionality against civilian non-combatants caught in a conflict they did not create. A counterforce strategy is more appropriate even though it may still degrade stability. The difficulty with a counterforce strategy is that it holds the opponent's few weapons at risk and, either through a preemptive attack or fear of a potential attack, incentivizes the nonpeer to launch the weapons during a conflict before they lose them. Likewise, if the United States does not preemptively attack the weapons, there may be little residual nuclear forces to hold at risk for a retaliatory strike after the nonpeer weapons are used. It may be more stabilizing to consider a counter-leadership strategy designed to hold the nonpeer leadership directly at risk. If this approach is adopted, new nuclear capabilities will be required to hold hard and deeply buried leadership targets at risk. Finally, damage limitation through offensive weapons severely erodes stability for the nonpeer category. It leaves the United States vulnerable to attack with very few military targets to hold at risk in return. In the nonpeer category, active defenses enhance strategic stability by countering the threat with assured denial of the nonpeer's attack should deterrence fail. There may be other asymmetrical ways to overcome the active defenses, but to leave them uncovered invites an eventual attack.

The strategic stability solution for the second nuclear age is complex. The United States cannot simply implement a solution from Table 1 that enhances strategic stability in response to the most pressing threat. Rather, the United States should seek a balanced strategic stability posture from a systems perspective. From this approach, the United States can identify and define the stability domain using the strategic stability elements and the three categories of nuclear actors. The analysis in this section shows that a balanced stability posture is one that (1) maintains a US nuclear arsenal that is in rough parity with peers, yet is large enough to uphold the status quo with near peers and does not incentivize vertical proliferation with nonpeers, (2) continues the less stable counterforce targeting strategy to hold opponents' nuclear targets at risk and provide escalation restraint should deterrence fail, and (3) develops active defenses that protect the United States against nonpeer threats, yet are limited in size and scope so as not to interfere with the more stable offensive damage limitation strategy in the peer and near peer categories.

**Table 1: Strategic Stability Elements Applied to the Nuclear Actors\***

	Weapons		Targeting		Defenses	
	Lower Numbers	Higher Numbers	Countervalue	Counterforce	Limited (Offensive Only)	Robust
<b>Peer</b>	<i>Degraded</i>	<i>Enhanced</i>	<i>Enhanced</i>	<i>Degraded</i>	<i>Enhanced</i>	<i>Degraded</i>
	Rough Parity  Risk of First Strike	Rough Parity  Survivable Retaliatory Force	Assured Retaliation  Unacceptable Damage	Escalatory Restraint  Use or Lose Weapons	Assured Retaliation  Mutual Vulnerability	Questionable Penalty of Denial  Defeated with Offensive Mass
<b>Near-Peer</b>	<i>Degraded</i>	<i>Enhanced</i>	<i>Enhanced</i>	<i>Degraded</i>	<i>Enhanced</i>	<i>Degraded</i>
	Race for Parity  Nuclear Brinkmanship	Retaliatory Forces only  Maintain Status Quo	Assured Retaliation  Unacceptable Damage  Moral Limitations	Escalatory restraint  Use or Lose Weapons  Advantage to First Use	Assured Retaliation  Mutual Vulnerability  Advantage to First Use	Limited Denial  Survival of the Strongest
<b>Non-Peer</b>	<i>Degraded</i>	<i>Non-Factor</i>	<i>Eroded</i>	<i>Degraded</i>	<i>Eroded</i>	<i>Enhanced</i>
	Incentive to Proliferate		Holds Civilian Population Responsible for Government  Moral Limitations	Use or Lose Weapons  Little Return if Capability Expended	United States Vulnerable to Attack  Counter US Conventional Capability	Assured Denial  Asymmetric Threats Develop

\* This table summarizes the previous section’s analysis on the elements of strategic stability (the number of weapons, targeting strategy, and defensive posture) for each nuclear actor category. The conditional characteristics are summarized in each block, and the impact to strategic stability (enhanced, degraded, or eroded) is scored at the top.

## **Conclusion**

The Cold War bilateral strategic stability paradigm is not well suited for multiple nuclear actors in the 21st century, and the United States needs a new concept of strategic stability for the second nuclear age. In the contemporary world, the United States must balance three nuclear actors: peers, near peers, and nonpeers. The relationship is more complex than the dilemma of the Cold War world, as what the United States does to strengthen its security against one actor will make the other nuclear states feel less secure. Despite the security “trilemma,” the United States can balance stability by understanding the stability triangle model. The stability triangle shows that as long as forces acting on the system stay within the stable region of the triangle, then strategic stability is maintained. Using elements of strategic stability from the Cold War era in a different context, the United States can meet its security needs by keeping enough weapons in the deployed arsenal to establish rough parity with the peers without incentivizing vertical proliferation from the near peers and nonpeers. Additionally, the United States should maintain a counterforce targeting strategy to hold the nuclear forces at risk and provide a restraint from escalation with the peers and near peers. Lastly, deterrence theory does not guarantee against nuclear strikes, it simply lowers the probability of attack. The United States should hedge its strategic stability strategy with active defenses such as missile defense systems to protect it from attack from nuclear nonpeers. These defenses should remain limited in size and scope to maintain stability with nuclear peers and near peers, yet provide a defensive capability that would eliminate the chance of a nuclear attack from the growing nuclear nonpeer threat. Viewing strategic stability through this lens provides a framework to protect the United States by minimizing current and potential nuclear threats in the 21st century.

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## CHAPTER 5

# Extending the US Nuclear Deterrence Umbrella to the Middle East

Allen N. Cohen

Since 1949, the United States has offered an extended nuclear deterrence policy to reassure North Atlantic Treaty Organization (NATO) members they are protected against existential threats like the Soviet Union.<sup>1</sup> The United States provides similar assurances to key Asian partners via bilateral agreements in order to deter Chinese and North Korean aggression.<sup>2</sup> Joint Publication 1-02 defines deterrence as “the prevention of action by the existence of a credible threat of unacceptable counteraction and/or belief that the cost of action outweighs the perceived benefits.”<sup>3</sup> This research focuses specifically on US foreign policy in which the objective is to deter nuclear attacks against our allies or to deter coercive behavior backed by the threat of nuclear attack; this research excludes standard aggressive behavior by non-nuclear states.

Strategic directives for extended nuclear deterrence and the associated role of nuclear weapons are outlined in the 2010 Nuclear Posture Review (NPR), which also highlights the secondary objective of halting the spread of nuclear proliferation.<sup>4</sup> Over the past several years, many high-level officials, including Secretary of State Clinton, contemplated the idea of extending the US nuclear deterrence umbrella to our Middle Eastern partner nations.<sup>5</sup> This idea stems from advancements and interest in nuclear capability by many Middle Eastern nations, including Israel’s unacknowledged nuclear strike capabilities, Iran’s controversial nuclear ambitions, Saudi Arabia’s anticipated response to a nuclear-armed Iran, and Iraq and Libya’s previous attempts to obtain nuclear weapons.<sup>6</sup>

Extending the United States' nuclear deterrence umbrella to our Middle Eastern partner nations would provide negligible benefits and could introduce negative political implications in the region. In line with Air Force Global Strike Command (AFGSC) Reference # 2014-LAS-27, this research effort seeks solutions to the following key questions: 1) is the United States currently able to credibly extend nuclear deterrence to our Middle Eastern partner nations? 2) if so, what are the potential impacts to regional stability and the global strategic landscape, and should such a course of action be taken? 3) if not, what factors would have to change in order for the United States to credibly extend deterrence, and how likely are those changes?

The 2015 National Security Strategy (NSS) directs that “in the Middle East, we will dismantle terrorist networks that threaten our people, confront external aggression against our allies and partners...and prevent the development, proliferation, or use of weapons of mass destruction.”<sup>7</sup> The 2015 National Military Strategy (NMS) lists several state and non-state threats to our national objectives. It calls out Iran for posing “strategic challenges to the international community. It is pursuing nuclear and missile delivery technologies despite repeated United Nations Security Council resolutions demanding that it cease such efforts.”<sup>8</sup> These challenges must be weighed against other directives such as the “rebalance to the Asia-Pacific region, placing our most advanced capabilities and greater capacity in that vital theater.”<sup>9</sup> Future US extended nuclear deterrence decisions will carry implications for all the aforementioned issues. Extending this policy to the Middle East may demonstrate heightened US resolve and commitments to our regional partners. Others may perceive it as continued US meddling in the region, or causing further divisions in an already volatile environment. US decision-makers must carefully assess the potential impacts of extending our nuclear umbrella in terms of regional and global stability.

The research methodology for this topic uses a qualitative approach due to the low number of available case studies. The United States currently has extended nuclear deterrence agreements for NATO members and only a few nations in the Asia-Pacific region. An experimental design framework is inappropriate for this topic because of the complexities of international politics (e.g., the researcher cannot toggle on/off extended deterrence agreements as an independent variable and observe the

corresponding impacts between the affected nations). The approach of this research is to review case studies and pertinent data, establish theories and definitions, analyze three courses of action (COAs), and make final recommendations. Each section is explained in further detail below, beginning with a historical review of relevant US foreign policies.

### **Literature Review**

The United States currently provides assurance to NATO members multilaterally, and to some Asia-Pacific nations (e.g., South Korea, Japan, Taiwan, and Australia) on a bilateral basis.<sup>10</sup> These agreements are not permanent, as proven by the termination of assurance between the United States and New Zealand, as well as certain Middle East nations after the Cold War.<sup>11</sup> An examination of these case studies gives insight into when and where US extended nuclear deterrence is best applied.

According to the 2010 NPR, US nuclear weapons “contribute to Alliance cohesion and provide reassurance to allies and partners who feel exposed to regional threats.”<sup>12</sup> This assurance applies to all NATO members regardless of the member’s actual possession of such weapons. The 2010 NPR does not call out European regional threats by name, but history shows that a nuclear-capable Soviet Union provided the original catalyst for extended deterrence policy. The Cold War’s bipolar strategic environment pitted the United States and NATO against the Soviet Union and Warsaw Pact. David Yost mentions that NATO’s collective agreement continues “to hedge against the risk of backsliding in Moscow, given Russia’s long-term power potential, particularly its nuclear forces.”<sup>13</sup>

Among NATO members, only the United States, the United Kingdom, and France are nuclear-capable nations. The United Kingdom and France provide independent nuclear forces, some non-nuclear members provide basing and possess dual-capable aircraft that can deliver US tactical nuclear weapons, and many NATO members participate in nuclear planning or contribute to the Strategic Concept. The most recent version of the Strategic Concept declared that “the greatest responsibility of the Alliance is to protect and defend our territory and our populations against attack” and that “deterrence, based on an appropriate mix of nuclear and conventional capabilities, remains a core element of our overall strategy.”<sup>14</sup>

The US extended deterrence policy bolsters NATO's collective security and simultaneously constrains nuclear proliferation. When allies perceive a credible and reliable US deterrence against a mutual threat, they are less likely to seek their own nuclear weapons. This balance between security and non-proliferation requires extensive dialogue and cooperation between all involved actors. As the NATO Strategic Concept states, "we will seek to create the conditions for further reductions in the future."<sup>15</sup> Michael Mullen, former Chairman of the Joint Chiefs, reassured that the New Strategic Arms Reduction Treaty mandate "leaves us with more than enough nuclear deterrent capability for the world we live in."<sup>16</sup>

No multilateral alliance structure exists in Asia on par with NATO, and the United States "has mainly extended deterrence through bilateral alliances and security relationships and through its forward military presence and security guarantees."<sup>17</sup> China's explosion of a nuclear device in 1964 troubled many US allies in the Pacific region.<sup>18</sup> Taiwan, South Korea, Japan, and Australia all sought independent nuclear weapons programs to counter this threat. Only through US pressure and expanded deterrence agreements did these nations forego their nuclear weapons pursuits. North Korea first tested a nuclear device in 2006 that again raised concerns for South Korea and Japan, both of whom continue to rely on US-provided deterrence.

