



***Do ICBMs Have a Future?***

**By**

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### **Approval**

The undersigned certify that this thesis meets master's-level standards of research, argumentation, and expression.

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Colonel Michael V. Smith, PhD      (Date)

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## **Disclaimer**

The conclusions and opinions expressed in this document are those of the author. They do not reflect the position of the US Government, Department of Defense, the United States Air Force, or Air University.



## **About the Author**

Major Robert W. Hebert was born in Fort Worth, Texas. He enlisted in the United States Air Force in January of 1996 as an Airborne Warning and Control Radar technician. He received a commission from the Officer Training School in 2002. Major Hebert completed Initial Qualification Training as an operator for the Minuteman III intercontinental ballistic missile. He served in various missile positions including missile combat crew commander, evaluator, and senior crew evaluator. Additionally, Major Hebert served as a flight commander and in various staff positions, including Center-level executive officer and Chief of the Commander's Action Group.



## **Acknowledgments**

Special thanks go to my thesis advisor, Colonel M.V. “Coyote” Smith, and my thesis reader, Dr. Richard R. Muller. The advice and guidance played no small part in the completion of this study. My passion for Intercontinental Ballistic Missiles dates back to my crew experience and Francis E. Warren AFB, WY where young crew members continually asked the question: “Why are we here?” Strong leadership from individuals like my Squadron Commander, Colonel “Coyote” Smith (then Lieutenant Colonel), and my Group Commander, Major General Michael Fortney (then Colonel), sparked the curiosity and drive that led me to this project.

To all my fellow missileers, with a constant barrage of negative press coverage, this study is dedicated to you and the thankless work you do every day. You all ensure those Launch Control Centers are manned 365 days a year, without exception. Many will question your purpose. However, you should all know that your deterrent mission provides the defensive foundation for the US Military and its ability and willingness to extend, and even overextend, all across the globe.

The United States Air Force bestows on everyone the opportunity to succeed. Some people are blessed with strong leaders and mentors, and other are not. Fortunately for me, Major General Garrett Harencak provided me with countless hours of invaluable mentorship. His guidance sharpened my mind, focused my energy on advocating the nuclear mission, and helped transform me into a better leader and officer. I cannot possibly express my gratitude in a few short words.

Finally, and most importantly, I must thank my family. My wife and children endured the greatest agony as I struggled to complete this project. They suffered through me being home in body, but not in mind and spirit.

## **Abstract**

As the US military and civilian leaders debate the future of deterrence and nuclear deterrence, the status of the Intercontinental Ballistic Missile (ICBM) comes to the fore. This study specifically seeks to answer the question: “Will ICBMs continue to play a vital role in nuclear deterrence?” Many factors heavily influence that future. This study evaluates some of the unique capabilities of the ICBM, both quantitative and qualitative, and weighs those against three criticisms of the ICBM. Additionally, it presents a discussion outlining possible replacement options to fill the ICBM role in nuclear deterrence. Finally, three potential adversarial categories, peer/near-peer, rogue states, and terror organizations, provide the structure for the evaluation and analysis of the evidence.



## Chapter 1

### Introduction

*The future cannot be foreseen in detail, but for good or ill one can foresee a long-term role for nuclear weapons and other WMD.*

—Dr. Colin S. Gray

*There is simply no reason for nuclear weapons to play a central role in US defense policy any longer.*

—Dr. Wolfgang K.H. Panofsky

This study evaluates the role played by Intercontinental Ballistic Missiles (ICBMs) in current and future US deterrence strategies. The goal is to provide political and military leaders, as well as interested US citizens, a theoretical analysis to inform future discussions and debates concerning the retention of the ICBM force. Further, this study provides a primer for Airmen lacking a basic understanding of the day-to-day utility of ICBMs. Unfortunately, far too few members of the United States Air Force (USAF) understand the enduring value of the rapid response that ICBMs provide within the framework of nuclear deterrence. This hampers meaningful discussions of nuclear strategy between Airmen and political leaders. The central question under examination to this study is simply: “Should ICBMs continue to play a vital role in nuclear deterrence?” The evidence and analysis will answer this question.

The purpose of fielding nuclear weapons, specifically ICBMs, has remained unchanged over many decades. A recent RAND study explains: “ICBMs have been a cornerstone of the US nuclear force posture since the 1960s when the United States fielded the first Minuteman missile.”<sup>1</sup> The problem many ICBM proponents face is explaining the “daily use” of nuclear weapons to an audience who believes that ICBMs have never been “used.” ICBMs provide first strike stability that compels adversaries to take an all-in approach to neutralize or destroy the entire ICBM fleet housed in silos throughout a 32,000 square mile area.<sup>2</sup> The size of the area and the number of warheads

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<sup>1</sup> Lauren Caston et al., *The Future of the U.S. Intercontinental Ballistic Missile Force*, 13.

<sup>2</sup> Major General Garrett Harencak, Assistant Chief of Staff for Strategic Deterrence and Nuclear Integration (briefing, School of Advanced Air and Space Studies, 3 December 2014).

creates a dynamic that forces alterations in an adversarial calculus and strategy. However, opponents question continuously whether the United States still needs this form of nuclear infrastructure.

### **Hypothesis**

ICBMs are currently an active element of the nuclear deterrence umbrella projected by the United States. Should that continue? The hypothesis tested in this study is that ICBMs should continue to play a vital role in the future of nuclear deterrence within the United States. The test of the hypothesis occurs by evaluating the current role of ICBMs, identifying inherent capabilities, and using a comparative analysis to determine if these capabilities retain utility in future nuclear deterrent roles. This comparative analysis occurs by studying three example scenarios. Furthermore, this study examines ideas from notable theorists concerning the future of nuclear weapons and ICBMs. Finally, an evaluation interprets and synthesizes the hypothetical scenarios (due to the lack of actual nuclear conflicts post World War II) and the evidence presented.

### **Significance**

More aggressive Russian behavior in recent years, as well as concerns over China and Pakistan, has created angst about the state of US nuclear weapons. A federal study estimates a one trillion dollar price tag to modernize and revitalize aging nuclear weapons.<sup>3</sup> Leaders operating in a resource-constrained environment seek every opportunity to cut funding. Because current American ICBMs require three dedicated Air Force bases and the employment of thousands of individuals, ICBMs could be a prime target for reduction. The central question in this study addresses the future utility of ICBMs, and the answer could either validate continued long-term support or justify a decision to remove ICBMs from the US arsenal.

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<sup>3</sup> William J. Broad and David E. Sanger, "U.S. Ramping Up Major Renewal in Nuclear Arms," *New York Times*, 21 September 2014.

## Definitions

In dealing with this topic, a certain amount of ambiguity can exist simply with the usage and definition of terms. A robust collection of writings has developed since the invention of nuclear weapons. As such, new terms have been introduced to the lexicon of military theorists. Unfortunately, as the debates continue and discussions lengthen, the meanings of certain words change. With this in mind, a few specific definitions are provided below. Certainly, not all readers will agree with the findings or even the terminology used here. However, at least a foundational understanding can be achieved for the purpose of the argument herein.

### Nuclear Deterrence

The Joint Publication (JP) 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>4</sup> The concept of deterrence dates back eons, and different iterations exist. However, the definition provided above will be used in this study. Dr. Keith Payne highlights how the nuclear age has merged with deterrence thinking. “Deterrence is, and since the end of World War II has been, the primary rationale for US nuclear weapons.”<sup>5</sup> Simply stated, nuclear deterrence combines nuclear weapons with the age-old idea of using the threat of violence to prevent an adversary from taking a specific action. Deterrence exists in many other forms, but for the sake of this paper, nuclear deterrence is the specific type discussed.

### Instantaneous Deterrence

Nothing in the US inventory provides the President of the United States as rapid a response option as ICBMs. Indeed, this quick reaction force remains at a state of constant readiness, even in the midst of a nuclear laydown. Conversely, the bomber force needs time to generate comparatively slow-moving aircraft. Submarines armed with Sea-Launched Ballistic Missiles (SLBMs) require transit time to arrive at their launch

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<sup>4</sup> Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 8 November 2010, amended through 15 November 2014, 73.

<sup>5</sup> Keith B. Payne, *The Great American Gamble: Deterrence Theory and Practice from the Cold War to the Twenty-First Century* (Fairfax, VA: National Institute Press, 2008), 20.

locations. While it is somewhat dated, the Air Force Posture Statement from 1992 accurately characterizes the contributions of ICBMs as prompt, reliable, and accurate.<sup>6</sup> The promptness is especially critical when discussing instantaneous deterrence. The study will use the definition explained by Colonel Michael V. Smith, as *the ability of ICBMs to hold targets at risk by accurately delivering nuclear warheads on a moment's notice*.<sup>7</sup> US decision makers understand this unique capability, but more importantly, potential adversaries also grasp the concept.

### **Targeting options**

One of the more controversial aspects of nuclear weapons and ICBMs involves identifying target sets for the weapons. Should they be used against cities and populations or strictly against military targets? The number of warheads available ultimately can influence this decision on whether to use counterforce or countervalue.

#### **Counterforce**

As with deterrence, JP 1-02 provides a definition of counterforce. It reads, “The employment of strategic air and missile forces in an effort to destroy, or render impotent, selected military capabilities of an enemy force under any of the circumstances by which hostilities may be initiated.”<sup>8</sup> Professor James Forsyth incorporates the nuclear element. This study will use his definition. *Counterforce focuse[s] upon mitigating the ability of the adversary to use its military forces, especially nuclear forces, in the event of a conflict to reduce its chances of victory*.<sup>9</sup>

#### **Countervalue**

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<sup>6</sup> Quoted in Richard A. Paulsen, *The Role of US Nuclear Weapons: In the Post-Cold War Era* (Maxwell AFB, AL: Air University Press, 1994), 55.

<sup>7</sup> Colonel Michael V. Smith (Professor, School of Advanced Air and Space Studies), interview by the author, 15 November 2014.

<sup>8</sup> Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 8 November 2010, amended through 15 November 2014, 53.

<sup>9</sup> James Wood Forsyth Jr., B. Chance Saltzman, and Gary Schaub Jr., “Remembrance of Things Past: The Enduring Value of Nuclear Weapons,” *Strategic Studies Quarterly*, Spring 2010, 76.

Unlike counterforce, JP 1-02 does not define the term countervalue. Bernard Brodie discusses the concept: “The attacker may feel he cannot count with high confidence on fully eliminating the enemy air force, even if he strikes first. He might, therefore, feel obliged to begin the counter-economy competition.”<sup>10</sup> Forsyth expounds a bit further, and again this study uses his more complete definition. *Countervalue focuse[s] upon destroying the industrial capacity and urban centers of the adversary to impose terrible costs upon its society.*<sup>11</sup>

### **State Categories**

Not all states are created equally. The United States remains a superpower, although the gap between the United States and its closest competitors has lessened in the last twenty years. Countries at the other end of the spectrum struggle day-to-day to manage affairs within their own borders. The continuum between the states at the top and those at the bottom is broad and complex. However, for the purposes of analyzing the future deterrence of US ICBMs, this study groups the potential adversaries into three broad categories: Peer/Near-Peer, Rogue State, and Terror Organization.

#### **Peer/Near-Peer**

Multiple factors contribute to determining a country’s international power. This study considers the influence of the economic and military factors. The United States stands alone in 2015 with its combination of superior military might and economic strength. However, a few countries, most notably Russia and China, have the economic or military power to rival the United States. Estimates show that Russia has roughly 1,600 strategic warheads on missiles and bombers, which is enough to maintain approximate parity with the United States.<sup>12</sup> The

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<sup>10</sup> Bernard Brodie, *Strategy in the Missile Age* (Santa Monica, CA: RAND, 1959), 155.

<sup>11</sup> Forsyth, Saltzman, and Schaub, “Remembrance of Things Past: The Enduring Value of Nuclear Weapons,” 76.