Unlike our strategic posture in Europe, no US tactical nuclear weapons are based in Asia. The United States withdrew its intra-theater nuclear assets during the 1990s, and currently provides extended deterrence via conventional capabilities (e.g., troops stationed in South Korea and Japan) and the US strategic nuclear force. Intercontinental ballistic missiles (ICBMs), strategic bombers, and submarine-launched ballistic missiles (SLBMs) have so far proven adequate to reassure our allies in the region. A Naval Postgraduate School thesis concluded that "the nuclear umbrella has been a small but important reason for Japan not obtaining its own strategic deterrent...[preventing] a nuclear arms race between Tokyo and Beijing akin to the Cold War competition between Washington and Moscow."<sup>19</sup> An Australian defense white paper explained that "we are able to rely on the nuclear forces of the United States to deter nuclear attack on Australia... [which has] removed the need for Australia to consider more significant and expensive defence options."<sup>20</sup> These examples illustrate how deterrence policies in Asia have reassured US

allies, deterred nuclear aggression, and minimized nuclear arms races between adversaries.

The US extended deterrence agreements in Asia will likely remain relevant well into the future. China continues to exert pressure against its neighbors over disputed territory in the South China Sea, which may eventually result in open military conflict.<sup>21</sup> A lack of transparency regarding their nuclear modernization efforts “raises questions about China’s future strategic intentions.”<sup>22</sup> Smaller nations may seek their own capabilities to rebalance the Asia security environment, or may look towards the United States to play a bigger role.

Extended deterrence agreements certainly are not permanent, and require significant consideration and planning to be effective. The perceived necessity of these agreements has occasionally given way to shifts in national policy, changes to the strategic landscape, or re-prioritized interests. France, New Zealand, and Iran provide examples of the dissolution of extended deterrence. In addition, the calculus of strategic interests often results in our deterrence policies never being established, as in Africa and South America.

In the case of France, US Cold War policies were sufficient to deter a threat, but not sufficient to reassure a close ally. Following the first successful Soviet atomic test in 1949, many European countries found themselves precariously wedged between two nuclear superpowers, with little capacity to compete with either side. Several years of political debate ensued to address the issue of effective deterrence: conventional versus atomic. Conventional capabilities were difficult to support, given the war-weary populations and tremendous costs of World War II. Atomic capabilities offered a less expensive, but more terrifying, option to the growing nuclear Soviet threat. Trachtenberg recounts a US proposition for a shared NATO nuclear stockpile: “allies would control the delivery systems, but the warheads themselves would normally be in American custody.”<sup>23</sup> Furthermore, the United States was reluctant to share the technical information necessary to develop these weapons. France relied on this arrangement for several years, as did other NATO nations, but eventually lost confidence and developed its own nuclear capabilities. As Premier De Gaulle proclaimed, “the view of a war and even of a battle in which France would no longer act on her own behalf, and in accordance with her own wishes, such a view is unacceptable.”<sup>24</sup> Nuclear weapons

grant nations a certain prestige and status in the world, but are often viewed through a negative lens, as demonstrated by the case of New Zealand.

In 1951, New Zealand signed a three-nation common defense pact with Australia and the United States known as ANZUS. Each nation cooperated on security matters that included the US nuclear umbrella coverage for the South Pacific region. In 1984, New Zealand's newly elected Labour government pledged a "nuclear free" national posture. Under this policy, US vessels were denied access to New Zealand ports unless first declaring if they carried nuclear weapons. However, this requirement conflicted with US security policy to neither confirm nor deny the presence of nuclear weapons on each vessel, which applied to all US allies under its nuclear umbrella. The reluctance by both nations to cede their respective policies "led the Reagan administration to state in 1985 that New Zealand had failed to meet its alliance obligations and U.S. defense and deterrence guarantees no longer applied to the country."<sup>25</sup> The United States and New Zealand have since mended diplomatic relationships, but extended nuclear deterrence was never reinstated. The next example shows more complex dynamics of applying foreign policy to a region of blurred alliances and adversaries.

The US nuclear umbrella did extend into the Middle East for a brief period during the Cold War. As Pifer et al. explain, "following the Iranian revolution and Soviet invasion of Afghanistan in 1979, the Carter administration announced its 'Carter Doctrine,' which stated that the United States would use force to prevent any power from conquering the oil fields of the Persian Gulf."<sup>26</sup> This policy supported a larger US strategic objective of containing Soviet expansion, and was applied to Saudi Arabia, Israel, and Iran. At the time, Iran "not only did not want American guarantees but sought to rid the region of a U.S. military presence."<sup>27</sup> This unique example of extended deterrence illustrates the complexities that can arise within multi-nation conflicts. Once the Soviet threat diminished, US leaders removed this assurance and redirected their focus to preserving regional stability against the ambitious goals of Iraq and Iran.

Though some countries did receive it, far more were never offered extended deterrence. Within a review of global case studies, it should be noted that no nation on the continents of Africa or South America were

invited under the US nuclear umbrella. Primary reasons for these situations may include the perceived lack of a nuclear aggressor, limited US national interest, and a lower level of US commitment to those nations. Evidence for this claim follows that the overall US military presence on these two continents is historically low compared to Europe, Asia-Pacific, and the Middle East, which is indicative of our strategic priorities. No African or South American nations possess nuclear weapons, which correlates to a minimal fear of nuclear attack. US Africa Command Headquarters did not exist prior to 2007, because it was not viewed with the same strategic importance as other geographic commands. General Kelly repeatedly referenced US Southern Command as “the lowest priority Geographic Combatant Command” in his 2015 Posture Statement to Congress.<sup>28</sup> However, the United States maintains a collective defense arrangement via the Rio Treaty of 1947 “which provides that an armed attack against any American State shall be considered as an attack against all the American States and each one undertakes to assist in meeting the attack.”<sup>29</sup> This treaty originally addressed overseas threats, but now encompasses intra-Hemispheric aggression between states. The decision to withhold its nuclear umbrella from African and South American countries reflects US strategic priorities as well as the considerations to establish nuclear foreign policy.

The rationale of the United States in extending nuclear deterrence is complex, and has manifested in different agreements to our partners across Europe, Asia-Pacific, and the Middle East. From the previously mentioned case studies, several factors appear to heavily influence US decisions to establish these policies. Some primary factors are: US national interest, primary threat, partner’s economic status, partner’s form of government, and cultural compatibility. The Analysis section contains more in-depth evaluations of these factors and helps construct a recommendation for the primary research questions: 1) is the United States currently able to credibly extend nuclear deterrence to our Middle Eastern partner nations? 2) if so, what are the potential impacts to regional stability and the global strategic landscape, and should such a course of action be taken? 3) if not, what factors would have to change in order for the United States to credibly extend deterrence, and how likely are those changes?

## **Theory/Argument**

The primary theories governing this research are deterrence and international relations. According to Bernard Brodie, “by deterrence we mean obliging the opponent to consider, in an environment of great uncertainty, the probably high cost of attacking us against the expected gain thereof.”<sup>30</sup> This evaluation requires one side to 1) understand their own capabilities and limitations, 2) understand the adversary’s values and motivations, and 3) properly convey a strategic message so the adversary believes the deterrent threat. Successful deterrence occurs when the adversary believes that the cost of a decision outweighs any potential gains, and thus chooses not to act. States are assumed to be rational entities that can be incentivized or coerced based on what they value, and make decisions that advance their self-interests.<sup>31</sup> Between multiple actors, deterrence is a psychological interaction rather than a strict comparison of military capabilities. Given the inherent strategic and political nature of nuclear weapons, leaders must always consider the potential international impacts of their employment. The deterrent and the one being deterred are not alone within this calculus.

The important international relations concepts are balance of power and strategic culture.<sup>32</sup> Balance of power defines the natural struggle between states due to their individual interests in the absence of a world government; strategic culture refers to how a state views itself and its place on the international stage.<sup>33</sup> Along with deterrence theory, the realist perspective of international relations theory assumes states to be rational actors, whether governed by a democracy or dictatorship. While deliberating a nuclear umbrella policy for our Middle Eastern partners, US leaders must focus on exactly who needs to be deterred.

As mentioned in the Background section, this research effort defines “extended nuclear deterrence” as deterring nuclear attacks against our allies or deterring coercive behavior backed by the threat of nuclear attack. In the Middle East, no nation has acknowledged a nuclear strike capability. Israel’s unacknowledged military capabilities are addressed through direct US-Israeli diplomacy, just as they were during Operation Desert Storm. As General Horner recounts, “Israeli retaliation would have been a terrible political mistake.”<sup>34</sup> The United States feared that an Israeli overreaction to Iraq’s missile attacks would expand the conflict and break up the coalition. Tensions were high, but the desire of the United States to



minimize the potentially negative impacts to its ally does not fit the definition of deterrence used in this research. However, Iran's continued pursuit of nuclear weapons capabilities raises security concerns for which deterrence could apply.

The 2015 National Military Strategy identifies Iran as "a state-sponsor of terrorism that has undermined stability in many nations, including Israel, Lebanon, Iraq, Syria, and Yemen."<sup>35</sup> Iran views itself as a regional hegemon and has actively sought the removal of US and Western influences from Middle Eastern affairs. A School of Advanced Air and Space Studies thesis argued that most Arab governments do not fear nuclear attack from Iran, but nuclear weapons would dramatically tip the balance of power. The author states that Iran "may become more flagrant in its support to bad actors...and could attempt to leverage its nuclear clout to limit Persian Gulf access."<sup>36</sup> In addition, Iran may act more coercively toward its neighbors while challenging regional stability.

To curb further weapons development, the P5+1, European Union, and Iran negotiated the Joint Comprehensive Plan of Action (JCPOA).<sup>37</sup> This agreement went into effect 16 January 2016 and established commitments for increased transparency into Iran's nuclear programs and lifted several sanctions against Iran. The JCPOA includes "a long-term [International Atomic Energy Agency (IAEA)] presence in Iran; IAEA monitoring of uranium ore concentrate produced by Iran...containment and surveillance of centrifuge rotors and bellows...use of IAEA approved and certified modern [measurement] technologies."<sup>38</sup> So long as Iran fulfills their commitments, the JCPOA "will terminate all the provisions of the previous UN Security Council resolutions on the Iranian nuclear issue" and the European Union (EU) "will terminate all provisions of the EU Regulation...implementing all the nuclear related economic and financial sanctions."<sup>39</sup> The long-term implications of this deal are uncertain. Secretary of State Kerry lauded that "the U.S., our friends and allies in the Middle East, and the entire world are safer because the threat of a nuclear weapon has been reduced... each of the pathways that Iran had toward...a nuclear weapon has been verifiably closed down."<sup>40</sup> Critics like Israel's Prime Minister Netanyahu argued that the deal would fuel "Iran's aggressions with billions of dollars in sanctions relief, [making] war more likely," before citing several Iranian-sponsored terrorist activities and threats during the months of JCPOA negotiations.<sup>41</sup> The concepts

contained in deterrence theory and international relations theory set the stage upon which analysis of extended nuclear deterrence policy may occur.

## **Analysis**

This research investigates three COAs for the Middle Eastern scenario:

**COA 1—*Extend Nuclear Deterrence***—This scenario mimics the US approach for key Asian-partner nations. In the absence of a strong multilateral framework (such as NATO) in the Middle East, a bilateral approach can provide significant assurance. This COA requires individual consideration for each potential partner because US interests and compatibility vary from one nation to the next. Extended deterrence of this fashion includes a range of options, including forward-basing tactical nuclear weapons, employing dual-capable host aircraft, or deploying SLBMs and US strategic bombers in closer proximity to the threat.

**COA 2—*No Deterrence***—This scenario requires no additional US assets in the region. No additional security commitments occur, nor does the United States further involve itself in Middle Eastern affairs. Diplomacy would still exist, although this COA may face credibility issues from the lack of tangible actions. This COA would potentially free up US resources to serve national interests in other geographic areas such as the Asia-Pacific region.

**COA 3—*Conventional-Only Deterrence***—offers some level of reassurance via missile defense, power-projection, and coordinated diplomacy. US conventional capabilities currently provide varying degrees of assurance to Middle Eastern partner nations. For example, multi-nation military exercises, forward-based US operations, and foreign military sales may strengthen our partners' overall capacity for self-defense in the face of current and future threats. This approach does not lock the United States into deeper involvement in the Middle East, and may be flexible enough to meet a wider range of security concerns. It is heavily reliant on strategic messaging, as different actions may cause different regional partners to perceive US favoritism.

From the case studies in the Literature Review section, several key factors stand out which may influence the US decision to extend or not extend nuclear deterrence to different nations. The following factors are used for this qualitative analysis: US national interest, primary threat, partner's global economic ranking, partner's form of government, and cultural

compatibility. The dependent variable in each case is the type of deterrence offered, and each factor contains values as they exist today. The decision to extend deterrence is ongoing, and subject to change with shifts in strategic interests and priorities:

1. **US national interest:** Why is the United States primarily concerned with the partner or region?
2. **Primary threat:** Who is the key adversary?
3. **Economic rank:** What is the nation's world ranking in terms of gross domestic product purchasing power?
4. **Partner's form of government:** What is the predominant form of governance in the nation?
5. **Cultural compatibility:** What are the dominant religions, languages, and rule of law?
6. **Type of deterrence offered:** Nuclear (tactical weapons deployed in theater), nuclear (via strategic weapons only), conventional only, or none?

Table 1 contains summary regional data for the countries examined in this research. Appendix A contains data for individual countries, and represents a sample of nations for which the United States may or may not have extended nuclear deterrence. The values provided in each cell are derived from the Central Intelligence Agency's "The World Factbook" and from the Literature Review.<sup>42</sup> Additional nations are included as a control for the familiar case studies and to illustrate regional trends.

**Table 1: Summary Regional Data**

	<b>Europe</b>	<b>Asia</b>	<b>Middle East</b>	<b>Africa</b>
<b>US national interests</b>	Contain communism/ Preserve NATO	Contain communism	Regional stability/ Strategic resources	Regional stability/ Terrorism
<b>Primary threats</b>	Russia	China	Russia/Iran	None
<b>Economic ranks</b>	6th (Germany) to 167th (Monaco)	1st (China) to 227th (Tuvalu)	15th (S. Arabia) to 98th (Bahrain)	23rd (Nigeria) to 201st (Comoros)
<b>Government</b>	Monarchs/ Republics/ Democracies	Republics/ Democracies	Monarchs/ Emirates/ Republics	Monarchs/ Republics
<b>Cultures (religion, language, law)</b>	Christianity, Various, Common & Civil law	Buddhism/ Hinduism/ Christianity/ Islam, Various, Common & Civil law	Islam/ Orthodox/ Judaism, Various, Mixed Sharia / Civil law	Christianity/ Islam, Various, Common & Civil law
<b>Deterrence offered</b>	Nuclear (tactical & strategic)	Nuclear (strategic); Conventional; None	Conventional; None	None

Appendix A, Tables 2 through 7, provide some noteworthy insights regarding historical US decisions to extend or not extend nuclear deterrence around the world. Arguably, the most significant factors are US national interest and the existence of a primary threat. The national imperative to contain communism led US decision makers to develop deterrence policies in Europe, the Middle East, and Asia. Specifically, nuclear-capable Russia and China posed the greatest threats for our global partners. The battle of communism versus capitalism existed within Africa and South America as well, but no state actors directly threatened a nuclear attack against US partners. Conventional deterrence was often provided to mitigate non-nuclear aggression and to promote regional

stability. In the Middle East, Iran's nuclear aspirations and subversive actions are the greatest concern against US interests.

A partner's economic ranking, form of government, and culture were less significant factors. Smaller nations like Estonia and New Zealand had less global economic influence than many US allies, but held strategic geographic locations from which the United States could encircle a primary threat. Most nations that received extended nuclear deterrence have democratic or republic forms of government. However, there is no direct correlation between the world's democratic societies and the list of nations under the US nuclear umbrella. A nation's religion, language, and legal system were shown to have no bearing on their receiving US assurance. Cultural factors varied widely across the sample data, with no obvious correlation to US deterrence policy. Given these insights from previous policy decisions, the next section evaluates how well each proposed COA meets US strategic interests in the Middle East.

In addition to the country data within Appendix A, two additional criteria are useful to evaluate the COAs: US Central Command's (USCENTCOM) strategic guidance, and global perceptions based on Iran's relationships. USCENTCOM is involved with all US actions in the Middle East and has a heavy military and civilian footprint in the theater. The complex relationships between Middle Eastern countries require US policymakers to always consider the perceptions of our allies and adversaries.

COA 1—Extend Nuclear Deterrence—would provide negligible benefits for the US Middle Eastern partners due to lack of a significant nuclear threat. The world's nuclear nations have shown little aggression against the Middle East in recent decades, so US forces have no clear entity to deter. The top five priorities listed in the 2015 USCENTCOM Posture Statement involve violent extremist organizations, dangerous ideologies by Islamists, or government instability.<sup>43</sup> An extended nuclear deterrence policy does little to address any of these root issues. Iran's nuclear program causes some concerns for regional stability, but US leaders currently look to the JPCOA to address these concerns.

Complex international relations pose another major barrier for COA 1. The United States and its Middle Eastern partners have a mixed history of cooperation, which often requires maintaining a delicate balance between strategic necessity and ideological sensitivities. Cultural

compatibility is not a prerequisite for extended deterrence, but the United States has frequently shown its ineffectiveness in navigating Middle Eastern affairs (e.g., calming religious tension in Iraq, or establishing a central government in Afghanistan). COA 1 would potentially lock the United States into an alliance that it is not prepared to fully support. For example, such a policy towards Shia-led Iraq would demonstrate much deeper commitments, but might be seen as a slight against Sunni-governed neighbors. Offering extended nuclear deterrence to a predominantly Sunni partner might fuel Iran's rhetoric and exacerbate sectarian tensions within other countries such as Bahrain or Lebanon.

COA 2—No Deterrence—runs counter to the first COA, but does not meet US strategic interests. A policy in which US forces withdrew from the region would likely result in increased destabilization for our partners. Furthermore, this approach would embolden those such as Iran, Islamic State, and Al Qaeda, who already seek domination and desire to create a single Islamic Caliphate over the population. The 2015 NSS states that “we remain committed to a vision of the Middle East that is peaceful and prosperous.”<sup>44</sup>

General Austin's USCENTCOM Posture Statement considers Iran “the most significant threat to the Central Region” and expressly lists a command priority to “maintain credible general and specific deterrent capability and capacity to counter Iran.”<sup>45</sup> Given the perceived inability of some Middle Eastern partners to provide for their own defense against an increasingly capable Iran, future US involvement appears necessary. Several Gulf States—Saudi Arabia, Jordan, United Arab Emirates, Bahrain, and Qatar—contribute to the containment of Iran's hegemonic aspirations, but rely heavily on US resources and capabilities. Similarly, these nations work alongside US forces to combat extremist organizations. COA 2 would degrade these partnerships and weaken the influence and credibility of the United States in the region. In response, many nations might look to Russia, China, and other world powers for support. Therefore, COA 2 does not promote US interests and might generate long-term negative impacts for the Middle East.

COA 3—Conventional-Only Deterrence—supports US national interests without over-committing to a historically volatile region. USCENTCOM actively builds partner capacity through foreign military sales, training, and education with a goal to “enable them to assume a

greater share of the responsibility and do what is required to bring about improved stability in the region.”<sup>46</sup> The use of conventional capabilities and coordinated diplomacy should be sufficient to deter non-nuclear regional aggressors. “Rotational joint forces that include fighter and airlift assets, surveillance platforms, ballistic missile defenses, naval vessels, ground forces, and cyber teams...are indispensable to protecting our core interests and supporting and reassuring our partners in the region.”<sup>47</sup>

By fostering better relationships between and within Saudi Arabia, Jordan, Kuwait, and others, the United States can help preserve a healthy balance of power without a significant US military presence. These activities rely on concurrent diplomacy with third-party states to mitigate unintended consequences and prevent escalation. The United States should be aware of misperceived favoritism towards particular religious or ethnic groups, and intentionally address these concerns.

### **Conclusion/Recommendation**

In conclusion, this research provides the following recommendations to the key questions from AFGSC Ref # 2014-LAS-27:

- 1) Is the United States currently able to credibly extend nuclear deterrence to our Middle Eastern partner nations? The United States certainly has the physical capacity to extend nuclear deterrence, as seen by forward deployments of nuclear weapon systems and the US-based global strike assets. However, US decision-makers lack the justification and political will to do so. Without a significant regional threat, extending the nuclear umbrella does not provide tangible benefits to our Middle Eastern partners, but would significantly increase US commitments. President Obama’s directive for a “strategic pivot” to the Asia-Pacific theater, combined with the desire to reduce the US presence in current Middle Eastern conflicts, conveys unwillingness for additional commitments in the region.
- 2) If so, what are the potential impacts to regional stability and the global strategic landscape, and should such a course of action be taken? This research does not recommend extending our nuclear umbrella to the Middle East. Non-nuclear solutions already exist which can bolster regional stability against potential aggressors like Iran. A whole-of-government approach is necessary to avoid misperceptions of favoritism, to contain proliferation, and to ease the concerns of our partners. The United States should maintain its conventional deterrence capabilities while continuing to build partner capacity for self defense.

- 3) If not, what factors would have to change in order for the United States to credibly extend deterrence, and how likely are those changes? To credibly extend nuclear deterrence, the primary change needed is the existence of a regional nuclear threat. This change is likely in the near future, as many of the Iran JCPOA requirements expire after 10 or 15 years. If Iran violates the JCPOA stipulations or openly pursues a nuclear weapon, the United States may be compelled to extend our nuclear umbrella to key Middle Eastern partners. Without doing so, Saudi Arabia will likely acquire their own nuclear capability, as France did in 1960, with help from their partner Pakistan. When asked about the Saudi response to a nuclear-armed Iran, foreign minister Jubeir told CNN that “Saudi Arabia will do whatever it takes to protect our nation and people from any harm. And I will leave it at that.”<sup>48</sup>

This topic should be revisited to address strategic changes to the Middle Eastern landscape, such as Iran’s acquisition and development of a functional nuclear weapon, dramatic shifts in Middle Eastern alliances, or significant changes to US foreign policy during future administrations.

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## Appendix A

### Data for Individual Countries by Region

***Table 2: Europe Sample Data***

	<b>United Kingdom</b>	<b>France</b>	<b>Estonia</b>	<b>Turkey</b>
<b>US national interest</b>	Contain communism/ preserve NATO	Contain communism/ preserve NATO	Contain communism/ preserve NATO	Contain communism/ preserve NATO
<b>Primary threat</b>	Russia	Russia	Russia	Russia
<b>Economic rank</b>	10	11	115	18
<b>Government</b>	Constitutional monarchy	Republic	Parliamentary republic	Republican parliamentary democracy
<b>Culture (religion, language, law)</b>	Christianity, English, Common law	Christianity, French, Civil law	None/Christianity, Estonian, Civil law	Islam (Sunni), Turkish, Civil law based on Swiss model
<b>Deterrence offered</b>	Nuclear (tactical & strategic)	Nuclear (tactical & strategic)	Nuclear (tactical & strategic)	Nuclear (tactical & strategic)

***Table 3: Asia Sample Data***

	<b>Japan</b>	<b>South Korea</b>	<b>Philippines</b>	<b>Taiwan</b>
<b>US national interest</b>	Contain communism	Contain communism	Contain communism	Contain communism
<b>Primary threat</b>	China	China	China	China
<b>Economic rank</b>	5	14	30	21
<b>Government</b>	Parliamentary government w/ constitutional monarchy	Republic	Republic	Democracy
<b>Culture (religion, language, law)</b>	Shintoism/ Buddhism, Japanese, Civil law	Christianity/ Buddhism, Korean/English, Civil/American law	Christianity, Tagalog, Civil/common/ Islamic law	Buddhist/ Taoist, Mandarin, Civil law
<b>Deterrence offered</b>	Nuclear (strategic assets)	Nuclear (strategic assets)	Conventional	Nuclear (strategic assets)

*Table 4: Pacific Sample Data*

	Australia	New Zealand	Malaysia
<b>US national interest</b>	Contain communism	Contain communism	Regional stability
<b>Primary threat</b>	China	China	China
<b>Economic rank</b>	19	71	29
<b>Government</b>	Federal parliamentary democracy	Parliamentary democracy	Constitutional monarchy
<b>Culture (religion, language, law)</b>	Christianity, English, Common law	Christianity, English, Common law	Islam, Bahasa Malaysia/English, Common/Islam/customary law
<b>Deterrence offered</b>	Nuclear (strategic assets)	Conventional (nuclear during Cold War)	None