<sup>12</sup> Hans M. Kristensen and Robert S. Norris, “Russian Nuclear Forces, 2014,” *Bulletin of the Atomic Scientists*, vol. 70(2), 2014, 75-76.

sheer numbers and capability combined with their pursuit of modern ICBMs places Russia in a strategic class with the United States.

In addition to Russia, China presents a growing concern. Commander David Forman captures China's economic position when he discusses China's growth "from a considerably closed society in 1972 to a global near-peer to the United States."<sup>13</sup> Furthermore, China maintains a growing nuclear capability. Estimates show that China maintains approximately 60 missiles that can reach the United States and that number could climb past 100 by the mid-2020s.<sup>14</sup> The combination of current military capabilities and a robust economy that allows China to expand its strategic inventory places China in a category with Russia. For the purposes of this study, *a peer/near-peer is a country who currently possesses the nuclear capability to hold at-risk large portions of the United States and/or has the economic strength to achieve that military capacity in the near future*. Currently, China and Russia are the two countries who fall into that category evaluated in the examples. However, those two will not likely be the only ones in the future. Other countries could experience the rapid growth and development necessary to threaten US stability.

### **Rogue State**

The term rogue state could certainly offend some political leaders. Attempting to place states in specific categories creates a problem with potential overlap. Dr. Derek Smith writes that some states straddle the boundary of the term and others are in a transitional period that makes categorization without qualifications difficult. Further, from a US perspective the term terror state has connotations that link to former President George W. Bush's famous axis of evil speech. Countries that act according to the above definition and are not friendly to the United States will typically be labeled rogue states.<sup>15</sup>

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<sup>13</sup> David S. Forman, "Deterrence with China: Avoiding Nuclear Miscalculation," *Joint Force Quarterly*, vol. 75, 4th Quarter 2014, 35.

<sup>14</sup> Hans M. Kristensen and Robert S. Norris, "Chinese Nuclear Forces, 2013," *Bulletin of the Atomic Scientists*, vol. 69(6), 2013, 79.

<sup>15</sup> Derek D. Smith, *Deterring America* (Cambridge, UK: Cambridge University Press, 2006), 14.

Dr. James Scouras uses the pejorative term “rogue nation” and identifies the following features: not a major power, generally hostile towards the United States, ambitions beyond its borders, and attempting to acquire weapons of mass destruction.<sup>16</sup> These points lead to a basic definition used in this study. *The term rogue state refers to countries that lack the power to compete with the United States on a global scale, but still possess enough military force that could threaten US interests and disrupt regional security.* According to this definition, countries like North Korea, Iran, and Syria fall into this category. Changing political landscapes can alter the relationship between nations. Shifting tides could lead to a future where a nuclear-armed Pakistan could fall into this category, as well as other countries seeking to achieve nuclear status.

### **Terror Organization**

Deterring a nation or state with defined borders and a leadership regime that operates rationally, even if not universally accepted, presents certain challenges. Attempting to deter an organization without those state-like qualities, especially when it does not act in accordance with expected social and moral norms, proves to be quite different. This study groups those non-state actors into a terror organization category using a definition explained by Elaine Bunn, a research fellow at the National Defense University, as “*those who brutalize their own people, display no regard for international law, threaten their neighbors, are determined to acquire weapons of mass destruction, sponsor terrorism around the globe, and reject basic human values.*”<sup>17</sup> The only modification to Bunn’s definition is to replace the word ‘and’ with the word ‘or’ to remove the checklist aspect of the definition. A group does not need to do every listed action to be considered a terror organization. The most easily identified terror organization is

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<sup>16</sup> James Scouras, “Post-Cold War Nuclear Scenarios: Implications for a New Strategic Calculus,” In *Deterrence and Nuclear Proliferation in the Twenty-First Century*, ed. by Stephen J. Cimbala (Westport, CT: Praeger Publishers, 2001), 47.

<sup>17</sup> M. Elaine Bunn, “Preemptive Action: When, How, and to What Effect?” *Strategic Forum*, no. 200, July 2003, 3.

Al-Qaeda and its many emerging affiliates. The new Islamic State in Iraq and Syria falls into this category as well.

### **Limitations of This Study**

This study is purely a theoretical discussion concerning the future viability of ICBMs in a nuclear deterrent role. Such a topic can easily stray off-course and delve into many rabbit holes along the way. In order to avoid many of these tangents, it must be understood from the outset that this discussion does not address the effectiveness or utility of nuclear weapons. Further, the sheer destructive nature of nuclear weapons inspires moral and ethical questions in many observers. “The morality of nuclear weapons has from time to time become an important part of the public debate over military policy.”<sup>18</sup> Volumes have been dedicated to addressing those issues. However, they will not be analyzed here.

Additionally, this will not be an exercise in finance or budgetary balancing. The 2013 operating budget for all three legs of the nuclear triad was less than two percent of the Department of Defense (DoD) budget.<sup>19</sup> For the average American, that small percentage equates to a large sum. As such, debates concerning the best usage of defense dollars continue to rage. A cursory review of annual operating expenses and cost per delivery system will be included. However, attempting to delve into specific costs (e.g., maintenance, basing, modernization, etc.) and conducting a cost/benefit analysis would consume this work and miss the more specific target concerning the future role of ICBMs in a comprehensive deterrence strategy.

Finally, this study does not address the success or failure of nuclear deterrence as a national strategy. Does the absence of nuclear war validate nuclear deterrence as a success since the conclusion of World War II? As with the aforementioned topics, this question is best suited for a separate study. The United States has used, and continues to use, nuclear deterrence as a foundation for national and military strategy. This study accepts that without challenge.

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<sup>18</sup> Peter R. Beckman et al., *Nuclear Weapons Nuclear States & Terrorism*, 4th ed. (Hudson, NY: Sloan Publishing, 2007) 301.

<sup>19</sup> Major General Garrett Harencak, Assistant Chief of Staff for Strategic Deterrence and Nuclear Integration, briefing to School of Advanced Air and Space Studies, 3 December 2014.

## Literature Review

The concept of deterrence has existed for thousands of years, and surfaces in many great historical works, like those written by Thucydides and Sun Tzu. Prodigious amounts of literature exist that specifically discusses and details deterrence and nuclear deterrence. Many of the giants in the field of international relations and deterrence theory, such as Bernard Brodie, Thomas Schelling, Lawrence Freedman, Kenneth Waltz, and Scott Sagan, have written volumes discussing nuclear weapons and deterrence, including nuclear deterrence. While this essay acknowledges the tremendous influence those and other theorists had on this field of study, this essay does not examine the effectiveness of nuclear deterrence. With that in mind, a review of more recently written books by Keith Payne and Colin Gray provides the foundation for this study. In addition to these seminal texts, a number of other books and articles provided significant contributions. A review of the more recent literature highlights the fact that some of the current works accurately capture the changing nature of the international landscape, especially since the end of the Cold War.

To begin, Keith Payne, in *The Great American Gamble*, challenges the ideas established by Thomas Schelling and adopted by the United States. He begins by reviewing the beginnings of nuclear deterrence. Payne details two schools of thought, mutual assured destruction (MAD) and a defensive posture. MAD eventually emerged as the theory that influenced US policy, thus causing the United States to neglect the defense. This idea continued through the bipolar Cold War era. Furthermore, Payne claims that while deterrence remains important, it is uncertain. He challenges the US policy of continuing to give credence to the balance of terror concept. Simply stated, the preexisting thoughts on nuclear deterrence, as used during the Cold War, will not apply in the same manner for future US policy.

The second major work comes from Colin Gray. He writes his book about future concerns with the potential use of weapons of mass destruction, including nuclear weapons. He titles his book *The Second Nuclear Age* because he defines the first nuclear age as the period dominated by a bipolar world between superpowers: the United States and the Soviet Union. Gray claims that period has ended and the second age now

presents different challenges and threats, including a greater likelihood that the taboo on using nuclear weapons may not hold. According to Gray, the abolition of nuclear weapons is hopeless, and the future will include nuclear weapons. In addition, the second nuclear age could include nuclear conflict not experienced during the Cold War. He writes that deterrence is unreliable, and new threats have emerged to challenge international security.

While the works of Gray and Payne contributed heavily to this essay, a number of other books provided key information. Moreover, numerous short essays and articles proved invaluable to the analysis and evaluation. They tended to capture the most current views on nuclear deterrence, nuclear weapons, and ICBMs. Included in this group are numerous articles from the *Bulletin of the Atomic Scientists* that detail the nuclear forces for the nuclear-armed states. Hans Kristensen and Robert Norris authored the majority of these articles. In doing so, they provide a significant portion of the quantitative data used to complete the force analysis. In addition, articles by the Senate ICBM Coalition, Wolfgang Panofsky, and James Forsyth, et al. discuss the future of ICBMs and nuclear deterrence. In sum, a mix of theoretical texts and recent articles creates the background and setting for the analysis of evidence conducted in this study.

### **Roadmap**

Chapter Two begins with a brief summary of the history of ICBMs and their role in US nuclear deterrence. The chapter continues with the basic arguments and evidence concerning the hypothesis. The bulk of the analysis occurs in this chapter. It begins by reviewing three critiques of ICBMs: nuclear war will never occur; ICBMs lack survivability; and ICBMs have a narrow scope for target selection. Reviewing these questions leads to a discussion on ICBM-specific capabilities, both quantitative and qualitative. A brief analysis of the annual operating costs identifies how the triad legs compare. Finally, the pros and cons are considered in a section that discusses possible options that could replace the ICBM. The evidence will answer the central question in this study: “Should ICBMs continue to play an important role in US nuclear deterrence?”

Chapter Three applies the evidence to three hypothetical examples. Ideally, historical examples would be used as case studies. However, nuclear war has not

occurred since the bombing of Japan at the end of World War II. With that in mind, the theories and evidence will analyze possible situations that could occur in the future with the objective of determining if ICBMs could deter the threat. The first example involves a conflict between a peer/near-peer adversary (e.g., China or Russia) and the United States. The second example involves a rogue state and includes extended deterrence to allies. The final example tests the ability of ICBMs to deter a terror organization. Not every potential adversary will fit comfortably into these three categories. However, these three adversaries represent a significant range that should encompass the challenges that the United States faces as it applies nuclear deterrence in the future.

Chapter Four concludes the study with a summary of the findings, and an evaluation of the evidence and analysis. The results will determine the acceptance or rejection of the hypothesis. Additionally, a short review of lessons learned discusses the impact of leadership on nuclear deterrence. The study interprets the evidence within the parameters of established assumptions. A small section identifies possible counterarguments to the effectiveness and continued need for nuclear deterrence. Lastly, some final thoughts provide insight concerning the influence of US geographic isolation, fluctuating will, and the relationship with Russia.

## Chapter 2

### What ICBMs Bring to the Table

*The Minuteman III Intercontinental Ballistic Missile force is the most stabilizing leg of the American triad. It offers assurance to our allies with obvious visible permanence. ICBMs also represent the most cost-effective delivery systems the United States possesses.*

—US Senate ICBM Coalition

The debate concerning the utility of intercontinental ballistic missiles (ICBMs) in the US arsenal continues among proponents and opponents. The current post-Cold War nuclear age began with the fall of the Soviet Union. The Air Force captured the essence of ICBMs shortly afterwards with the following remarks from the Fiscal Year 1992 (FY92) Posture Statement, “ICBMs make unique contributions to the triad. They are valued for their promptness, reliability, accuracy, low operating cost, connectivity, and availability—while their near 100% alert rate allows the other two legs of the triad to operate at more economical tempos.”<sup>1</sup> While the remark comes from a dated posture statement, the principles have endured. Indeed, almost two decades later, a coalition of US Senators continued to echo similar sentiments when they stated that the Minuteman III (MMIII) is the most stabilizing leg of the triad and protects the survivability of the nuclear bombers and submarines. Further, MMIII offers the greatest visible assurance to US allies.<sup>2</sup> The times have changed, yet their message concerning ICBMs remains consistent.