*Table 5: Africa Sample Data*

	South Africa	Nigeria	Congo
<b>US national interest</b>	Regional stability/terrorism	Regional stability/terrorism	Regional stability/terrorism
<b>Primary threat</b>	None	None	None
<b>Economic rank</b>	31	23	101
<b>Government</b>	Republic	Federal Republic	Republic
<b>Culture (religion, language, law)</b>	Christianity, IsiZulu/IsiXhosa/Afrikaans, Civil/Common law	Islam/Christianity, English, English common & Islamic law	Christianity, French, civil law based on Belgian law
<b>Deterrence offered</b>	None	None	None

**Table 6: South America Sample Data**

	<b>Saudi Arabia</b>	<b>Jordan</b>	<b>Qatar</b>	<b>Iran</b>
<b>US national interest</b>	Regional stability/ strategic resources	Regional stability/ strategic resources	Regional stability/ strategic resources	Regional stability/ contain communism
<b>Primary threat</b>	Iran	Iran	Iran	Russia (during Cold War), Israel
<b>Economic rank</b>	15	87	52	20
<b>Government</b>	Monarchy	Constitutional monarchy	Emirate	Theocratic republic
<b>Culture (religion, language, law)</b>	Islam (Sunni), Arabic, Sharia w/ customary law	Islam (Sunni), Arabic, Mixed civil/Islamic law	Islam, Arabic, Mixed civil/Islamic law	Islam, Persian, Sharia law
<b>Deterrence offered</b>	Conventional	Conventional	Conventional	None (nuclear during Cold War)

**Table 7: Middle East Sample Data**

	<b>Brazil</b>	<b>Colombia</b>	<b>Guatemala</b>
<b>US national interest</b>	Regional stability/drugs/ organized crime	Regional stability/drugs/ organized crime	Regional stability/drugs/ organized crime
<b>Primary threat</b>	None	None	None
<b>Economic rank</b>	8	32	80
<b>Government</b>	Federal republic	Republic	Constitutional democratic republic
<b>Culture (religion, language, law)</b>	Christianity, Portuguese, Civil law	Christianity, Spanish, Civil law based on Spanish/French codes	Christianity, Spanish, Civil law
<b>Deterrence offered</b>	Conventional	Conventional	Conventional

## CHAPTER 6

# The Need for Joint Doctrine

Daniel Lindsey

The purpose of joint doctrine is to enhance the operational effectiveness of US joint forces. It reflects fundamental principles and best practices based on extant capabilities, and incorporates changes derived from lessons learned during operations, training, exercises, and, when appropriate, validated concepts.<sup>1</sup> Unfortunately, the last published joint nuclear doctrine statements were Joint Publication (JP) 3-12: *Doctrine for Joint Nuclear Operations*, 15 December 1995 and JP 3-12.1: *Doctrine for Joint Theater Nuclear Operations*, 9 February 1996. In 2005, the Joint Staff rescinded both publications, creating a void of nuclear doctrine within the community. In 2009, the US Air Force (USAF) published Air Force Doctrine Document 2-12: *Nuclear Operations* as the only officially published Department of Defense (DoD) nuclear doctrine. In recent years, several nuclear incidents have highlighted the neglect of the nuclear enterprise, and subsequent investigations have identified the need for a renewed emphasis on all aspects of nuclear operations, including joint nuclear doctrine. Nuclear fighters are the most challenging arm of the nuclear forces to doctrinally integrate because of their limited role outside the European theater and the resulting small pool of knowledgeable Airmen. This research will analyze the role of these fighters in nuclear operations and propose a framework by which to best integrate them into a new joint nuclear doctrine. It is best illustrated with an examination of events that have influenced the need for new doctrine, the mission of nuclear fighters as dual-capable aircraft (DCA), their capabilities and limitations, and key inputs for incorporating nuclear fighters into the new doctrine.

## **Background**

In 2007, a B-52 mistakenly departed Minot Air Force Base (AFB) and landed at Barksdale AFB loaded with six nuclear tipped AGM-129 air-launched cruise missiles (ALCM); the crew was unaware that it carried live nuclear weapons.<sup>2</sup> In 2008, the USAF reported that it had unknowingly shipped four intercontinental ballistic missile (ICBM) electrical fuses to Taiwan back in 2006; it was the Taiwanese, not the USAF, who caught the mistake.<sup>3</sup> In 2014 at Malmstrom AFB, nine commanders were fired when an investigation into illegal drug activity indicated some missile operators were cheating on tests; an inquiry revealed a longstanding culture of perfectionism and micromanagement, which had destroyed morale within the missile wing.<sup>4</sup> In response to this series of nuclear missteps, the DoD directed the Nuclear Enterprise Review, which used two independent teams that each found systematic problems with investment and support of nuclear forces that if not addressed could undermine safety, security, and effectiveness. Then Secretary of Defense Chuck Hagel responded by reiterating his policy on the importance of the nuclear mission to the DoD, and promised improvements in all aspects of the nuclear community, including funding for equipment and personnel.<sup>5</sup>

The Nuclear Enterprise Review successfully identified disconnects within the nuclear forces, but did not address the lack of joint nuclear doctrine. However, in May 2015, the DoD Inspector General urged that it was time to “reconsider, with input from the GCCs [Ground Combatant Commanders] and services, the need for *published unclassified doctrine* addressing the integration of theater nuclear planning and execution into traditionally conventional operations.”<sup>6</sup> At the time of this writing, the Joint Staff is in the process of filling this doctrinal gap by developing a new doctrine titled JP 3-72 *Nuclear Operations*.<sup>7</sup> The publication’s scope encompasses the command and control, operations, planning, and surety of employing nuclear weapons.<sup>8</sup>

## **Joint Doctrine Development Process**

The Chairman of the Joint Chiefs of Staff Manual governs the joint doctrine developmental process. The manual uses four stages of doctrinal life cycle: initiation, development, approval, and maintenance. Since the



Joint Staff is currently committed to the development of a new joint nuclear doctrine, only the developmental phase needs reviewing. The formulation of the new nuclear doctrine uses the “normal” seventeen-month process. The first five months involve the initial writing by J-33 (current operations), incorporating inputs from all the services. Next, the publication moves through eleven months of coordination and revisions with J-7 (joint force development), joint doctrine sponsor, and others before reaching the Secretary of the Joint Staff for signature. One month later, J-7 approves the publication for distribution. However, one challenge to this process is the unique nature of nuclear fighters as DCA. Unlike many components of the nuclear triad, the nuclear fighter’s mission is executed with a small number of Airmen, which results in a limited knowledge base, and typically means there are few experienced nuclear fighter officers that can provide the input the Joint Staff requests and needs.

### **Nuclear Fighters**

A foundational understanding of DCA terminology and how it differs from the nuclear triad is critical to understanding the difficulties involved in incorporating it into doctrine. First, DCA is a term meaning “capable of conventional and nuclear operations,” and commonly refers to nuclear fighter aircraft. Although this definition can be a little confusing given that bombers are capable of conventional weapons deliveries just as fighters are, it is the widely accepted term. Second, fighters are not a member of the nuclear triad. The 2010 NPR states that the nuclear triad consists of submarine launched ballistic missiles (SLBM), ICBM, and nuclear-capable heavy bombers.<sup>9</sup> Given that fighters are not a part of the nuclear triad, many within the USAF are unaware of the role nuclear fighters perform as DCA.

The NPR states that “the United States has reduced its non-strategic (or ‘tactical’) nuclear weapons dramatically since the end of the Cold War. Today, it keeps only a limited number of forward deployed nuclear weapons in Europe, plus a small number of nuclear weapons stored in the United States for possible overseas deployment in support of *extended deterrence* to allies and partners worldwide. Russia maintains a much larger force of non-strategic nuclear weapons, a significant number of

which are deployed near the territories of several North Atlantic Treaty Organization (NATO) countries and are therefore *a concern to NATO*.<sup>10</sup> As the sole nuclear force stationed in Europe, the mission of nuclear fighters is to project US extended deterrence in support of NATO and other allies.

Air Force Doctrine Annex 3-72: *Nuclear Operations*, 19 May 2015, describes extended deterrence as the United States providing for the security of its allies by threatening a nuclear response in the event of an enemy attack. This threat of retaliation serves as the foundation for what is defined as extended deterrence.<sup>11</sup> As such, extended deterrence is a visible signal against adversary aggression to convince an enemy they will not achieve their political and military objectives when attacking the United States and its allies. Lastly, the NPR plainly states that there will be no changes to US extended deterrence capabilities without continued consultation with allies and partners, a statement consistent with the US commitment to invest in developing and upgrading both the next generation nuclear fighter, the F-35, and its weapon, the B-61 Mod 12.<sup>12</sup>

## **Politics**

Strategic heavy bombers and fighters are capable of delivering the same weapon, so why do nuclear fighters execute extended deterrence? The answer is politics. The political issues associated with nuclear fighters are more complex than they might appear. Nowhere is this complexity more apparent than with the political relationship between the United States and NATO. In 2010, the heads of state and the government of the NATO nations published a renewed Strategic Concept. The document details NATO's core tasks and principles as a group. Task/principle one is that "NATO's fundamental and enduring purpose is to safeguard the freedom and security of all its members by political and military means."<sup>13</sup> Task/principle two under defense and deterrence is that "deterrence, based on an appropriate mix of nuclear and conventional capabilities, remains a core element of our overall strategy. The circumstances in which any use of nuclear weapons might have to be contemplated are extremely remote. As long as nuclear weapons exist, NATO will remain a nuclear alliance."<sup>14</sup> The 40-page document goes on to reference the nuclear issue 20 more times, which highlights the political underpinnings of NATO's

existence, in which nuclear weapons remain a core-bonding agent for the organization.

A recent US Army War College report on tactical nuclear weapons and NATO stated that “in addition, the nuclear issue—and the specific matter of those ‘tactical’ bombs—can never be divorced from the broader question of NATO’s future identity and orientation, which is still a work in progress.”<sup>15</sup> However, the renewed Strategic Concept’s verbiage is different from its previous 1999 version, as it has tried to divorce NATO from this image: “gone is the previous message that these weapons provide an essential military and political link between Europe and North America.”<sup>16</sup>

The US commitment to operating nuclear fighters within Europe is a visible assurance to NATO and its future. Without this commitment, concern for NATO’s existence may be very real and viable. Critics of this idea cite the US extended deterrence policy already in use in Asia. Within this region, the United States has already removed its nuclear weapons, but continues to provide its allies with protection under its nuclear umbrella of the traditional nuclear triad; however, it does require some degree of advanced warning to adequately posture nuclear forces. A benefit to removing nuclear weapons from Europe could be that Russia might negotiate removing or reducing its tactical nuclear weapons on its European border. Russia has always maintained that the removal of US tactical nuclear weapons from Europe is a precondition for negotiations on those weapons, although Russia has shown little interest in negotiations with the United States after the 2014 Ukraine crisis. A precondition is reciprocated in the renewed Strategic Concept: “in any future reductions, our aim should be to seek Russian agreement to increase transparency on its nuclear weapons in Europe and relocate these weapons away from the territory of NATO members. Any further steps must take into account the disparity with the greater Russian stockpiles of short range nuclear weapons.”<sup>17</sup> However, the very method with which NATO builds its strategic concept is likely a roadblock to ever achieving this goal. Remember, NATO is a consensus of 28 nations, and often the overall decision for change is a condition of the least motivated member. The limitation of no unilateral actions often stifles changes, for if one member does not agree, then the result is too often concession and weakening.

Therefore, this method is unlikely to bring the United States, Russia, and NATO into a consensus on tactical nuclear weapons.

Approaching the 2010 rewrite of the renewed Strategic Concept, many expected a significant change in NATO's nuclear posture. With the Cold War far behind, and the likelihood of an attack from Russia seen as much more remote, the opportunity for change certainly existed. High-ranking politicians from various NATO countries began to question US weapons on European soil, as well as the threat necessitating them. Some politicians running for office made campaign promises to remove US nuclear weapons. The momentum built and "together with Germany, Norway, and Luxembourg, these governments [Dutch and Belgian] sent a letter in February 2010 to the NATO Secretary-General, asking him to put the withdrawal on the agenda of the informal NATO meeting of the foreign affairs ministers in Tallinn, Estonia, in April 2010. At that meeting, a policy rift opened among NATO members."<sup>18</sup> NATO members could not come to a consensus on the debate and the rift closed through concession.