Opponents of ICBMs dispute the FY92 Posture Statement and the Senate ICBM Coalition, which has created the uncertainty that surrounds ICBMs in their current role. Questions about their future utility must begin by answering some pertinent questions. The sections that follow start with a brief background that details the history of ICBMs and then address three of the common critiques of ICBMs, including the limited utility due to a deterrence role that precludes any possibility of actual use, low survivability, and a narrow scope of targets. The next section conducts a review of specific capabilities

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<sup>1</sup> Quoted in Richard Paulson, *The Role of US Nuclear Weapons in the Post-Cold War Era* (Maxwell ADB, AL: Air University Press, 1994), 55.

<sup>2</sup> Kent Conrad et al., *The Long Pole of the Nuclear Umbrella* (Washington, DC: Senate ICBM Coalition, 4 November 2009), 11.

associated with ICBMs. This study addresses the quantitative functions in the sub-section “Timing and Targeting” and qualitative abilities in the sub-section “Stabilizing Force.” Each of these two categories discusses capabilities that ICBMs provide to the United States. The “Economic” section highlights some significant factors associated with ICBM operating costs, including how the costs relate to submarine-launched ballistic missiles (SLBMs). The final section, “Replacement Options,” examines the possibility of using a different weapon in the US arsenal in lieu of ICBMs without the United States suffering a severe detriment to national security. Analyzing these aspects of the ICBM force goes a long way in identifying whether ICBMs have a future role in the defense of the United States.

### **Historical Background**

The theory of deterrence rests upon a foundation of fear. An adversary must work through a decision matrix weighing the possibility that an action could trigger a response from the United States. Fear of the potential retaliation limits the adversary’s actions. Ironically, fear itself contributed mightily to the development and promulgation for the single, greatest US nuclear deterrent: the ICBM. As World War II came to close, the United States and the Soviet Union raced to acquire German scientists and V-2 rocket technology.

The United States believed that it maintained a technological edge. However, Sputnik shattered that belief. Professor Lawrence Freedman writes, “It brought home the fact that the United States no longer enjoyed invulnerability to the ravages of war.”<sup>3</sup> Furthermore, it created a fear that the Soviets had surpassed the United States in ballistic missile technology, which led to the United States believing that the Soviets would develop an ICBM. The Americans and Soviets differed in their priorities. The United States placed a premium on Strategic Air Command’s long-range bomber capability. The Soviets eschewed that philosophy and prioritized ICBMs.<sup>4</sup> Moreover, Freedman states, “If the Soviet Union was the first to achieve a significant ICBM capability, then the ease

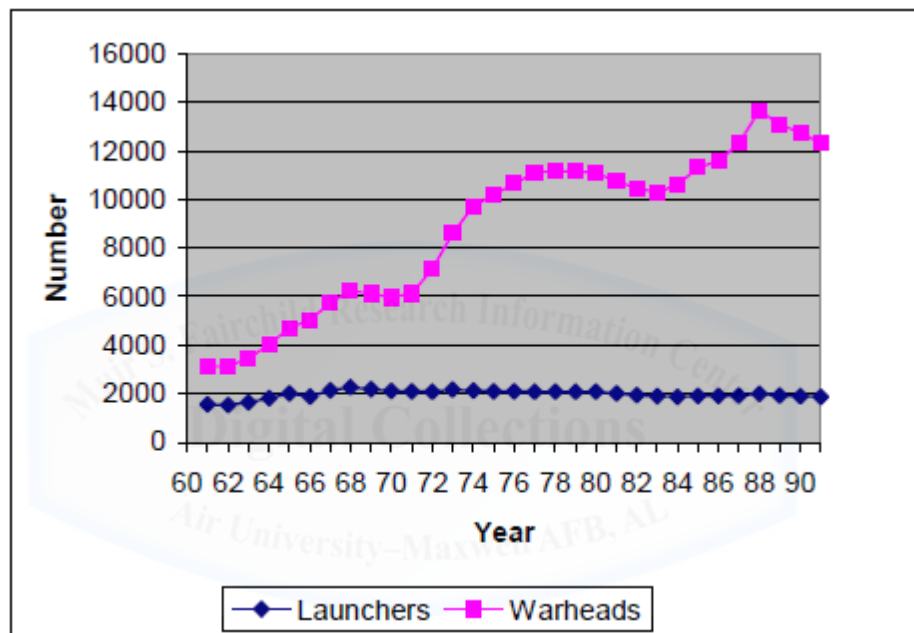
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<sup>3</sup> Lawrence Freedman, *The Evolution of Nuclear Strategy*, 3rd ed. (New York, NY: Palgrave Macmillan, 2003), 131.

<sup>4</sup> Freedman, *The Evolution of Nuclear Strategy*, 131.

and speed with which these weapons could reach their targets could place the United States at a considerable, perhaps decisive, disadvantage.”<sup>5</sup> Ultimately, the United States reached a point where it feared the Soviet forces had achieved a missile gap with the United States resting on the wrong side of the chasm. This prompted an arms race as US policymakers adopted plans that neglected active defenses and embraced the risk associated with mutual destruction. As seen in Figure 1, the number of US strategic nuclear weapons continued on a steady incline throughout the Cold War.

**Figure 1**



### **US Strategic Nuclear Weapons, 1960-1990**

Source: Reprinted from Amy F. Woolf, “US Strategic Nuclear Forces: Background, Developments, and Issues,” *Congressional Research Service*, September 5, 2014, 3.

The US ICBMs increased along the same lines as the total nuclear forces. The ICBM force reached its zenith in 1968 with a total of 1,054 ICBMs.<sup>6</sup> Moreover, from 1959 to 2008, the United States produced an estimated 3,160 ICBMs, while the Soviet/Russian production estimates approach 5,000 ICBMs during that same period.<sup>7</sup> Table 1 details the type, number, years deployed, and yield for the US ICBM forces. In

<sup>5</sup> Freeman, *The Evolution of Nuclear Strategy*, 128.

<sup>6</sup>David N. Spires, *On Alert: An Operational History of the United States Air Force Intercontinental Ballistic Missile Program, 1945-2011* (Colorado Springs, CO: Air Force Space Command, 2012), 197.

<sup>7</sup> Hans M. Kristensen and Robert S. Norris, “Nuclear Notebook: US and Soviet/Russian intercontinental ballistic missiles, 1959-2008,” *Bulletin of the Atomic Scientists* 65, no. 1 (Jan/Feb 2009), 64, 66.

addition to the information provided, a few significant dates are worth highlighting. The first operational ICBM, the Atlas D, became operational in September 1959. The first Minuteman ICBMs joined the force in October 1962, with the MMIII following in April 1970. The MMIII became the sole operational US ICBM on September 2005 with the deactivation of the Peacekeeper.

**Table 1: US ICBMs, 1959-Present**

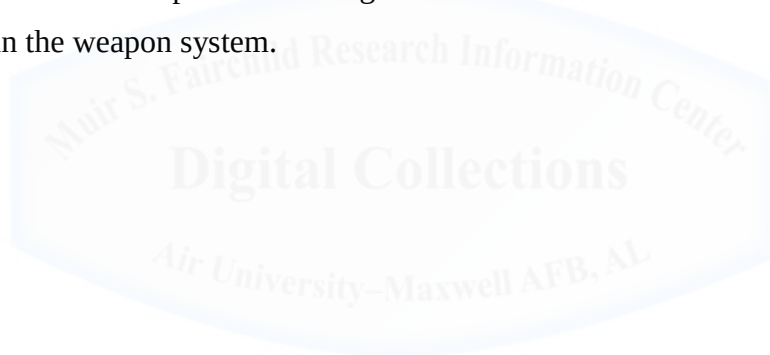
| Designation   | Peak Number Deployed | Dates Deployed | Yield             |
|---------------|----------------------|----------------|-------------------|
| Atlas D       | 30                   | 1959 – 1963    | 1.4 megatons      |
| Atlas E       | 27                   | 1961 – 1964    | 4.5 megatons      |
| Atlas F       | 72                   | 1962 – 1964    | 4.5 megatons      |
| Titan I       | 54                   | 1962 – 1964    | 4.5 megatons      |
| Titan II      | 54                   | 1963 – 1986    | 9 megatons        |
| Minuteman I   | 800                  | 1962 – 1974    | 1 megaton         |
| Minuteman II  | 450                  | 1966 – 1990    | 1.2 megatons      |
| Minuteman III | 550                  | 1970 – present | 170 - 330 kiloton |
| Peacekeeper   | 50                   | 1986 – 2005    | 300 kiloton       |

*Source:* Adapted from Hans M. Kristensen and Robert S. Norris, “Nuclear Notebook: US and Soviet/Russian intercontinental ballistic missiles, 1959-2008,” *Bulletin of the Atomic Scientists* 65, no. 1 (Jan/Feb 2009), 65.

The nuclear arsenals for the Soviet Union and the United States peaked at the height of the Cold War. Then, the notion of arms reduction gained traction. Figure 2 illustrates the steady decline of US nuclear weapons since the end of the Cold War. The first attempt at limiting nuclear arsenals was the Strategic Arms Limitation Treaty I (SALT). The two parties agreed to limit the number of anti-ballistic missiles (ABMs) for each country. SALT I led to the signing of the ABM Treaty. The follow-on talks of SALT II attempted to limit the number of nuclear warheads and delivery vehicles. Although the United States never ratified the treaty, President Reagan continued to abide by the terms of SALT II until it expired, while he pursued the Strategic Arms Reduction Treaty (START).<sup>8</sup>

<sup>8</sup> Office of the Historian, “Milestones: 1969-1976, Strategic Arms Limitations Talks/Treaty (SALT) I and II,” US Department of State, <https://history.state.gov/milestones/1969-1976/salt> (accessed 22 March 2015).

START I entered into force in December 1994 and set limits of 1,600 delivery vehicles and 6,000 warheads, of which 4,900 could be on ICBMs and SLBMs.<sup>9</sup> START II further reduced these numbers. However, it never went into force as neither side ratified the treaty. Despite the expiration of START I in December 2009, Russia and the United States continued further arms reduction. An agreement on the New START set the following aggregate limits: 1) 700 deployed ICBMs, SLBMs, and heavy bombers, 2) 1,550 nuclear warheads on those deployed platforms, and 3) 800 deployed and non-deployed ICBM launchers, SLBM launchers, and heavy bombers equipped for nuclear armaments.<sup>10</sup> To parse these numbers into meaningful data for this study, the United States plans to reduce the number of MMIIIs from the current 450 to a maximum 420.<sup>11</sup> After all the massive build-up and subsequent reductions, the United States will retain those 420 MMIIIs to use in its nuclear deterrent role. With the numbers now set, the study will shift to the specific challenges that ICBMs face and the unique capabilities inherent in the weapon system.



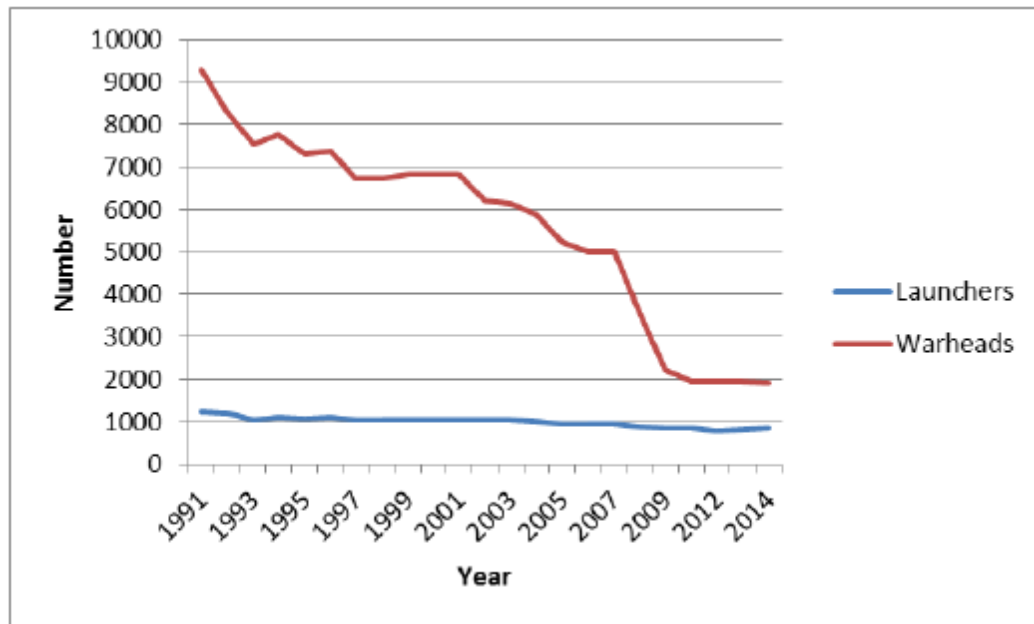
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<sup>9</sup> Treaties and Regimes, “Treaty between the United States of America and the Union of Soviet Socialist Republics on Strategic Offensive Reductions (START I),” Nuclear Threat Initiative, <http://www.nti.org/treaties-and-regimes/treaties-between-united-states-america-and-union-soviet-socialist-republics-strategic-offensive-reductions-start-i-start-ii/> (accessed 22 March 2015).

<sup>10</sup> Diplomacy in Action, “New START,” US Department of State, <http://www.state.gov/t/avc/newstart/index.htm> (accessed 23 March 2015).

<sup>11</sup> Department of Defense, *Quadrennial Defense Review 2014* (Washington DC: Government Printing Office, 2014), 41.

**Figure 2**



### **US Strategic Nuclear Weapons, 1991-2014**

Source: Reprinted from Woolf, Amy F., "US Strategic Nuclear Forces: Background, Developments, and Issues," Congressional Research Service (September 5, 2014), 5.

### **Challenges**

Opponents of ICBMs point to a number of issues that indicate a need to make changes in the US nuclear arsenal. Often these changes include the removal of the ICBM force from the current inventory. Three prominent issues are discussed in detail.

### **Deterrence and Nuclear War**

Prior to identifying possible future roles, the current ones must be evaluated. The ICBM force continues to provide the foundation for nuclear deterrence, but some still question the need to maintain an operational ICBM force. Colin Gray outlines two types of deterrence: one that protects the homeland and one that extends to cover allies and friends. In order for this extended deterrence to be effective, it must appear all-but-seamless as an overlapping web of potential action.<sup>12</sup> Certainly range and accuracy, along with a number of other capabilities, allows the ICBM force to play an integral part in creating this web. Wolfgang Panofsky questions the need for maintaining a vast

<sup>12</sup> Colin S. Gray, *The Second Nuclear Age* (Boulder, CO: Lynne Rienner Publishers, 1999), 62.

arsenal of nuclear weapons, but he quite clearly states that deterrence has not become obsolete against a major foe like Russia, or even smaller states like Iran.<sup>13</sup> Along similar lines, Keith Payne concludes that deterrence is not obsolete, but lacks reliability. The problem lies in the fact that strategies must be different in a post-Cold War era.<sup>14</sup> Indeed, the US does not directly target Russia with ICBMs. However, the presence of the MMIII force continues to provide deterrence on some level.

Like so many other contested subjects, even individuals who support the deterrent value of ICBMs quickly diverge when the subject changes to the weapons' potential beyond deterrence. Gray makes a bold statement, "Nuclear war(s) can happen."<sup>15</sup> Certainly, qualifiers exist on this idea. An accident or rogue entity willing to sacrifice its possible existence could trigger a war. A rational minded individual might struggle to conceive of a scenario that would lead to nuclear war. Indeed, Panofsky makes his beliefs obvious as he claims that nuclear weapons serve no purpose beyond deterrence, and a strategy including nuclear weapons deserves no role in US policy.<sup>16</sup> The argument fails a simple logic test. Few, including Panofsky and Payne, would argue that deterrence, as a strategic option, provides any guarantees. It is an option that appears to have worked throughout the Cold War. Gray identifies the lack of nuclear conflict as the most important aspect of the Cold War.<sup>17</sup> However, success in the Cold War does not guarantee future success. Indeed, Thomas Schelling aptly identifies the failing of deterrence in the Korean conflict. If deterrence were infallible then US nuclear weapons would have deterred North Korea. Sadly, that was not the case. Deterrence, even nuclear deterrence, failed to dissuade North Korea, and war commenced.<sup>18</sup> The conflict never escalated to a nuclear exchange, even as nuclear powers eventually opposed each other on the Korean peninsula.

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<sup>13</sup> Wolfgang K.H. Panofsky, "Nuclear Insecurity," *Foreign Affairs*, September/October 2007, <http://www.foreignaffairs.com/articles/62832/wolfgang-k-h-panofsky/nuclear-insecurity> (accessed 23 November 2014), 113.

<sup>14</sup> Keith B. Payne, *The Great American Gamble: Deterrence Theory and Practice from the Cold War to the Twenty-First Century* (Fairfax, VA: National Institute Press, 2008), 19.

<sup>15</sup> Gray, *The Second Nuclear Age*, 163.

<sup>16</sup> Panofsky, "Nuclear Insecurity," 114.

<sup>17</sup> Gray, *The Second Nuclear Age*, 19.

<sup>18</sup> Thomas C. Schelling, *Arms and Influence* (New Haven, CT: Yale University Press, 2008), xi.

If deterrence prevents wars, then what would happen if deterrence fails? As demonstrated in Korea, war is the result of failed deterrence. Logic dictates that if war will occur, then it is certainly plausible that nuclear war could occur as well, just as Gray has stated. It seems prudent to be prepared to the maximum extent possible. Furthermore, if this possibility exists at any level, then retaining the most lethal option (ICBMs) seems prudent. This is not a focused review of the relevance of deterrence. On the contrary, this discussion highlights the possibility that nuclear war could indeed occur.

### **Survivability and Implications**

If a nuclear war begins, how long would ICBMs last? The survivability of the weapons continues to be a significant concern. When comparing the three legs of the nuclear triad, the fixed location of the ICBM force creates an image that it is the least survivable. Unlike the submarine force that can patrol the vast areas of the ocean virtually undetected or even the bomber force that can relocate if danger is imminent, the ICBMs rest comfortably in their silos dispersed across 34,600 square miles spread over five states.<sup>19</sup> Just as the farmers and ranchers in those areas can easily identify the ICBM silos, US adversaries could do the same. The United States classifies certain specifications on the Minuteman III weapon system. However, the location of the silos is common knowledge.

Does the risk from visibility increase the chance of a nuclear strike? Richard Paulsen, a Strategic Air Command and Air Combat Command research fellow, explains how the fear of destruction could create the trigger that begins a nuclear war. He claims that ICBMs with multiple independently retargeted reentry vehicles (MIRV) are destabilizing because the only way to ensure survivability is to launch them prior to an attack.<sup>20</sup> Indeed, the fear of losing the entire ICBM force could surely cause consternation within the decision-making channels of the US Government. However, this idea fails to consider the difficulty in actually accomplishing the total annihilation of the entire US ICBM force. Mitch Bott, a systems engineer with Northrup Grumman

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<sup>19</sup> Conrad et al., *The Long Pole of the Nuclear Umbrella*, 11.

<sup>20</sup> Paulsen, *The Role of US Nuclear Weapons in the Post-Cold War Era*, 90.

Aerospace Systems, highlights this challenge when he argues that the required force to accomplish this task would require approximately a two to one strike on the US missile fields.<sup>21</sup> Considering the 450 ICBMs currently deployed, that would require an adversary to create a strike package of approximately 900 nuclear weapons. Even with a strike this large, the odds of achieving 100 per cent success are low. Bott continues his discussion by analyzing an attack with a 95 per cent success rate.<sup>22</sup> The remaining five per cent would still leave around 20 MMIIIs ready to launch. A 2014 RAND report evaluating the future of ICBMs makes the following conclusion, “Today, only Russia is capable of attacking US ICBMs. Even in that situation, however, an attack would require a substantial fraction of Russian RVs.”<sup>23</sup>

The complexity and almost impossibility of attacking and destroying the entire MMIII force changes the lens for viewing survivability. A nuclear missile operator performing daily duties in a Launch Control Center (LCC) will be at a greater risk than an SLBM operator on patrol in an unknown location. The missileer could lose his entire fleet as well as the other four LCCs in the squadron. Ultimately, all LCCs in the three ICBM wings could be lost. However, an airborne platform can still launch any surviving missiles. Thus, analyzing the survivability of ICBMs from a silo perspective may be more convenient, but it simply fails to account for the improbability of losing the entire fleet, which is what would need to happen from an adversary’s point of view in order to remove the capability from the decision matrix of the President of the United States. Given the challenges involved in accomplishing this feat, Bott’s statement that “the MMIII force is essentially invulnerable to attack with the exception of a large nuclear exchange” forces one to reevaluate the survivability equation of the nuclear triad.<sup>24</sup>

Beyond survivability, implications exist by simply having the Minuteman III on alert. As previously discussed, some pundits argue the destabilizing impact of an easily identified and targeted weapon. The 2010 Nuclear Posture Review Report (NPR) states

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<sup>21</sup> Mitch Bott, “Unique and Complementary Characteristics of the US ICBM and SLBM Weapon Systems,” in *A collection of Papers From the 2009 PONI Conference Series*, ed. by Andrew St. Denis, Joe Lardizabal and Anna Newby (Washington, DC: Center for Strategic and International Studies, 2010), 80.

<sup>22</sup> Bott, “Unique and Complementary Characteristics of the US ICBM and SLBM Weapon Systems,” 80.

<sup>23</sup> Lauren Caston et al., *The Future of the U.S. Intercontinental Ballistic Missile Force* (Santa Monica, CA: RAND, 2014), 45.

<sup>24</sup> Bott, “Unique and Complementary Characteristics of the US ICBM and SLBM Weapon Systems,” 80.

unequivocally that de-MIRVing the MMIII will reduce the incentive for a first strike and thus increase overall security.<sup>25</sup> The obvious difference between Paulsen's assessment and that of the NPR is the MIRV aspect of the ICBM force. The difference between one warhead and three on each ICBM creates an equation that appears more palatable. Eliminating 450 silos would potentially reduce the number of warheads by 1350 (with three warheads on each MMIII). Making this attack with the same two-to-one ratio of approximately 900 warheads could now produce a nuclear advantage for a potential adversary.

Does the simple math cut to the heart of this issue? The analytical approach could certainly be a factor. Paulsen's decree shortly after the end of the Cold War does not have the same applicability today with the significant reduction in the number of warheads. The NPR postulates that single warheads present a less inviting target for adversaries. Although this may be true, one fact has eluded both discussions. Professor Stephen Cimbala uses the term "warhead sponge" to describe a function of the ICBM force. The term derives its name from the requirement of a large-scale attack on the US missile complex.<sup>26</sup> This idea has been mentioned in passing, but without the appropriate discussion concerning the impact. Any first-strike attack on the nuclear capabilities of the United States requires the use of vast resources against the MMIII force, thus the term warhead sponge. Few countries can ever hope to achieve the necessary number of warheads required to neutralize the US ICBMs. If the attack occurs, then the other two legs of the triad, as well as conventional forces, will benefit from the missile fields absorbing the bulk of nuclear warheads.

In addition, the MMIII allows the US Government to continue to advocate a no first use policy on nuclear weapons. Professor Michael Quinlan captures this idea, "Nuclear-weapon possessors would give an absolute and permanent promise that never, under any circumstances whatever, would they be the first side to use such weapons in a

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<sup>25</sup> Department of Defense, *Nuclear Posture Review Report* (Washington, DC: Office of the Secretary of Defense, April 2010), 23.