The process for change within NATO is challenging, and was a likely contributor in reaffirming the same old policies of the past, as written in the renewed Strategic Concept. NATO has always faced the problem of diverse opinions. Therefore, any change requires the backing of many—otherwise NATO risks division within the organization. In the end, NATO has concluded that the risks of division far outweigh any cohesion that could be brought about by concession. Therefore, nuclear weapons will continue to remain a bonding agent for NATO as an institution, and the mission of extended deterrence will remain as an exercise of that bond. As long as the United States supports NATO, it must commit nuclear fighters to the mission of extended deterrence as a tangible sign of that commitment.

## **Doctrine**

The mission of extended deterrence in support of NATO is not going away, and nuclear fighters will continue to fill this critical role—but what other factors are driving the need for a new joint nuclear doctrine? JP 3-12 *Joint Nuclear Doctrine* and JP 3-12.1 *Joint Theater Nuclear Doctrine*, were the last officially published joint nuclear doctrines. JP 3-12 focused

on a broad view of nuclear operations through three categories: nuclear objectives, employment of forces, and integration. JP 3-12.1 provided slightly more detail with respect to operations and capabilities, as it focused on nuclear command and control, planning and employment, command responsibilities, and staff procedures. Currently, the only officially published nuclear doctrine is Air Force Doctrine Annex 3-72. This publication focuses on the five strategic nuclear effect fundamentals: deterrence, extended deterrence, assurance, dissuasion, and defeat, as well as force presentation, command and control, planning considerations, and surety. However, Annex 3-72 does not provide the various combatant commanders with a foundational knowledge of nuclear operations, nor can it provide a complete integration strategy for the spectrum of nuclear forces. Therefore, the signal demand for a joint nuclear doctrine necessitates that the Joint Staff fill this doctrinal gap with a single comprehensive publication that will support commanders and staffs on all nuclear forces.

The operational environment has changed significantly since the original 1995 and 1996 publications of joint nuclear doctrine. For example, two new nuclear powers have risen—Pakistan in 1998 and North Korea in 2009. The 2010 New Strategic Arms Reduction Treaty (START) further reduced US and Russian nuclear stockpiles from 1996 levels. The 2006 Quadrennial Defense Review (QDR) introduced a new concept called tailored deterrence, attempting to customize deterrence to a specific adversary rather than applying a universal concept. The 2015 Iranian nuclear deal allows Iran to begin legally using nuclear facilities for peaceful purposes; however, the country's controversial past leaves open many illicit possibilities. These changes are just a few of many that have affected the environment in which commanders must make nuclear decisions, which only solidifies the need for a new nuclear doctrine.

### **New Doctrine**

The new joint nuclear doctrine must comprise three fundamental component areas: purpose of nuclear forces, command and control, and employment. To adequately educate unfamiliar combatant commanders and staffs on the full spectrum of nuclear forces, the component of employment must include the key factors of force integration, targeting

considerations, and capabilities and attributes. Specific to DCA operations, this doctrine should address six elements that are essential to nuclear fighters: the role of fighters in DCA operations, deployment considerations, training/spin-up, hosting considerations, security, and supporting forces.

The purpose of the nuclear forces component should mirror the five strategic effects outlined in Air Force Doctrine Annex 3-72: deterrence, extended deterrence, assurance, dissuasion, and defeat.<sup>19</sup> These effects prominently describe the missions that each US nuclear force executes, and links those forces across the five missions. For example, nuclear fighters predominantly execute extended deterrence in support of NATO nuclear operations, but at the same time are fulfilling a piece of the deterrence and dissuasion mission. The idea is to demonstrate to commanders and staffs that all nuclear platforms perform multiple missions simultaneously, which should be taken into account when deciding to use or not use an arm of the nuclear forces.

The component of command and control does not necessitate a caveat for nuclear fighters; however, the remaining component of employment does. Nuclear fighters differ from other arms of the nuclear triad in several key ways. For example, unlike ICBMs, SLBMs, and possibly some bombers, nuclear fighters typically employ in large force packages that cover numerous mission sets such as offensive counter air (OCA), suppression of enemy air defense (SEAD), air-to-air refueling, electronic warfare (EW), and airborne command and control (C2). These packages can quickly exceed 60 aircraft; therefore, planners must anticipate and incorporate all these assets. Additionally, nuclear fighters are more capable, both offensively and defensively, than heavy nuclear bombers. With respect to offense, in addition to bombs, fighters utilize radars that have air-to-air capabilities to support the detection and destruction of an airborne adversary. For defense, like bombers, fighters have passive and active countermeasures and decoys, but fighters are more maneuverable against incoming threats. As a baseline, nuclear fighters will employ in at least a two-ship for mutual support, and as high as a four-ship. Commanders must be aware of these capabilities, as it may influence the decision to send fighters over bombers or vice versa.

The first key factor to the component of employment is force integration. As previously described, nuclear fighters typically have a

large supporting force, and integration into that force becomes difficult as its size increases. Even more challenging is the fact that a supporting force is most likely executing conventional weapons deliveries while supporting the nuclear fighter, not only for efficiency in execution, but also to aid in deception, as having to distinguish nuclear fighters from conventional ones amongst a large force package complicates the adversary's targeting process.

The problem with force integration is that the supporting force lacks knowledge of nuclear operations, and this problem is exacerbated by isolation of the nuclear force. To integrate conventional and nuclear forces into a single fighting unit requires that commanders and staffs facilitate communication between the two forces and remove the isolation barrier. One method to accomplish this goal is to co-locate forces at the same base to the maximum extent possible. Additionally, barriers to detailed planning must be removed to allow conventional and nuclear crews to iron out the details by mission planning together. Too often, procedures require nuclear crews to be put into isolation, and they are thus excluded from the details of the mission commander's plans and vice versa. Unfortunately, conventional crews are rarely briefed on the details of a nuclear attack. It would be beneficial to provide the crews not just the general target location, but also the details of attack axis, weapon time of fall, detonation, and effects expectations. This information provides the entire force package with flexibility in response during a dynamic employment scenario.

The third component, targeting, highlights one of the limitations with using nuclear fighters. Although the nuclear fighter and heavy nuclear bomber can all deliver the B61, the fighter carries a much smaller conventional and nuclear bomb load than the bombers. If a target or target set requires multiple weapons to service it, then the bomber would be a better choice. However, one advantage of the nuclear fighter is speed, which affects both response time and standoff distance. Because nuclear fighters can employ weapons at the maximum designed employment speed, increasing the range between aircraft and target at delivery. In a scenario that demands maximum standoff, the fighter may be the optimum choice.

The last component to a new joint doctrine is capabilities and attributes. Nuclear fighters have a wide range of advantages and

disadvantages when compared with ICBMs, SLBMs, and nuclear bombers, as shown in Table 1.

**Table 1: Nuclear Fighter Advantages and Disadvantages**

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>• Increased speed and standoff</li> <li>• Maneuverability</li> <li>• Typically a large support structure that affords flexibility in execution</li> <li>• Offensive and Defensive weapons</li> <li>• Recallability for escalation management</li> <li>• Long ranges when supported by air-to-air refueling</li> <li>• Weapons can be employed against mobile targets</li> <li>• Selectable yields</li> </ul>	<ul style="list-style-type: none"> <li>• Limited payload</li> <li>• Limited payload options (B61 only)</li> <li>• Typically a large support structure is complex and more prone to failure</li> <li>• Human life at risk</li> <li>• Poor nuclear messaging (shows of force, fly overs)</li> </ul>

To be comprehensive, the new doctrine must address the elements that are specific to the employment of nuclear fighters. The first is a foundational understanding of the role of nuclear fighter in DCA, extended deterrence. Surprisingly, nuclear fighters are a low-density asset. The USAF fighter inventory is well into the thousands, but there may only be one or two squadrons whose aircraft and crews are capable of employing nuclear weapons at any given time. This number is further reduced by maintenance schedules and problems, resulting in an average of less than 40 aircraft total at any specific time, noting there is a limited surge capability depending on the amount of notice.

Currently, USAF nuclear fighters and crews serve in support of the US commitment to extended deterrence for NATO. No other triad



platforms can perform this role in the same tangible way as fighters. ICBMs cannot deploy in support, SLBMs must remain submerged to maintain their stealth, the United States is not going to station B-2s in Europe, and few, if any, European countries have the political backing to host a B-52 bomber squadron. However, many European countries fly US-made fighters, and are more comfortable with their smaller footprint.

The second element, deployment, is interconnected with the third element of training/spin-up. Nuclear fighter crews will usually use a rolling currency method to maintain the required number of combat-ready crews. Therefore, if a commander needs more aircraft and crews than the minimum, squadrons may have to conduct a quick spin-up to meet the demand. Consequently, commanders and staffs should be as precise as possible when requesting forces.

The fourth element is hosting. As previously noted, nuclear fighters tend to fly in larger formations with a large supporting structure, which necessitates a larger hosting facility than is typically expected. For example, although nuclear fighters need little ramp space in comparison to a heavy nuclear bomber, the increased number of aircraft requires a large number of maintenance personnel, demanding more support facilities. In addition, the planning consideration for deploying the supporting assets should be taken into account. As much of the supporting force as possible should be co-located with the nuclear fighter force to facilitate planning, which could dramatically increase the demands on a hosting base's support structure with OCA, SEAD, EW, C2, and tanker forces.

The fifth element is security. Nuclear fighters are more flexible with respect to security in the deployed environment than other platforms because they are smaller and can fit in more of the proliferated hardened aircraft shelters (HAS) or partially-hardened aircraft shelters (PAS) of hosting nations, or in the open if necessary. Aircraft that are stored in a HAS or PAS reduce the security personnel footprint, the ability for an adversary to detect the nuclear operations, and also provide a safer environment for personnel working in and around the aircraft and weapon. However, commanders should be aware that the more aircraft requested, the more facilities are needed. For example, if a commander wants just one nuclear fighter, there will be a spare aircraft for the primary nuclear fighter, and typically one for each of his supporting formation (up to three more), which means a commander will get three to eight aircraft to ensure

the one nuclear fighter is ready, depending on the size of the formation. Obviously, security requirements for supporting aircraft are different than that of the primary nuclear fighter.

The last element is supporting forces. Although the nuclear fighter does possess numerous advantages, it also requires supporting forces to ensure mission success. Unlike the ICBM and SLBM, which are “fire and forget” weapons, fixed wing aircraft have to fight their way to the target, and each has unique characteristics. For example, the B-2 utilizes stealth to evade detection, thus greatly reducing support assets and the probability of loss of human life. Even the F-35 cannot duplicate the performance of the B-2, since it is only a low observable aircraft and not truly stealth. Consequently, the supporting forces for nuclear fighter operations are in the form of direct support versus indirect support. Considerations for those supporting forces include deployment, basing, planning and execution, and redeployment. A commander should be intimately prepared for the entourage that follows the nuclear fighter.

### **NATO as Lead**

Future nuclear operations are not defaulted to a unilateral operation. The United States maintains the ability to act as a supporting force through the nuclear sharing program with NATO. The NATO alliance trains to execute this mission as the lead element utilizing nuclear fighters almost exclusively. In this scenario, it is important for commanders and staffs to realize they will be operating in accordance with both US and NATO rules and regulations. Many agreements between NATO members have already been solidified as Standardization Agreements (STANAGS). Most of these agreements are open source; however, some are classified and staffs will have to coordinate with Supreme Headquarters Allied Powers of Europe (SHAPE) Nuclear Operations for access. Additionally, commanders and staffs should prepare to provide the bulk of the nuclear fighter support forces. For example, the majority of NATO do not possess capabilities such as air-to-air refueling, SEAD, and EW. Lastly, commanders and staffs will integrate with their NATO partners throughout the planning and execution process.

## Conclusion

The signal demand for a new joint nuclear doctrine that increases the effectiveness of both commanders and staffs and nuclear forces as a whole is being met. This paper provides key inputs for defining the primary role of nuclear fighters, extended deterrence. Additionally, considerations for commanders and staffs on the capabilities of nuclear fighters in DCA and when those may or may not be to their advantage. Lastly, Appendix A gives a framework for incorporating nuclear fighters into the new doctrine based on the proposed table of contents. The implication to the joint community is a better understanding of a smaller piece of the nuclear mission that is often overlooked. Joint nuclear doctrine is the first step in providing commanders and staffs with the knowledge necessary to lead combat operations. As such, it is critical that the new doctrine provide a comprehensive baseline knowledge set of the full spectrum of nuclear forces.

## Notes

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2. Barbara Starr, "Air Force investigates mistaken transport of nuclear warheads," *CNN*, 6 September 2007, <http://www.cnn.com/2007/US/09/05/loose.nukes/index.html?s=PM:US>.

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10. Ibid., xiii.
11. LeMay Center for Doctrine, “Annex 3-72 Nuclear Operations,” <https://doctrine.af.mil/download.jsp?filename=3-72-D11-NUKE-OPS-Deterrence.pdf>.
12. Department of Defense, *Nuclear Posture Review Report*, xiii (see n. 9).
13. *Strategic Concept for the Defence and Security of the Members of the North Atlantic Treaty Organization* (Lisbon, Portugal: NATO Summit, November 2010), 6.
14. Ibid., 5.
15. Tom Nichols, Douglas Stuart, and Jeffrey McCausland, eds., *Tactical Nuclear Weapons and NATO* (Carlisle Barracks, PA: U.S. Army War College, April 2012), 310, <http://www.strategicstudiesinstitute.army.mil/pdffiles/PUB1103.pdf>.
16. Ibid., 72.
17. NATO, *Strategic Concept*, 24 (see n. 13).
18. Nichols et al., *Tactical Nuclear Weapons and NATO*, 267 (see n. 15).
19. LeMay Center, “Annex 3-72” (see n. 11).

## Appendix A

### Operationally Relevant DCA Considerations\*

#### 1. Chapter 1 – Overview of Nuclear Strategy

- a. General
- b. Strategic Guidance
- c. Strategy Effects
  - i. Deterrence
  - ii. Extended Deterrence
    - 1. *Add discussion on Nuclear fighters primary role*
  - iii. Assurance
    - 1. *Nuclear fighters provide assurance through extended deterrence*
    - 2. *Demonstrable show of Alliance resolve*
  - iv. Dissuasion
    - 1. *Nuclear fighters provide dissuasion through visible and tangible commitments to extended deterrence via multinational training exercises*
  - v. Defeat
    - 1. *Nuclear fighters capabilities may be ideal in certain scenarios, such as limited nuclear confrontation or escalation control*
- d. Nuclear Forces
  - i. *Define the role of nuclear fighters and DCA*
    - 1. *Note that although DCA is commonly a term for nuclear fighters, other platforms fill this role*
    - 2. *Nuclear fighters are not members of the nuclear triad*

\*using DRAFT Chapter Outline—*italics = inputs for consideration*

- e. Characteristics of Nuclear Forces
  - i. *Nuclear fighter capabilities (ex. Offensive and Defensive weaponry)*
  - ii. *Nuclear fighter limitations (ex. Show of Force)*
- f. Combat Readiness and Support

## **2. Chapter II – Command and Control**

- a. Introduction
- b. National Level Leadership and Release Authority
- c. Strategic Considerations
  - i. *Nuclear Powers*
  - ii. *NATO consultations*
- d. Considerations
- e. Command Responsibilities
- f. Command Relationships
- g. Command and Control Systems
  - i. *Survivability*
- h. Command and Control in Post-Nuclear Environments

## **3. Chapter III – Nuclear Operations**

- a. Introduction
- b. Principles and Purpose
  - i. *De-escalation*
  - ii. *Regaining deterrence*
- c. Force Integration
  - i. *Commanders should co-locate nuclear fighter forces when able for better planning and integration*
  - ii. *SNOWCAT integration*
  - iii. *Conventional to nuclear transition*
- d. Strategic Employment

- e. Employment
- f. Operations after Nuclear Weapons Use

**4. Chapter IV – Planning and Targeting**

- a. Introduction
- b. Nuclear Planning
  - i. *Nuclear fighter capabilities to penetrate*
  - ii. *NATO nuclear consultation*
- c. Nuclear Targeting
  - i. *Nuclear fighter only deliver the B-61*
- d. Intelligence Support
- e. Strategic Considerations
- f. Considerations
  - i. *Survivability*
- g. Consequences of Execution

**5. Chapter V – Surety**

- a. Safety
- b. Security
- c. Reliability

**6. Appendix**

- a. A – Characteristics of US Nuclear Weapons
- b. B – References
- c. C – Summary of Nuclear Weapons States’ doctrine statements
- d. D – Treaty Obligations
  - i. *Potential for NATO to be the lead element in a (limited) nuclear conflict*
- e. E – Administrative Instructions





## CHAPTER 7

# Undermining Extended Deterrence, Bit by Bit

Matthew O. Caylor

Nuclear deterrence and cyberspace have been inescapably linked in public consciousness since the debut of the film *WarGames* in 1983. With the progression of cyber attacks against both governments and private industry over the past decade, concern has grown considerably regarding cyber threats to the US Nuclear Command, Control, and Communications (NC3) architecture, which consists of the personnel, equipment, communications, facilities, organization, procedures, and chain of command required to credibly demonstrate nuclear capability.<sup>1</sup> When taken in context with recent activities of nation-states to combine Offensive Cyberspace Operations (OCO) and Information Operations (IO) with actual territorial aggression, the role of cyberspace and its effect on deterrence becomes very relevant, especially for extended deterrence, where regional stability is often based on specific guarantees by nuclear states to protect allies (who are most often not nuclear equipped) from nuclear attack or coercion.<sup>2</sup> However, current analyses tend to focus solely on technological vulnerabilities in NC3, while overlooking the impact that technology has on the most important part—people. This research will endeavor to address the question of how cyberspace can be leveraged by an adversary to undermine the credibility of extended nuclear deterrence through exploitation of the combination of technical and psychological vulnerabilities inherent to current strategic deterrence systems, personnel, and policies.

## **Background**

In April 2007, suspected Russian-government hackers launched crippling cyber attacks on Estonian governmental, financial, and information systems in retaliation for planned removal of a Soviet-era monument.<sup>3</sup> Less than a year later, massive cyber attacks disabled information systems in South Ossetia, Georgia, and Azerbaijan in conjunction with the Russian invasion of Georgia.<sup>4</sup> By 2009, a large-scale cyber espionage campaign called Sandworm, which is also believed to have been Russian-state sponsored, began infiltration of North American Treaty Organization (NATO) and European Union (EU) systems until discovered in 2014.<sup>5</sup>

Parallel to the growth of this cyberspace information warfare activity, President Obama, in a 2009 speech in Prague, renewed the US commitment to the Nuclear Non-Proliferation Treaty (NPT), and to reducing nuclear weapons.<sup>6</sup> The 2010 US Department of Defense (DoD) Nuclear Posture Review Report (NPR) outlines “reducing the role of US nuclear weapons in US national security strategy” as one of five key objectives while also indicating a goal of future reduction in total number of nuclear weapons in the US stockpile.<sup>7</sup> Also that year, a computer worm known as Stuxnet was discovered to have disabled large numbers of nuclear enrichment centrifuges in Iran.<sup>8</sup>

By 2012, the National Nuclear Security Administration (NNSA), which is responsible for NC3, had its own cyber incident response center and was spending more than \$126 million on cyber defense.<sup>9</sup> That same year, the DoD commissioned a study by the Defense Science Board (DSB) to evaluate the vulnerabilities of military command and control systems to nation-state level cyber threats. The findings of the DSB report, published in 2013, identified several critical areas where an adversary might attempt an attack. Protecting nuclear strike as a method of deterrence was listed as a priority.<sup>10</sup> Also in the report, the notion of “cyber culture” was discussed as an element of command and control, and the extent of its impact was not well understood.<sup>11</sup> In 2014, Russia successfully annexed Crimea from Ukraine in an openly hostile act. The stated Russian rationale was for defense of ethnic Russians. In conjunction with this message, tremendous online social commentary in support of Russian action flooded Europe. The United States responded with economic sanctions.<sup>12</sup>

The perceived trend is that as nation-states' cyberspace capability expands, the apparent effect of nuclear deterrence to constrain aggressive action is being diminished. At the same time, there appears to be effort specifically directed at the US nuclear enterprise. While this could be proliferation related, the fact that that the activity is believed to extend from nations already possessing nuclear weapons implies an alternate agenda.

### **Literature Review**

There is limited unclassified research that connects the cyber vulnerability of strategic decision makers with that of sustaining nuclear deterrence as a viable strategy, possibly due to the relative novelty of cyberspace as a recognized warfare domain, and the somewhat inconsistent legal view of "cyberspace attacks." The majority of academic work today either points to the overlap of cyberspace and nuclear warfare in policy and deterrence strategies, or it attempts to highlight potential technological vulnerabilities as a supporting argument for the reduction and elimination of nuclear weapons. Yet there have been sufficient studies regarding the psychology and limitations of deterrence theory and the use of information warfare by rivals such as Russia and China to evaluate the possible ramifications.

Primary sources for this research include the 2010 NPR, which reveals the political and strategic policy for US deterrence strategy, and the 2013 DSB report on cyber threats to military system resiliency. As a form of strategic messaging to both adversaries and allies, the NPR is a critical element to the analysis of the vulnerability of US nuclear deterrence, because it presents the intention of the United States to rely more heavily on conventional capabilities while maintaining nuclear weapons only for extreme threats.<sup>13</sup> Potential rivals could then infer that US administrations will be more willing to accept conventional conflict, or to pursue de-escalatory strategies as opposed to victory. The DSB report outlines categories of threat actors, vectors for attack, and recommendations for improving system resiliency. While it serves this research to support the validity of threats from cyberspace to NC3, the DSB underscores the communication linkages necessary for maintaining a strong deterrent by identifying three core consequences: (1) denial of

receipt of orders/sensor data, (2) distrust of information due to adversary manipulation, and (3) loss of credibility in weapons systems.<sup>14</sup> Any combination of these effects would significantly undermine the effectiveness of US nuclear strategy and extended deterrence while limiting available responses for decision makers.

Also, the *Tallin Manual on the International Law Applicable to Cyber Warfare* will serve as the legal framework for evaluating cyberspace actions that have the potential to affect nuclear deterrence within the context of the Law of Armed Conflict. Two key elements of the cyber domain enumerated by the *Tallin Manual* are digital sovereignty and proportional response. Digital sovereignty grants states the ability to protect associated cyber infrastructure existing within their territorial boundaries, whether government or privately owned.<sup>15</sup> Conversely, the origination of cyber operations from within a state's borders does not qualify as attribution and cannot be used as the sole indicator for retaliation.<sup>16</sup> This ambiguity places greater restriction on defenders than attackers. Proportional response further limits a defender's options because the *Tallin Manual* defines cyber attacks as those operations "reasonably expected to cause injury or death to persons or damage or destruction to objects."<sup>17</sup> Therefore, the legal rubric meant to bound warfare in the cyber domain is more burdensome for a defending nation, giving potential adversaries greater flexibility.