<sup>26</sup> Stephen J. Cimbala, "Triage of Triads: Does the United States Really Need Three Strategic-Retaliatory Forces?" In *Deterrence and Nuclear Proliferation in the Twenty-First Century*, ed. by Stephen J. Cimbala (Westport, CT: Praeger Publishers, 2001), 136.

conflict.”<sup>27</sup> Whether a no first use policy is practical or impedes deterrence can be debated. Quinlan points out the irrational nature of using nuclear weapons as a first option; stating a declaratory no first use policy is unnecessary. “No one for decades past, if ever, has seriously thought of using nuclear weapons save in defense of deeply vital interests where no other course would serve.”<sup>28</sup> Indeed, the logic sets a trap for the rational mind. Again, individuals have a difficult time conceiving of a situation in which nuclear weapons should be employed. Unfortunately, a simple black and white comparison of rational versus irrational is no easy task. “Adversaries of any note lead large organizations—states—and had to pursue strategies to gain and retain power, it is difficult to argue that such persons are irrational or nonrational.”<sup>29</sup> The aggressive actions of Russian President Vladimir Putin and his continued bellicose nature reinforce this idea. In spite of the difficulty that other countries face, due to a smaller and more vulnerable nuclear inventory, the United States has the luxury of maintaining a no first use policy. In all likelihood, a first strike would not destroy the entire nuclear arsenal of the United States. Moreover, the MMIII force greatly contributes to this luxury. As previously discussed, the difficulty in destroying the entire US missile complex means that the President of the United States will always have a nuclear option.

The dedicated missileer performing daily duties in an LCC would not look fondly upon a strategy that uses them and their weapon system as a simple decoy to attract the adversary’s nuclear weapons in order to weaken that country’s arsenal. However, combining all of the smaller pieces mentioned provides a strategic option for the President of the United States. In sum, the adversary easily recognizes the location and number of ICBMs. The United States does not hide the fact that 450 MMIIIs are in silos spread across 34,600 square miles and five states. A street fighter’s mentality exists, “Here I am, so come get me if you can.” All MMIII ICBMs have single warheads that remain geographically separated by several miles from each other, so none presents an optimal target. The United States maintains a no first use policy. However, if the

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<sup>27</sup> Michael Quinlan, *Thinking About Nuclear Weapons: Principles, Problems, Prospects* (New York, NY: Oxford University Press, Inc., 2009), 99.

<sup>28</sup> Quinlan, *Thinking About Nuclear Weapons*, 100.

<sup>29</sup> James Wood Forsyth Jr., B. Chance Saltzman, and Gary Schaub Jr., “Remembrance of Things Past: The Enduring Value of Nuclear Weapons,” *Strategic Studies Quarterly*, Spring 2010, 76-77.

adversary decides to attack, then the less densely populated farms and ranches absorb the bulk of the nuclear strikes, like a sponge soaking in water. The ICBMs that survive will deliver a devastating counterattack along with the remainder of the nuclear weapons. In a Project on Nuclear Issues briefing, Jerry Maxwell, a systems engineer at Northrup Grumman, succinctly articulates the value of ICBMs when he states, “MMIII; the world knows its capability, and knows it is ready.”<sup>30</sup>

### **Narrow Scope**

In addition to the concerns about survivability, a pervasive idea exists that ICBMs can only hold a small subset of targets at risk. The 2014 RAND study finds that ICBMs can only hold at risk a narrow set of targets that are relatively stationary and unhardened.<sup>31</sup> Undoubtedly, this statement is accurate as an ICBM would be a poor choice to strike a tank convoy traveling along a highway. Moreover, a deeply hardened and deeply buried site might challenge the limits of a MMIII, although the area above and around the buried site would most assuredly be destroyed. The interesting piece lies in that fact that so many targets exist that fall into the stationary and unhardened category. As mentioned earlier, the larger nuclear inventory affords the United States options that countries with fewer warheads simply do not possess. To wit, the United States could choose targets that might not provide the optimal result based on the size and cost of the weapon. A country with only a handful of nuclear weapons must maximize each weapon, and weigh the benefit against the loss of the deterrent value of possessing the weapon. While considering the no first use policy, a smaller country could detonate a nuclear weapon against US interests, including allies. Even if a country (like North Korea) does not possess targets that would normally provide a sufficient return, the United States has the luxury of numbers that would allow it to launch a nuclear strike in order to respond in kind.

### **Capabilities**

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<sup>30</sup> Jerry Maxwell, “Qualitative Benefits of ICBMs to US Nuclear Posture and Global Stability” briefing,, Project on Nuclear Issues 2011 Capstone Conference, Offut AFB, NE, 6 December 2011, slide 6; punctuation changes made by author for correctness.

<sup>31</sup> Lauren Caston et al., *The Future of the U.S. Intercontinental Ballistic Missile Force*, 45.

ICBM proponents often counter detractors' arguments by citing the capabilities of ICBMs. The MMIII currently provides some very specific and quantifiable capabilities to the decision makers within the US government. In addition to the easily identified capabilities, the MMIII offers a few qualitative capabilities as well. These features are often difficult to express in measurable amounts. However, the impact remains valid. These capabilities will be reviewed below.

### **Timing and Targeting**

The discussion to this point has centered on ideas that can be easily debated. Proponents can push the argument in one direction, and opponents can just as easily tilt the debate in their favor. Subjective topics, such as the value of deterrence, the possibility of nuclear war, and how ICBMs affects them both stoke the fires and create a raging debate. The following section deals more with the quantifiable aspects of the MMIII: availability, reaction time, target coverage, and accuracy. The data do not prevent debates from occurring, even about these topics. Opponents may challenge the need to maintain a short-notice launch readiness status or persist with traditional targeting methods. However, the data provides information that is more definitive in order to specify capabilities that MMIII weapon systems provide.

To begin, the availability of the ICBM force has always been a critical element of their success in a deterrence role. Availability includes the short-notice launch readiness alert rate and weapon system reliability. Launch officers are on alert at the LCCs that control the MMIII weapon system 24-hours a day throughout the year. The weapons themselves maintain launch readiness alert rates that far exceed 90 per cent and typically hover near 100 per cent.<sup>32</sup> Consequently, the United States typically has well over 400 MMIII missiles ready for launch at any given time. Maxwell sums up the concept aptly when he states that ICBMs have provided more than 50 years of demonstrated deterrence, and the MMIII is launch ready 24-hours a day, seven days a week.<sup>33</sup>

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<sup>32</sup> Bott, "Unique and Complementary Characteristics," 73.

<sup>33</sup> Maxwell, "Qualitative Benefits of ICBMs," slide 4.

Secondly, the reaction time is a significant factor for the MMIII weapon system. Minuteman derived its name from the ability to launch within minutes.<sup>34</sup> Unlike other weapon systems that can adjust a yield or deliver a smaller munition, the MMIII offers only one blast yield option. However, that option arrives quickly. According to the USAF Fact Sheet on the MMIII, “Launching a Minuteman III takes about 60 seconds. When a launch crew receives a valid emergency action message, they take specific and well-practiced steps to make sure their actions are correct.”<sup>35</sup> The actual launch time will have some variance depending upon factors involved. Unlike the location of the MMIII, the actual launch times are classified. However, the fact sheets’ description of about 60 seconds illuminates speed that a MMIII offers in response to immediate threats. “After launch, it would take roughly 30 minutes for the MMIII to deliver its warhead to target.”<sup>36</sup> The speed of the crew and of the missile’s flight time provides an unprecedented reaction time, thus creating the concept of instantaneous deterrence. Of all the weapons in the United States’ arsenal, nothing provides the President with a faster response option than the MMIII.

The final capability is the targeting aspect that includes accuracy, range, and target coverage. Accuracy is measured in Circular Error Probability (CEP), which is a circle with a specified radius around a target in which half of the warheads land. For the MMIII, the CEP is approximately 400 feet.<sup>37</sup> According to the Boeing Fact Sheet, the range on the MMIII is greater than 6,000 miles.<sup>38</sup> Authors of the missilethreat.com website place the range at just over 8,000 miles.<sup>39</sup> Similar to the reaction timing, identifying the specific range would lead to classification concerns. Suffice it to say that while the range is not sufficient to target any point on the globe, the MMIII can reach all major regions of interest.<sup>40</sup> The target coverage relates to availability and range. As

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<sup>34</sup> Bott, “Unique and Complementary Characteristics,” 76.

<sup>35</sup> US Air Force Facts Sheet, “BOEING LGM-30G MINUTEMAN III,” National Museum of the USAF, [http://www.nationalmuseum.af.mil/factsheets/factsheet\\_print.asp?fsID=540&page=1](http://www.nationalmuseum.af.mil/factsheets/factsheet_print.asp?fsID=540&page=1) (accessed 1 February 2015).

<sup>36</sup> Bott, “Unique and Complementary Characteristics,” 76.

<sup>37</sup> Bott, “Unique and Complementary Characteristics,” 77.

<sup>38</sup> Boeing Facts Sheet, “LGM-30, Minuteman Missile,” Boeing, <http://www.boeing.com/boeing/history/boeing/minuteman.page> (accessed 1 February 2015).

<sup>39</sup> Ballistic Missiles, “LGM-30G MINUTEMAN III,” Missile Threat, <http://missilethreat.com/missiles/lgm-30g-minuteman-iii> (accessed 1 February 2015).

<sup>40</sup> Bott, “Unique and Complementary Characteristics,” 78.

previously stated, with an availability above 90 percent, at the President's disposal is the option to launch over 400 MMIII missiles at any given time and reach major areas of concern.

### **Stabilizing Force**

Beyond simple quantitative data concerning timing, range, or accuracy, the MMIII weapon system provides three additional qualitative benefits to the United States and its allies. While the idea of survivability has thus far been discussed sufficiently here and elsewhere, a secondary benefit that the Senate Coalition identifies as protecting the United States "from the danger of an all our eggs in one basket strategy."<sup>41</sup> Next, the robust MMIII force dissuades adversaries from attempting to reach nuclear parity. Finally, the permanence of the MMIII force provides the visible reminder to allies that the US nuclear umbrella extends its reach to cover them. Each of these three concepts is significant, even without an ability to quantify the exact nature of the contribution.

According to the Senate Coalition, maintaining a robust ICBM force prevents the United States from creating a nuclear environment where an adversary believes that a first strike could be successful. "Without ICBMs, an adversary would have to destroy only 10 targets to destroy [the US'] entire submarine fleet. With [US] bombers located at only three continental bases, an adversary could target 13 locations and destroy all [US] nuclear delivery systems, except ICBMs."<sup>42</sup> The bombers and submarines simply do not have enough platforms or locations to dissuade a first strike. In identifying the need for at least 900 warheads to eliminate the ICBM force, the bar exceeds the threshold of almost the entire world. Reducing the number to less than 30 brings many countries back into the mix.

How can one explain the motives that drive many of the countries in the world to achieve nuclear status? Nuclear weapons bring credibility in the international realm. Moreover, that credibility increases dramatically if a country can reach nuclear parity with the United States. Gray explains this idea, "A peer, at least more than strictly regional, rival to the United States could decide that nuclear capability is the path to fame

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<sup>41</sup> Kent Conrad et al., *The Long Pole of the Nuclear Umbrella*, 13.

<sup>42</sup> Kent Conrad et al., *The Long Pole of the Nuclear Umbrella*, 13.

and global fortune.”<sup>43</sup> Gray takes this idea a step further as he explains that the ever-dwindling numbers of nuclear weapons among great powers makes parity with nuclear weapons seem more achievable than in conventional arms.<sup>44</sup> Maintaining a strong ICBM presence provides two benefits that increase the difficulty of an adversary achieving nuclear parity. First, retaining the current structure forces that parity number higher than almost any country can achieve. Even the few with the resources available would strongly consider stopping well below US parity. China has enough nuclear weapons to present a credible threat. However, they have not chosen an arms race to rival the nuclear arsenal of the United States. Second, in order to achieve parity, the adversary must account for the massive infrastructure that is already in place that supports the ICBM force. Again, the challenge of creating such a complex weapon system precludes the majority of the world from taking part.