Secondary literature sources are divided into two principle categories: those that focus on deterrence and its psychology and those that focus on the use of cyberspace to influence. In the first category, Keith Payne's books *Deterrence in the Second Nuclear Age* and *The Fallacies of Cold War Deterrence* outline the fragilities of deterrence in a multipolar world. Foremost among the modern problems of the Second Nuclear Age is that nations require a means to deter an adversary from escalating to nuclear response even while engaging in hostile operations within that nation's territory.<sup>18</sup> While the previously mentioned concept is clearly a departure from Cold War deterrence models that sought to prevent both nuclear and conventional engagements, strategic decision makers must address this dilemma in order to preserve credibility and counter regional threats. This is especially true for the implementation of extended deterrence where a nation like the United States, either through conventional or nuclear means, must address threats that may not directly threaten US territorial

sovereignty. *On Limited Nuclear War in the 21<sup>st</sup> Century* further illustrates new considerations by quantifying the growing potential of limited nuclear use for (1) demonstration, (2) selective attack, (3) incapacitating attacks, (4) preventing battlefield defeat, and (5) during collapse of a nuclear state.<sup>19</sup> Unfortunately, present US deterrence strategy, policies, and force structure are rooted in the Assured Vulnerability paradigm, which is predicated on the idea that the threat of nuclear retaliation is sufficient as a reliable deterrent.<sup>20</sup> As a result, an attitude of overconfidence underpins US deterrence theory, but may be unwarranted in the modern strategic landscape. Payne intimates that rationality, the basis of deterrence theory, is affected both by the flow of available information and by cognitive processes that are shaped in ways beyond merely the emotional and logical level.<sup>21</sup>

In *Psychology and Deterrence*, Jervis expounds on the psychological elements of deterrence theory and categorizes the biases of decision makers as either motivated or unmotivated. Whereas motivated biases are those derived from emotions emerging in conflict to seek specific affect, unmotivated biases exist because of the complexity of situations and the cognitive limitations of the decision maker. Unmotivated biases are important to the success or failure of deterrence because “complex and ambiguous information leads people to adopt shortcuts to rationality that simplify perceptions in order to make more manageable the task of making sense out of environments.”<sup>22</sup> Of these unmotivated biases, the three most relevant to nuclear deterrence are adherence to theory, availability, and representativeness. When limited by information or time, decision makers often default to accepted theory even when it does not seem to apply, which may delay or stifle an appropriate response. Availability refers to a person’s ability or inability to recognize patterns and causal relationships, particularly if other events take priority. Finally, representativeness is the tendency to view threats by one’s innate ability to categorize them based on preconceptions that often defy logical analysis or probability.<sup>23</sup> Snyder supports Payne’s observations in “Rationality at the Brink,” where he assesses the mental processes found in analytical (cost-benefit calculation) versus cybernetic (cognitive) decision models, ultimately determining that the influence of unmotivated bias on decision makers is felt more heavily in situations of uncertainty, and mentally enables them to avoid value-tradeoff of classic rationality.<sup>24</sup>

In the second category, Russell's *Cyber Blockades* analyzes the concept of cutting off information flow to a nation as an integral and comparative element of military strategy. Characterizing cyberspace as networks of power within an information society, Russell views a "cyber blockade" as a method of non-nuclear deterrence that relies on denial rather than punishment.<sup>25</sup> This principle is illustrated through case studies on Russian information campaigns against Georgia and Estonia. She concludes that cyber blockades are a legitimate tool available to virtually all states, and that due to their relatively low cost, speed of execution, and effectiveness, they represent a logical evolution in warfare that must be anticipated.<sup>26</sup>

Just as Russell looks at information flow from the external perspective, Morozov's *The Net Delusion* and Soldatov's *The Red Web* examine the importance of control of information within a nation. A particularly interesting element of Morozov's research indicates that authoritarian regimes do not focus solely on censorship as a method of control over their populations, but also devote significant effort to monitoring and shaping information.<sup>27</sup> Soldatov demonstrates how this level of control is possible through his examination of the Russian state's domestic and international operations in cyberspace. To begin with, the Russian government monitors all domestic telecommunications and Internet traffic through a program known as SORM or *Systema Operativno-Rozysknykh Meropriaty*.<sup>28</sup> This program arms the government with extensive insight into both popular support and opposition activity. From this information, the Russian state can then shape narratives within its population through censorship or artificially generated propaganda.<sup>29</sup> Adrian Chen's exposé "The Agency" contributes to Soldatov's examination of Russian cyber activity by examining the inner workings of one particular "troll farm" headquartered in St. Petersburg and detailing the effects of its state-sponsored disinformation campaign.<sup>30</sup>

With respect to deterrence, Thomas Coglitore examines the role perception plays in deterrent strategies in "Erosion of US Nuclear Deterrence Credibility in the 21<sup>st</sup> Century" and indicates potential consequences of this type of activity. His focus on how self-deterrence and calculated ambiguity can undermine will postulates that deterrence credibility can be greatly diminished, especially in the face of asymmetric warfare.<sup>31</sup> Michael Lamb goes further to conclude in "Bytes" that the US

dependence on information networks for virtually all aspects of governance and military command and control (C2) and the open aspect of US democracy make the United States ill-equipped to fight a strategic information war within its own borders.<sup>32</sup>

### **Theory/Argument**

From examination of the previous research, it can be theorized that because the psychological elements of deterrence (predicated on rationality and credibility) have technological connections, cyberspace influence in concert with kinetic action can affect these elements—possibly to an aggressor’s advantage. Rationality is the foundational element of the Assured Vulnerability paradigm, and extended deterrence is an extrapolation. Rationality requires that decision makers are capable of evaluating logical choices dispassionately, and they must receive and view information in the same fashion to minimize uncertainty. Cognitive limitations like adherence to theory, availability, and representativeness undermine one’s ability to always see choices logically. Social media and networking are an integral element of modern cognition because they offer decision makers a form of “extended mind,” which while enhancing capability also results in vulnerability.<sup>33</sup>

Unfortunately, these vulnerabilities are not equally shared between authoritarian and democratic regimes. Evaluating population mindset through social media monitoring and the ability to shape domestic, and sometimes foreign, media narratives in line with state objectives offers a means of cognitive insulation to authoritarian regimes that democratic nations do not possess. This imbalance can be exacerbated by an adversary’s information campaigns within democratic nations, making it more difficult to challenge foreign narratives. Consequently, democratic decision makers can be influenced by the social media efforts of their own population to avoid escalatory action, including personnel within the NC3. When combined with the ability to limit information quickly through cyber attacks against media, government, and communications systems, uncertainty can pervade the decisions of democratic nations and may delay or deny action that is critical in extended deterrence scenarios.

Credibility in nuclear deterrence consists of both the physical capability to launch nuclear weapons and the will to act.<sup>34</sup> In extended

deterrence, allies depend on the credibility of the supporting nation, including its arsenal and C2. For this reason, NC3 is vitally important to those nations under the “nuclear umbrella” of the United States, yet it represents fragility in extended deterrence because the allied nation depends on both psychological and technological factors for its safety. While the US NC3 is incredibly robust, and is unquestionably capable from the perspective of retaliation, the 2013 DSB report does indeed indicate that some weaknesses exist.<sup>35</sup> Therefore, for the sake of evaluation, we will assume that in a contested extended deterrence scenario, the United States would retain nuclear capability, but that technical weaknesses could be exploited, resulting in at the very least a delay of decision or action. As such, we can evaluate the associated impact on the will and resultant credibility of the democratic nation.

If the threat of asymmetric attack is high and the authoritarian narrative disguises intrinsic US interests in an ally’s situation, the possibility then increases that democratic decision makers may undergo self-deterrence due to constraints of proportional response.<sup>36</sup> Moreover, the multipolar nature of current world interactions may lead to denial, or failure to recognize the threat, until escalation or inaction seem the only recourse.<sup>37</sup> Social media and disinformation vulnerabilities inherent to democratic societies increase the likelihood of this threat and give aggressors time to consolidate gains while undermining the perceived will of the defender in the eyes of allies. As real will and perceived will diminish, so does credibility, resulting in the failure of extended deterrence.

Thus, we are left with the hypothesis that authoritarian regimes possessing the technical capability to exploit psychological linkages in deterrence theory are capable of undermining extended deterrence provided by democratic nations. Using a qualitative approach, this hypothesis will be examined against two case studies: the Russian-Georgian War and the Russian annexation of Crimea from Ukraine.

### **Analysis: Case Study I—Russian-Georgian War**

On 7 April 2008, Russian forces executed a coordinated air, land, naval, and cyber assault against the democratic nation of Georgia in order to occupy South Ossetia and Abkhazia.<sup>38</sup> While mechanized forces of



Russia occupied territory and created buffer zones, massive cyber attacks crippled 54 key Georgian websites. These included government, financial, media, and military communication services, and resulted in widespread disorder among the citizens of Georgia. At the same time, the Russian media emerged as the single narrative framing the situation to the world—Russia was acting in response to Georgian aggression.<sup>39</sup> Within six days, Russian forces crushed the Georgian military, and the Russian parliament would later formally recognize South Ossetia and Abkhazia's independence.<sup>40</sup> Despite being an ally of the United States in the Iraq war, and in the stages of the NATO admission process, no friendly forces rendered conventional military assistance to Georgia beyond humanitarian aid.<sup>41</sup> The loss that Georgia suffered in territorial sovereignty became the new status quo within Europe (see Figure 1).<sup>42</sup>

Although no extended deterrence agreement existed between the United States/NATO and Georgia, the Russian-Georgian war is significant to our analysis of extended deterrence for two key reasons: 1) it represents possibly the first example of conventional military operations in conjunction with a pre-coordinated and massive cyber attack, and 2) it indicates that control of information, including the pretext for action, aided the aggressor (Russia) while inhibiting military response by democratic governments.



Figure 1

The impact to rationality for the United States and NATO is perhaps most apparent when viewed through the lens of Russia's efforts to generate cognitive limitations through rapid dominance of the information environment. In fact, Russia was able to consolidate its position in South Ossetia within the first 24 hours of the invasion.<sup>43</sup> It created uncertainty and cognitive distortions by restricting communication "within the government of Georgia, between the government and its people, and between the government and the international community at a crucial point in time."<sup>44</sup> From the perspective of availability and representativeness, the United States and NATO were presented at the outset with what appeared to be a localized conflict, which led some senior US officials to speculate that further escalation was unlikely.<sup>45</sup> By the time reactions changed, the conflict was essentially over and the ability to assess value tradeoffs was past.

Even after the conflict was essentially resolved, the Russian activity to maintain control of the narrative continued. Russian leaders sought to limit any dissent to its actions within its own population, which resulted in increased scrutiny, and involvement of the Russian government in Yandex, Russia's largest online search engine, in an effort to suppress Georgian perspectives in online news and social media.<sup>46</sup>

In terms of affecting US and NATO credibility, the Russian cyber activity was understandably detrimental. Having just demonstrated significant capability against a US ally's communications infrastructure, Russia presented a significant asymmetric threat to the United States and NATO should they choose to involve themselves in the conflict. When combined with the continuing narrative of Georgian aggression, the Russian invasion undermined the legitimacy of the Georgian government in the international community.<sup>47</sup> In fact, the principle response from the United States was simply to release Georgian troops from their positions in Iraq, and to execute diplomatic efforts to constrain the conflict to proportional levels.<sup>48</sup> Already involved in conflicts in Iraq and Afghanistan, the United States had little motivation to become entangled in war in Europe.<sup>49</sup> It can be interpreted that self-deterrence and denial made it easy for the United States and NATO to condemn Russian activity on the basis of proportionality, but at the same time restricted will to offer courses of action beyond de-escalation. Further, it could be argued that because Georgia did not belong to NATO, the United States simply did

not value it enough to provide greater assistance; however, this argument ignores the efforts of the United States to bring Georgia into NATO during the April 2008 Bucharest Summit.<sup>50</sup>

The outcome of the Russian-Georgian War has significant implications to the credibility of the United States and NATO within the framework of extended deterrence. Despite apparently strong military ties, especially due to coalition involvement in Iraq, many in the international community were surprised that the United States did not even threaten the use of force against Russia in support of its ally.<sup>51</sup> Further, although many diplomatic threats were made, including expulsion of Russia from the G-8 and withdrawal of US support for Russia to host the 2014 Olympics, no significant US action against Russia was implemented.<sup>52</sup> This lack of response by the United States could be seen as supporting Russian intent to discredit the validity of US security commitments. With respect to NATO, post-conflict action has not brought Georgia any closer to NATO membership, and has ultimately weakened NATO's position against a possible expansionist Russia.