Finally, one important focus for the United States is to reduce nuclear proliferation. One important way to achieve this occurs through the promise of extended deterrence using the US nuclear umbrella. “Submarines are hidden, and bombers are inherently mobile—especially given the many conventional tasks...ICBMs stand visibly ready and permanently tied to their silos.”<sup>45</sup> This visible presence provides the reassurance to allies that the United States will ensure their nuclear security.

### **Economics**

Media outlets constantly sensationalize the costs associated with weapon systems. Indeed, the per unit cost of the new Joint Strike Fighter is considered astronomical by many. However, ICBMs operate with substantial infrastructure already in place that reduces their annual cost. In the case of the Air Force and nuclear weapons, “Less than one per cent of the DoD budget is allocated to the operating expenses for ICBMs and bombers.”<sup>46</sup> More specifically, ICBMs are the most cost-effective leg of the triad.<sup>47</sup> The

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<sup>43</sup> Gray, *The Second Nuclear Age*, 126.

<sup>44</sup> Gray, *The Second Nuclear Age*, 126.

<sup>45</sup> Kent Conrad et al., *The Long Pole of the Nuclear Umbrella*, 15.

<sup>46</sup> Lieutenant General Stephen W. Wilson. Commander, Air Force Global Strike Command (briefing, School of Advanced Air and Space Studies, 6 January 2015).

<sup>47</sup> Major General Garrett Harencak, Assistant Chief of Staff for Strategic Deterrence and Nuclear Integration (briefing, School of Advanced Air and Space Studies, 3 December 2014).

cost per delivery vehicle for bombers and SLBMs is almost four times the cost per Minuteman III, while the modernization costs for ICBMs are substantially less as well. The MMIII force has already been modernized through 2020 and will need less investment to reach 2030. The submarine and bomber force will require a substantially greater investment to reach these benchmark dates.<sup>48</sup>

Even though ICBMs' operating cost remains low, relative to the overall DoD budget, the dollar amount associated with the annual maintenance and operational costs still give rise to a cost-cutting discussion. What is the most efficient way to reduce costs? In weighing capabilities against the cost, Cimbala identifies three reasons to maintain a balanced triad: it complicates the plans of any attacker; each leg creates a different problem; and helps avoid a breakthrough technology that could negate a leg.<sup>49</sup> This suggests that maintaining the capability is paramount. However, a reduction in numbers could still be effective. Indeed, Panofsky highlights this idea when he posits that a vast arsenal is no longer justified to threaten targets in Russia and a reduced arsenal would still provide enough deterrence against Russia and smaller states.<sup>50</sup>

Forsyth takes the idea a step further by identifying a specific number that would still provide stable deterrence: 311 nuclear weapons. Of that, 100 single-warhead ICBMs would be sufficient.<sup>51</sup> The article does not suggest how this number would be distributed. In order to maximize the survivability, three wings would be optimal. However, from a cost-cutting perspective, a single MMIII wing would provide the greatest savings. Indeed, Quinlan identifies that a straight-line graph does not exist from a moral or financial perspective. "Fifty or a hundred weapons are not far more acceptable politically, more virtuous morally...or even necessarily many times less expensive than say, a thousand."<sup>52</sup> The RAND report addresses the idea specifically, "While budgetary constraints, along with other factors, could force further reductions of the Minuteman force below the 400-420 level currently planned to meet the New START limit, only complete closure of an ICBM-only base would result in significant annual operations and

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<sup>48</sup> Conrad et al., *The Long Pole of the Nuclear Umbrella*, 15.

<sup>49</sup> Cimbala, "Triage of Triads," 121-122.

<sup>50</sup> Panofsky, "Nuclear Insecurity," 113-114.

<sup>51</sup> Forsyth, "Remembrance of Things Past," 82.

<sup>52</sup> Quinlan, *Thinking About Nuclear Weapons*, 105.

support cost savings.”<sup>53</sup> The only way to maximize savings is to reduce the support personnel and infrastructure costs. However, considering the USAF has discussed Base Realignment and Closure for many years, but failed to gain traction in Congress, the odds of a complete base closure are slim.

With the circle completed, the discussion begins anew at the original question. What is the most efficient way to reduce costs? A delicate balance must be maintained between capability retention and savings maximization. From a security perspective, achieving minimal savings by reducing the number of ICBMs per wing provides the greatest options and strongest deterrence. A budgetary perspective would tilt to operating a single wing of MMIII and closing the other two missile bases. Minot operates bombers and ICBMs. Thus, it would seem the logical choice to retain both capabilities. Unfortunately, the required scope of a potential hostile first strike would be much narrower, and easier to accomplish. The detailed explanations and budgetary number crunching reaches beyond the scope of this essay. The author advocates for retaining the current three-wing structure in the ICBM force, in order to present the greatest deterrent possible to protect the United States. As a result, a more modest expectation for budgetary cuts would be achieved.

### **Replacement Options**

Now that a good foundation has provided many of the quantitative and qualitative capabilities and benefits the MMIII force provides, the discussion can shift to the possibility of replacing those benefits. The United States currently has two options for replacing the MMIII: conventional munitions or one of the other two legs in the nuclear triad. The discussion will begin with the idea of replacing nuclear weapons with conventional forces. The last review will analyze the possibility of nuclear capable bombers or submarines assuming the duties of the MMIII. The discussion takes place with national security as the dominant concern. A simplistic view of the associated economics was explained earlier. However, the nuclear force is designed as an investment in national security, not an economic investment.

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<sup>53</sup> Lauren Caston et al., *The Future of the U.S. Intercontinental Ballistic Missile Force*, xx.

How do the capabilities of conventional weapons compare to that of the MMIII? This essay did not go into any detail on the blast yield of a nuclear-armed MMIII. An analytical discussion that includes kiloton yields, blast radius, and anticipated destruction exceeds the scope of this discussion. A common understanding should exist that the MMIII provides a destructive force unrivaled by any conventional weapon. In a briefing to a group of Air Force officers, Lieutenant General Stephen Wilson compared the largest conventional munition in the arsenal, the Massive Ordnance Penetrator (MOP), to the single-warhead MMIII. The MOP reaches about 20.5 feet in length, or roughly the same length as a 2015 Ford Super Crew Pickup. In order to approximate the blast yield of one MMIII, 113,208 MOPs would be needed. If these MOPs were lined-up nose-to-tail, the line would stretch to a distance of nearly 440 miles.<sup>54</sup>

A disclaimer needs to be made concerning this analogy. The MOP and the MMIII serve different purposes in the US arsenal. The conventional weapons are complementary to nuclear weapons. However, for the purpose of this discussion, the enormous disparity in blast yield highlights the difficulty in using conventional weapons in place of the MMIII. Forsyth states, “In theory, nuclear weapons are better than conventional forces in terms of enhancing general deterrence. This is so because deterrence succeeds when the costs—or, more appropriately, the risks of costs—exceed any probable gains that are to be had through armed aggression.”<sup>55</sup> Using this idea, the MMIII provides the greatest potential devastation, and thus provides the maximum deterrence. Furthermore, if a nuclear war commences, conventional munitions, like the MOP, will not provide the blast required to create the destruction or even send the appropriate political message.

Dismissing conventional munitions as a replacement for the nuclear-armed ICBM only leaves the other two legs of the nuclear triad to assume the responsibilities of the MMIII. A nuclear-armed bomber does provide an option for a blast yield that could adequately compare with the MMIII. Furthermore, the range of a bomber with tanker

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<sup>54</sup> Lieutenant General Stephen Wilson, Commander Air Force Global Strike Command provided the analogy during a briefing to the School of Advanced Air and Space Studies. Dr. Christopher Yeaw, Chief Scientist, Air Force Global Strike Command provided the following data: MMIII with a 300kt yield compared to a MOP with a 5,300-pound yield.

<sup>55</sup> Forsyth, “Remembrance of Things Past,” 77.

assistance is unlimited, and the munitions are dropped with precision. However, the comparisons stop there. In terms of the capabilities discussed previously, the bomber force simply does not offer a response time that can rival the MMIII. Without having a bomber force on constant alert, the ability to survive a surprise first strike is very low. Bombers would need time to generate sorties in order to prepare for a nuclear mission. In essence, the response timing for a nuclear option changes from minutes to hours and days. The bomber adequately complements the capabilities of the MMIII, but the bomber cannot replace the missile.

The final analysis concerns the nuclear submarine force. Bott compares the ICBM and SLBM weapon systems because of characteristics they have in common. The Trident II force maintains a fleet on alert patrolling global waters. The so-called hard alert allows them to react more quickly than bombers. The numbers fall short of the MMIII, but depending on the patrol location at the time of attack, the reaction time could be very short. Furthermore, the Trident II forces possess similar accuracy as the MMIII, on the order of a 400-foot CEP.<sup>56</sup> The submarine force only maintains four to five submarines at sea on continual hard alert. With a similar alert rate to that of MMIII, and assuming an average of four warheads per tube, there are 86-96 missiles available for immediate use.<sup>57</sup> The range of the Trident coupled with the mobility of the submarines allows for complete global coverage.

From a capabilities standpoint, the SLBM comes the closest of any of the weapons in the current inventory to matching the MMIII. However, important qualitative functions are lost with SLBMs. The secretive nature of a patrolling submarine does not provide the visible assurance to US allies. An ally could be on the receiving end of a surprise attack, and a nuclear capable submarine might not be in position to retaliate. No certainty exists like that which the MMIII provides. As previously mentioned, the smaller numbers of submarines drastically changes the decision calculus for an adversary. Without a warhead sponge, the US nuclear inventory is far more susceptible to first-strike attacks. Finally, replacing the MMIII weapon system with the SLBM force removes such an important piece of the nuclear equation that rivals can now more easily achieve parity.

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<sup>56</sup> Bott, "Unique and Complementary Characteristics," 78.

<sup>57</sup> Bott, "Unique and Complementary Characteristics," 76.

## Summary

Determining a role for one of the most devastating weapons on the globe continues to be a contentious discussion. The 2010 Nuclear Posture Review clearly states, “Retaining all three Triad legs will best maintain strategic stability at reasonable cost, while hedging against potential technical problems or vulnerabilities.”<sup>58</sup> Of course, one should expect the Department of Defense to advocate for the retention of its weapons systems. Does that necessarily mean they are wrong? This chapter discussed a number of concerns that opponents have with ICBMs: the unlikelihood of nuclear war, the question of survivability, and the narrow targeting scope. All have some merit, but the strength of the arguments can be questioned. Deterrence has never (and will never) be a guaranteed eliminator of war. Certainly, a conflict has not escalated to the point of using nuclear weapons since World War II. Both points are valid, but the uncertainty in conflict means that nuclear war could happen, and nuclear weapons, including ICBMs, could also cause an adversary to refrain from a nuclear strike. The concern over survivability remains valid, if a country has the means to attack US ICBMs, which very few do. The final concern is the narrow category of potential targets. As noted earlier, limitations exist with respect to target sets. The United States has the inventory to enable it to use nuclear weapons against smaller targets or those without strategic value. However, the optimum targets for the MMIII are stationary, relatively unhardened, and high value strategic targets.

To counter the criticism, proponents will tout the capabilities provided by ICBMs. This study identifies the availability, reaction time, target coverage, and accuracy as quantitative features that make the MMIII a formidable weapon. In addition to the easily tracked capabilities, three qualitative functions are discussed in detail: the MMIII makes the US nuclear force more difficult to neutralize, the numbers force adversaries to rethink the possibility of achieving nuclear parity, and the MMIII provides the visible and prominent display of assurance to allies. A quick review of the economic aspect highlights the fact that the MMIII force is less costly per delivery vehicle compared to the

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<sup>58</sup> Department of Defense, *Nuclear Posture Review Report*, 21.

other two legs of the triad. Additionally, achieving a significant savings can only occur with major restructuring of the MMIII force that includes closing entire ICBM bases.

In an attempt to identify possible replacements of the nuclear-armed MMIII, this study compared and contrasted the capability of the MMIII force with those of conventional munitions, nuclear bombers, and nuclear submarines. SLBMs came the closest to matching the specific targeting abilities of the MMIII. However, limitations prevent it from being an optimal replacement. Conventional munitions and the other two legs of the nuclear triad are complementary to ICBMs, and not designed as a replacement.

Ultimately, the capabilities provided by the MMIII force allow the United States to maintain the maximum level of national security and counter existential threats that exist in the world. The Senate Coalition pinpointed a paradox unique to the nuclear age, “The only way to protect [the United States] from nuclear weapons is to possess nuclear weapons.”<sup>59</sup> The question for the future now turns to how much risk the United States is willing to accept in the realm of national security. The stage has been set in terms of the capabilities that ICBMs provide and the uncertain nature of nuclear deterrence. The following chapter takes this analysis and applies it to three examples of potential adversaries, each with varying degrees of political control and international respect. Instead of applying blanket statements concerning the future of nuclear deterrence, the examples apply the precepts of deterrence combined with the abilities of the MMIII to determine if the ICBMs would potentially play any role in deterrence.

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<sup>59</sup> Conrad et al., *The Long Pole of the Nuclear Umbrella*, 5.

## Chapter 3

### Deterrence in Practice

*The underlying reality remains that nuclear weapons provide overwhelming force.*

—Michael Quinlan

After completing a review of the capabilities of US intercontinental ballistic missiles (ICBMs), the study now continues the analysis by shifting to the applicability of ICBMs against potential adversaries. One of the unique aspects of discussing, analyzing, and “testing” nuclear deterrence lies in the fact that with the brief exception of two atomic detonations in World War II, nuclear war remains a theoretical discussion. Therefore, the evidentiary base of nuclear deterrence is somewhat lacking. The closest the world came to nuclear conflict was during the decades long Cold War between the United States and the Soviet Union. However, the war remained cold between these two superpowers. Certainly, proxy wars were fought in Southwest Asia and other parts of the world. Moreover, the Cuban Missile Crisis nearly brought the two nations into open and armed conflict. Of course, the operative word is *nearly*. The two nations postured and threatened, but never engaged in open and armed conflict.

The Cold War produced two key points concerning nuclear conflict. First, did the absence of a nuclear exchange validate nuclear deterrence? A certain amount of circular logic exists in evaluating that question. Colin Gray states, “The most important aspect to the nuclear history of the Cold War is the unanswerable fact that it was neither terminated nor punctuated by nuclear combat.”<sup>79</sup> He continues with a warning: “We cannot know why there was no nuclear war from 1947 until the formal demise of the [Union of Soviet Socialist Republics] in 1991. What is avoidable, however, is the drawing of unwarranted conclusions from essentially contestable, or absent, evidence.”<sup>80</sup> As a counter-factual, if a nuclear war had occurred between the United States and the Soviet Union then evidence

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<sup>79</sup> Colin S. Gray, *The Second Nuclear Age* (Boulder, CO: Lynne Rienner Publishers, 1999), 19.

<sup>80</sup> Gray, *The Second Nuclear Age*, 20.

would exist that disproves the theory of nuclear deterrence. However, as Gray points out, the absence of a conflict does not confirm the validity of nuclear deterrence. The second point of emphasis is the obvious lack of historical case studies from which to analyze data, draw conclusions, and predict future conflicts. As noted in Gray's comments, the absence of nuclear conflict leaves a dearth of evidence concerning nuclear deterrence.

If the Cold War is the primary example of nuclear deterrence between two global powers, then what about deterring lesser adversaries? The 2014 RAND Report states, "The principal role of US strategic nuclear forces has been to deter 'high end' nuclear-armed adversaries from attacking the United States by fear of retaliation."<sup>81</sup> While this certainly may be true, nuclear weapons, specifically ICBMs may play a role in other types of conflicts. This chapter will evaluate four factors to determine the possible future utility of ICBMs in nuclear deterrence: 1) possibility that an adversary could become a threat, 2) applicability of ICBMs to deter the threat, 3) likelihood of receiving support from US leaders and the civilian population to use ICBMs, and 4) credibility of using ICBMs against the adversary. The analysis will examine three possible adversarial examples: peer/near peer, rogue state, and a terror organization. In examining these three scenarios, the study will evaluate the evolving security landscape. The hypothetical confrontation with a peer/near-peer would likely involve a significant nuclear exchange, and therefore, a possible existential threat to the United States. Conversely, a conflict with a rogue state would likely occur on foreign soil due to the United States' geographic position and the inability of most smaller states to bring the conflict to the US mainland. Consequently, a significant threat to US and allied interests abroad would not likely endanger mainland United States. Finally, an encounter with a terror organization would likely occur in response to terrorist activity, similar to the attacks of 9-11. The focus for more than fifty years was the Soviet Union/Russian threat. Keith Payne states, "Most of what we then believed to be true about deterrence is of questionable value now because the stakes, the opponents, the context, and our deterrence goals differ so dramatically from those of the Cold War."<sup>82</sup> Although still a prominent concern, other threats have

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<sup>81</sup> Lauren Caston et al., *The Future of the U.S. Intercontinental Ballistic Missile Force* (Santa Monica, CA: RAND, 2014), 7.

<sup>82</sup> Keith B. Payne, *The Great American Gamble* (Fairfax, VA: National Institute Press, 2008), 12.

emerged. The three examples highlight differences in threats to the United States and provide an opportunity to evaluate what role the ICBM might play in each conflict.

### **Peer/Near-Peer**

In discussing a possible peer/near-peer adversary, this study acknowledges that in the current international order, the United States stands alone in terms of its economic power and military might. The gap may have diminished since the end of the Cold War. However, a significant gap still exists. That does not mean that threats from global powers do not exist. In reviewing a list of the nations with top Gross Domestic Products combined with significant military might, the United States maintains long-standing alliances with the global powers at the top of this list, such as Japan and the countries in the European Union. The two that stand out as potential future adversaries are Russia and China, and each presents unique challenges. Russia continues as the lone global power equipped with a nuclear arsenal that rivals the United States, while China's recent growth and development makes them a burgeoning peer competitor. China possesses a smaller nuclear arsenal than either the United States or Russia. However, China's economic power provides it with the capital necessary to expand its nuclear capabilities. China's development could be a precursor to other economically booming countries who could use nuclear weapons as a springboard to compete with or surpass the United States.

### **Russia**

**Table 2: Russian Strategic Nuclear Forces**

| Type    | Launchers | Warheads |
|---------|-----------|----------|
| ICBMs   | 304       | 967      |
| SLBMs   | 9/144     | 528      |
| Bombers | 72        | 810      |

Source: Adapted from Hans M. Kristensen and Robert S. Norris, "Russian nuclear forces, 2014," *Bulletin of the Atomic Scientists* 70, no. 2 (2014), 77.

An analysis of the Russian strategic nuclear forces must begin with the Union of Soviet Socialist Republics in order to understand where Russia stands in terms of strength and reliability. Professor George Quester discusses how the Soviet Union maintained a

conventional advantage over the United States. Consequently, Americans needed nuclear weapons as equalizers. Since 1989, the roles reversed. “It might be Moscow’s turn to welcome the existence of nuclear weapons and to play with escalation threats as the counter to conventional power.”<sup>83</sup> However, until the recent events in Ukraine, questions arose concerning the threat that Russia posed. Indeed, Professor Patrick Morgan claimed, “Russia is now a friend, a close associate of [the North Atlantic Treaty Organization].”<sup>84</sup> James Scouras discusses aspects of the Russian perspective that have significant impact. Does Russia lack the intent that the Soviets possessed, and is the strategic partnership forming between Russia and the United States reducing the Russian threat? Scouras attacks these points with a simple counterargument that the United States cannot fully understand the Russian perspective and decision-making dynamics. He questions whether a single, clearly dominant Russian perspective exists. Moreover, even if rational minds in Russia would never attack the United States, crises can spin out of control and unanticipated results can occur.<sup>85</sup> In short, a logical attempt by United States to explain away the risk of conflict with Russia would be faulty. Applying American reasoning to a Russian mind will not create the predictability desired.

If Russia does indeed remain on the list of potential adversaries, then can nuclear deterrence provide a viable counter to the threat? Certainty simply does not exist when human beings possess free will. Indeed, the Russian leadership could choose an option that US leaders would never expect. However, a comfort level still exists with the knowledge that nuclear deterrence did not fail during the Cold War. In fact, the Cold War model provides a solid foundation from which to begin the discussion concerning the utility of ICBMs.

From a capabilities perspective, the Minuteman III (MMIII) provides an immediate option to counter possible first strike attacks. Table 2 highlights the extensive nuclear assets the Russians possess. With an arsenal that consists of more than 300

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<sup>83</sup> George H. Quester, “Relating Nuclear Weapons to American Power,” In *Deterrence and Nuclear Proliferation in the Twenty-First Century*, ed. by Stephen J. Cimbala (Westport, CT: Praeger Publishers, 2001), 18.

<sup>84</sup> Patrick Morgan, *Deterrence Now* (Cambridge, UK: Cambridge University Press, 2003), 250.

<sup>85</sup> James Scouras, “Post-Cold War Nuclear Scenarios: Implications for a New Strategic Calculus,” In *Deterrence and Nuclear Proliferation in the Twenty-First Century*, ed. by Stephen J. Cimbala (Westport, CT: Praeger Publishers, 2001), 42-46.

ICBMs, the Russians maintain the capability to strike the United States at will, on a moment's notice, and without any advanced warning. The constant vigilance provided by the MMIII counters this Russian threat. In actuality, the MMIII force and the Russian ICBM force balance each other. This equalizing effect ultimately provides security and promotes stability. Neither country can act without fear of a massive nuclear retaliation led by ICBMs.

In addition to the well-defined target sets that are present in Russia, the current deployment of the MMIII force creates a significant obstacle for Russian targeting. As previously mentioned, the geographic disposition creates a "warhead sponge" against Russian nuclear forces. Continuing to use Bott's assumption that a two-to-one ratio is needed to have an opportunity to destroy the US MMIII forces, Russia would need to commit the majority of its nuclear warheads just to give itself a chance to neutralize US ICBMs.<sup>86</sup> Indeed, if both countries operate at the nuclear warhead levels identified in the New START Treaty (1550 nuclear warheads), then a surprise first strike intended to destroy the US ICBM force would require the expenditure of almost 60% of Russia's entire nuclear force. Such an attack would be targeting roughly 30% of the US nuclear force. According to the Brookings Institute, "Even after absorbing a first strike, residual US strategic forces would remain capable of delivering hundreds of warheads against an attacker."<sup>87</sup> The sheer numbers required to complete this complicated attack combined with the difficulty in achieving a 100 percent success rate makes such an attack extremely challenging.

A final consideration for a potential nuclear conflict with Russia is the will of US leadership and support of the civilian population. The United States maintains a no-first-use policy, but retains the ability and willingness to authorize a nuclear counterstrike. The 2014 Quadrennial Defense Review (QDR) highlights this position: "Nuclear forces continue to play a limited but critical role in the Nation's strategy to address threats posed

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<sup>86</sup> Mitch Bott, "Unique and Complementary Characteristics of the US ICBM and SLBM Weapon Systems," in *A collection of Papers From the 2009 PONI Conference Series*, ed. by Andrew St. Denis, Joe Lardizabal and Anna Newby (Washington, DC: Center for Strategic and International Studies, 2010), 80.