### **Analysis: Case Study II—Annexation of Crimea**

In late 2013, the pro-Russian cabinet of Ukrainian President Yanukovich rejected increased European Union involvement, at the behest of Moscow, sparking massive anti-government protests and civil unrest.<sup>53</sup> Meanwhile, NATO websites experienced sporadic Distributed Denial of Service (DDoS) attacks that took them offline in conjunction with particular anti-government protests.<sup>54</sup> By February 2014, popular opposition was such that the Russian-supported regime in Ukraine collapsed while Yanukovich and his supporters were forced to flee to Russia.<sup>55</sup> While the reformist Ukrainian government prepared to hold new elections, uniformed pro-Russian “insurgents” began to occupy the Crimean peninsula on 27 February 2014 (see Figure 2).<sup>56</sup> Among the key targets captured were media and television stations within Crimea and C2 for Ukraine's communications satellite *Lybid*, as well as Internet Exchange Points (IXP), which enabled communications traffic to be cut off or routed through Russia.<sup>57</sup> Russian President Putin identified the invading combatants as Crimean self-defense forces and denied Russian military involvement. By 16 March, authorities in Crimea allegedly

conducted a popular referendum approving annexation to Russia in an overwhelming majority, and were formally welcomed by Russia two days later.<sup>58</sup> Although the United States and the European Union condemned the action as Russian aggression and began imposing a progressive series of sanctions on Russia, it did not stop Russian military units from formally entering into armed conflict with Ukrainian forces in the east and maintaining control of Crimea.



For the analysis of cyberspace effects as integral elements to undermining extended deterrence, the case of Ukraine and Crimea is particularly important. Although the Ukrainian conflict retained elements of the cyberspace campaign in Georgia, it reflected an even more aggressive and evolved form of information warfare, meant to discredit all but the Russian narrative. Additionally, while Ukraine was not a member, or even an aspiring member, of NATO, it did enjoy a 1994 territorial security assurance agreement known as the Budapest Memorandum, which guaranteed respect of Ukraine's territorial sovereignty and promised non-aggression in exchange for complete elimination of its

sizable nuclear weapons stockpile. This agreement was signed by both the United States and Russia.<sup>59</sup>

Domination of the information domain was an instrumental and vital part of Russian operations to seize Crimea and impact the rationality of Western influence. The selection of critical information nodes during the opening phases ensured that not only would Crimea be isolated from Ukraine, but also that Ukraine's ability to challenge Russia's version of events was technologically restricted. From Russia's perspective, the civil unrest in Ukraine could affect Crimean citizens, 58 percent of which were ethnic Russians.<sup>60</sup> As Russia denied any involvement in Crimea prior to the "democratically held" referendum, it leveraged the opportunity to portray its later military engagements against Ukrainian forces as self-defense rather than naked aggression. Russia would make extensive use of cyberspace to protect this narrative.

In addition to traditional DDoS attacks, pro-Russian cyber forces or "troll farms" executed what would later be called "social cyber attacks" as a means to generate psychological effects like fear, hate, and panic in target populations.<sup>61</sup> Through the use of YouTube, Twitter, Facebook, and online forums, disinformation and propaganda were promulgated to paint Ukrainian forces in a negative light, while eliciting sympathy for pro-Russian separatists in Crimea and Eastern Ukraine.<sup>62</sup> Perhaps the most shocking element of this social media campaign was that Russian authorities were somehow able to coerce Twitter, a US-based company, into self-censoring pro-Ukrainian accounts for Russian Internet users.<sup>63</sup> Just as with Georgia, while NATO and US decision makers battled the cyber-generated cognitive distortions in the media, Russia was already consolidating territory and creating facts on the ground.

Russia and its pro-Russian cyber teams sought to undermine US and NATO credibility even before the invasion of Crimea. While DDoS attacks against NATO occurred during the early protests in Ukraine, hacktivist groups like *CyberBerkut* began systematic and continuous theft and dissemination of sensitive Ukrainian government documents. These leaks, including voice conversations between the US Assistant Secretary of State and the US Ambassador to Ukraine, signified that secure communication with the Ukrainian government, or even between US citizens in Ukraine, was no longer assured.<sup>64</sup> Also, comments made by President Putin indicating his willingness to "escalate to de-escalate"

should the United States become more involved in Ukraine's situation hinted at potential for nuclear escalation.<sup>65</sup> From the perspective of self-deterrence, these actions have left the Obama administration with few options beyond economic sanctions.

With respect to extended deterrence, the current geopolitical landscape shows that indeed there has been negative impact to US and NATO credibility. Although the annexation of Crimea is over (with Crimea remaining a part of Russia), the conflict between Ukraine and Russia continues with separatist engagements throughout Eastern Ukraine. The fact that it is occurring despite extensive sanctions against the Russian government by the United States and the European Union is indicative of two things: (1) Russia's will to expand beyond its own borders is greater than the will of the United States or NATO to contain it and (2) the United States, as a democratic nation, lacks sufficient strategy to effectively deny Russia its asymmetric advantage in narrative control.

## **Conclusion**

While the two case studies included with this research do not prove definitively that cyber-capable authoritarian regimes can completely undermine extended deterrence, it certainly indicates that the psychological underpinnings to deterrence models (rationality and credibility) can be influenced through manipulation of the cyberspace environment. Further, and possibly more importantly, it is apparent that US adversaries understand this potential and are beginning to attempt to exploit it. If the United States intends to maintain extended deterrence as an effective policy, both for use of nuclear weapons and for nonproliferation efforts, more study of this subject is required. Specifically, greater examination of similar cyber activity by other nations such as China and North Korea should be pursued.

Though the current awareness of cyber threats has in some ways drawn attention away from the need for strong and coherent nuclear security strategy, the intent of this research is to raise awareness of how information technology and the cognitive processes it shapes can impact strategic messaging and ultimately subvert poorly defined and executed nuclear deterrence policy.

## Notes

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## CHAPTER 8

# Conclusions

The concept of how deterrence operates within national security strategy has not significantly changed since the 1960s and 1970s, and the scholars of today continue the discussion of strategy and policy choices through the lens of strategic stability or strategic defense. In addition, it is difficult to determine the success of nuclear deterrence operations, given that success means that one's adversary didn't take a course of action because of the threatened use of force. As a result, some critics have suggested that nuclear deterrence is an unproven concept that is best relegated to the Cold War and is not relevant in contemporary security studies. We do not agree with this observation; while the security environment has become more complex with the introduction of new nuclear state powers, the basic construct of deterrence still applies. What has changed is our understanding of how other nations' strategic cultures play into the discussion, and how different capabilities—both nuclear and conventional—can affect deterrence policy objectives. There is a greater need to tailor deterrence capabilities toward specific security scenarios; there is no one strategic template for all deterrence discussions.

The student research conducted in academic year 2016 had two important objectives: (1) to educate Air Force officers as to how deterrence strategy and policy is applied to contemporary national security discussions, and (2) to utilize their academic skills to critically examine challenging policy issues and to offer recommendations to Air Force leadership. These topics, ranging from arms control, to deterrence theory and vulnerability, to cyber-attacks, provide fresh perspectives on issues facing Air Force leadership in working to address national-level policy objectives.

Nonproliferation and arms control has a long history of qualitative judgment as to the success of efforts to reduce the threat of conventional

and unconventional weapons. Sean Conroy offers an important quantitative approach to examining a nation's compliance with the overall nonproliferation regime. This study directly supports the ideals of the liberal international construct, and could be used to advance nonproliferation efforts across the board. As Christopher Russell notes, arms control efforts do impact the military's organizational structure and weapon systems, and so it remains important for military leadership to be invested in these discussions in order to better understand the impact on the force as political discussions continue to lead toward a reduced nuclear stockpile.

However, discussions on the size of the force must still be moderated by the overall political goal of continued strategic stability among the nuclear-weapon states while those arms control discussions are advanced. Robert Ewers offers a model to examine how to find that "sweet spot" in maintaining stability between peers, near-peers, and non-peers. During the Cold War, dealing in bilateral discussions was simple compared to dealing with multiple nuclear actors today, and nowhere is this complexity more apparent than in the Middle East, where Allen Cohen has suggested that the United States use conventional weapons to offer extended deterrence to its allies that may be facing a nuclear-armed Iran. If the United States is to promote nonproliferation, these promises of extended deterrence are important, not just in Europe and Asia, but in the Middle East as well.

Daniel Lindsey correctly points out the importance of maintaining the military's doctrine on nuclear operations, in particular how the US military intends to use dual-capable aircraft to deter nuclear-armed adversaries in future conflicts. While the political objectives are clear, the military must ensure that its fighter pilots understand the concept of extended deterrence in support of NATO operations, especially as the Air Force transitions to the F-35 as its future dual-capable aircraft. Finally, Matt Caylor expertly identifies how the US military should take on the challenge of cyber-attacks against the nuclear deterrence force. As cyber-capable adversaries continue to mature their capabilities, it is imperative that our national leadership and our allies do not lose faith in deterrence operations as a result of possible manipulation of the nuclear force through the cyberspace environment.

These papers illustrate the advanced critical thinking taking place at Maxwell Air Force Base, and to a greater point, that the discussion on

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deterrence operations is far from over. While the conceptual construct of deterrence remains sound, applying the principles of deterrence to contemporary and future military operations requires deep thinking as to the possibilities of how US military forces can continue to support deterrence policy objectives throughout the world, despite the many different scenarios and adversaries it may face.

# Contributors

**Lieutenant Commander Matt Caylor (USN)** was a student at Air Command and Staff College, undertaking a nuclear elective with the US Air Force Center for Unconventional Weapons Studies.

**Major Allen Cohen (USAF)** currently serves as Chief, Operational Assessment Team, at the 603d Air Operations Center, Ramstein Airbase, Germany. Following his initial assignment at Edwards Air Force Base, California, Maj Cohen served in numerous staff positions at the group, wing, and MAJCOM levels in electronic warfare, Air Force sustainment, and nuclear treaty monitoring. He obtained a Master of Science degree in Operations Research at the Air Force Institute of Technology and attended intermediate developmental education at Air Command and Staff College.

**Mr. Sean Conroy (USAF)** is the Chief, Air National Guard Director's Action Group. He is responsible for supporting the Director, Deputy Director, and Executive Director of the Air National Guard in their engagements and tasks. Mr. Conroy previously served as the Associate Director of Air, Space, and Cyber Operations (NGB/A3) for the National Guard. As such, he was the senior civilian responsible for National Guard Bureau support for operations, training, and deployment of 105,400 air guardsmen assigned to 89 wings and 579 mission support units spanning 54 states, territories, and the District of Columbia. His prior assignments have included Analysis Branch Chief in the Air National Guard Plans and Programs Directorate (NGB/A8A9) and uniformed service in the United States Air Force. He earned an undergraduate degree from the University of Maine, and master's degrees from the United States Marine Corps Command and Staff College and the USAF School of Advanced Air and Space Studies.

**Lieutenant Colonel Robert Ewers (USAF)** is currently a command missileer in the Minuteman III Intercontinental Ballistic Missile weapon system. Following his initial missile assignment at Malmstrom Air Force Base, Montana, Lt Col Ewers served in numerous staff positions at the major command and air staff levels in ICBM targeting, nuclear survivability and nuclear command, control, and communication. He attended intermediate developmental education as an Air Force Fellow at



Sandia National Laboratory in the Weapon Intern Program. Lt Col Ewers served as the 91st Missile Wing Chief of Safety, and Operations Officer in the 740th and 741st Missile Squadrons at Minot Air Force Base, North Dakota, and then took command of the 320th Missile Squadron at F.E. Warren Air Force Base, Wyoming.

**Major Daniel Lindsey (USAF)** was a student at Air Command and Staff College, undertaking a nuclear elective with the US Air Force Center for Unconventional Weapons Studies.

**Lieutenant Colonel Christopher J. Russell (USAF)** is a career F-15E Instructor Weapon Systems Officer with over 2,100 flying hours, including flying operations in Southern Watch, Enduring Freedom, Noble Eagle, and Iraqi Freedom. He holds a bachelor's degree in Physical Sciences with minors in Mathematics and Geology from Colorado State University, a master's degree in Military Art and Science from the Army's Command and General Staff College, and a master's degree in Aeronautical Science from Embry-Riddle University. Colonel Russell is a graduate of the Army's School of Advanced Military Studies, where he later served as Chief, Strategy Plans Team, 609th Combined Air and Space Operations Center at Al Udeid Air Base, Qatar. Prior to arriving at Air War College, Colonel Russell served as director of operations, and later commander of the 48th Operations Support Squadron, RAF Lakenheath, England.

# USAF Center for Unconventional Weapons Studies

Maxwell Air Force Base, Alabama

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