<sup>87</sup> Steven Pifer, et al, "US Nuclear and Extended Deterrence: Considerations and Challenges," *Brookings* (May, 2010), 15.  
[http://www.brookings.edu/~media/research/files/papers/2010/6/nuclear%20deterrence/06\\_nuclear\\_deterrence.pdf](http://www.brookings.edu/~media/research/files/papers/2010/6/nuclear%20deterrence/06_nuclear_deterrence.pdf) (accessed 18 January 2015)

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.”<sup>88</sup> The United States prefers not to advertise a willingness to use nuclear weapons, especially with an administration that seeks to reduce nuclear weapons globally. However, addressing threats with nuclear forces using an effective nuclear response could aptly apply to a future situation with Russia.

Additionally, US leaders would find significant support from the civilian population for a nuclear counterstrike, including the use of ICBMs, in response to a nuclear attack from Russia. The immediate response to the terror attacks against the World Trade Center on 11 September 2001 demonstrates the willingness of the United States to respond to attacks against the homeland. Russian leaders should expect similar decisive and retaliatory action if they choose to launch a nuclear strike.

## China

**Table 3: Chinese Nuclear Forces**

| Type                          | Launchers | Range           | Warheads |
|-------------------------------|-----------|-----------------|----------|
| Land-based Ballistic Missiles | ~40       | 10,000+ km      | ~40      |
| Land-based Ballistic Missiles | ~8        | 7,000-10,000 km | ~8       |
| Land-based Ballistic Missiles | ~100      | 2,000-7,000 km  | ~100     |
| Bombers                       | ~20       | 3,100+ km       | ~20      |

Source: Adapted from Hans M. Kristensen and Robert S. Norris, “Chinese nuclear forces, 2013,” *Bulletin of the Atomic Scientists* 69, no. 6 (2013), 80.

In stark contrast to the Soviet/Russian experience with the Cold War, the United States has almost no experience in dealing with a nuclear-armed China, especially with respect to the impact of nuclear deterrence. As evidenced in Table 3, China simply does not possess the sheer volume of nuclear warheads and weapon systems. However, they retain the capability to strike limited parts of the continental United States, as well as

<sup>88</sup> Department of Defense, *Quadrennial Defense Review 2014* (Washington DC: Government Printing Office, 2014), 14.

Hawaii and Alaska. In addition, China has the ability to target close allies like South Korea and Japan.

Does the fact that China possesses a much smaller number of nuclear weapons reduce the threat or lower stability? Morgan discusses how China is uncomfortable conducting great-power relations, due in part to feeling too weak to be safe or too weak to achieve regional hegemony. Further, China's focus is on the military, influencing its region, and territorial disputes.<sup>89</sup> Two of the disputes could trigger a response from the United States. The first issue concerns Taiwanese independence. Morgan claims that Chinese statements indicate a willingness to go to war with the United States over Taiwan. While the United States may support Taiwan, would it actually go to war? If so, how quickly and to what magnitude could the conflict escalate? Secondly, Japan and China continue to dispute the ownership of the Senkaku Islands. Japan has remained one of the United States' staunchest allies for many decades. If this dispute intensifies into an armed conflict, the United States would be obligated to support Japan. Either situation (or any number of other scenarios) could lead to war between the United States and China.

Although China does not possess a significant number of launchers and warheads like Russia, a sudden flurry of activity at Chinese nuclear sites combined with intelligence reports could require an immediate response that only the MMIII could provide. Additionally, the MMIII force places China at a distinct disadvantage. Any nuclear strike against US interests, or its allies, could be devastating. However, unlike Russia, China does not possess the overwhelming numbers necessary to decapitate US nuclear forces. The United States could counterstrike with ICBMs with such speed, lethality, and accuracy that could cripple the Chinese land-based nuclear forces.

Finally, evaluating the support and credibility factors produces the same logical conclusions as it did in considering the Russian case. As evidenced by the aforementioned QDR and the response to the attacks on 9-11, US leaders and civilians would generally support ICBM employment as a counterstrike option. The significance of China as a potential adversary lies in the fact that much of the Cold War nuclear deterrence strategy is untested against China and future adversaries that could rise to

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<sup>89</sup> Patrick Morgan, *Deterrence Now* (Cambridge, UK: Cambridge University Press, 2003), 248.

challenge the United States. Payne captures this concern when he writes that an increase in the number and type of opponents increases the likelihood of failure in deterrence due to a lack of familiarity with the adversary.<sup>90</sup> A failure of deterrence with a smaller, less capable country could be inconvenient. However, failure with a global power like China, or a country that rises to a similar position, could prove catastrophic. ICBMs provide the logical answer to security and stability concerns that arise from these situations.

### **Rogue States**

In analyzing rogue states, two elements come to the fore. First, identifying what US interests are threatened by these adversaries could play a decisive role in determining the response. In all likelihood, these rogue states can threaten US interests on the periphery, but lack the capability to threaten the United States, especially in an existential manner. Second, if US allies perceived threats against them, then to what degree would the United States respond? A response in-kind to a North Korean nuclear strike on South Korea would be a nuclear strike from the United States. While the United States stands firmly behind its allies and extends the US umbrella of nuclear deterrence, a MMIII with a 300-kiloton yield may not be an appropriate response to a small yield strike. The disparity between the destructive force of US nuclear weapons and those owned by the smaller states is tremendous. Table 4 highlights some important features of the nuclear-armed states who are not part of the five nuclear-weapon states, according to the Non-Proliferation Treaty.<sup>91</sup> The information shows the gap that exists between the global powers and the next tier of nuclear states. The most worrisome state of the group is North Korea. Information on its nuclear programs is very limited, but it has been aggressively pursuing nuclear weapons in recent years.

For the sake of clarity, this study does not include Israel and India as rogue states. Pakistan and the United States maintain a tenuous and often difficult relationship. At this point, Pakistan might not be a rogue state. However, challenges with the Pakistan-India relationship could eventually place the United States at odds with Pakistan. In addition to

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<sup>90</sup> Keith B. Payne, *The Great American Gamble* (Fairfax, VA: National Institute Press, 2008), 366.

<sup>91</sup> The “Power Five” acknowledged nuclear-weapon states are the United States, United Kingdom, Russia, France, and China.

these nuclear-armed states, countries like Syria and Iran could attempt to acquire or manufacture nuclear weapons.<sup>92</sup> The United States has a tumultuous relationship with both countries.

**Table 4: Non-Power Five Nuclear-Armed States**

|                           | Israel    | India         | Pakistan    | North Korea |
|---------------------------|-----------|---------------|-------------|-------------|
| <b>Number of Warheads</b> | 80-200    | 80-100        | 90-110      | Unknown     |
| <b>Aircraft Delivery</b>  | F-16/F-15 | Mirage/Jaguar | F-16/Mirage | Unknown     |
| <b>Max Range</b>          | 3,500 km  | 1800 km       | 2,100 km    | Unknown     |
| <b>Land-based</b>         | Yes       | Yes           | Yes         | Unknown     |
| <b>Maximum Range</b>      | 1500+ km  | 1,000 km      | 1,200+ km   | Unknown     |
| <b>ICBM</b>               | No        | No            | No          | No          |
| <b>Last Nuclear Test</b>  | 1980      | 1998          | 1998        | 2009        |

*Source:* Adapted from Timothy McDonnell, “Nuclear pursuits: Non-P5 nuclear-armed states, 2013,” *Bulletin of the Atomic Scientists* 69, no. 1 (2013), 64. Hans M. Kristensen and Robert S. Norris, “Israeli nuclear weapons, 2014,” *Bulletin of the Atomic Scientists* 70, no. 6 (2014), 102. Hans M. Kristensen and Robert S. Norris, “Pakistan nuclear forces, 2011,” *Bulletin of the Atomic Scientists* 67, no. 4 (2011), 93. Hans M. Kristensen and Robert S. Norris, “Indian nuclear forces, 2012,” *Bulletin of the Atomic Scientists* 68, no. 4 (2012), 100.

Identifying a rogue state threat is a rather simple matter. North Korea continued the Kim Jong lineage. Not surprisingly, the country continues to challenge the international community with nuclear tests, ballistic missile tests that overfly US allies, and bellicose and often threatening language. In addition, the Middle East remains a hotbed of conflict into which the United States must carefully tread, including the recent escalation of concern with Syria’s use of chemical weapons.

The possibility of conflict exists, but can nuclear deterrence and ICBMs prevent it? The 2014 RAND Report identifies a number of instances where nuclear deterrence failed in regards to these smaller rogue states. This list includes North Korea invading South Korea and recent events in the Middle East involving Iraq.<sup>93</sup> Derek Smith notes, “The United States was unable to deter Hussein from initially choosing to invade Kuwait,

<sup>92</sup> Although the United States and Iran have had a difficult relationship in the past, it must be noted that both countries have been involved in negotiations to ensure that Iran’s nuclear program is developed strictly for peaceful purposes. Iran has been a willing participant in these negotiations.

<sup>93</sup> Lauren Caston et al., *The Future of the U.S. Intercontinental Ballistic Missile Force* (Santa Monica, CA: RAND, 2014), 8.

and then failed in attempting to compel him to withdraw.”<sup>94</sup> Further evidence lies in more recent history with North Korea and its continued pursuit of nuclear weapons, going against the United States and the international community. These limited conflicts occurred without the United States employing nuclear weapons. These events challenge the effectiveness of nuclear deterrence against a rogue state, and calls into question the credibility of the United States concerning nuclear weapons and nuclear deterrence.

Given this history, why should the leader of a rogue state believe US threats? The 2015 National Security Strategy (NSS) specifically addresses the concerns on the Korean peninsula: “[US] commitment to the denuclearization of the Korean Peninsula is rooted in the profound risks posed by North Korean weapons development and proliferation.”<sup>95</sup> The NSS also includes following statement, “[The United States has] made clear Iran must meet its international obligations and demonstrate its nuclear program is entirely peaceful. [US] sanctions regime has demonstrated that the international community can—and will—hold accountable those nations that do not meet their obligations, while also opening up a space for a diplomatic resolution.”<sup>96</sup> Accountability through sanctions and diplomatic resolutions demonstrate the US resolve to oppose these situations. However, leaders in North Korea and Iran, along with others of similar ilk, would have no reason to believe that a US-launched ICBM is a viable threat.

The utility of the MMIII has been discussed in depth. Any one of the aforementioned rogue countries has targets that ICBMs could hold at risk. Nonetheless, do the appropriate target sets exist to justify using ICBMs? The MMIII can certainly destroy fixed targets, both counterforce and countervalue. Furthermore, with the limited nuclear arsenals, gaining approval and support for the employment of ICBMs might be difficult to achieve. Additionally, attacking countervalue targets with nuclear weapons might be difficult to explain. Similar to the hypothetical nuclear exchange with a peer competitor, the American public would likely support a response, but without an existential threat, it is difficult to foresee a plausible scenario that would include a full-scale nuclear attack.

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<sup>94</sup> Derek D. Smith, *Deterring America* (Cambridge, UK: Cambridge University Press, 2006), 55-56.

<sup>95</sup> The White House, *National Security Strategy* (Washington, DC: Government Printing Office, February 2015), 11.

<sup>96</sup> The White House, *National Security Strategy*, February 2015), 11.

With the credibility, applicability, and even support for the employment of ICBMs in question, the MMIII force appears to have an extremely limited utility in deterring rogue states. On the other hand, the 2014 RAND Report proposes a possible additional element of the MMIII force: “ICBMs, in particular, may be newly relevant because they can compel emerging nuclear states to conceal or bury their nuclear weapons and their means of delivery so that they are not available on a day-to-day basis.”<sup>97</sup> While the general theory behind this idea is plausible, the credibility is still lacking. The US intelligence gathering and conventional strike capabilities could force adversaries to bury or hide its nuclear weapons. Moreover, the conventional strike option would garner more national and international support than an ICBM. The same RAND report posits the following question: “What does it take to make an adversary believe that the United States would really carry out threats to use nuclear weapons in situations where its own existence is not being threatened directly and the risks might exceed the benefits?”<sup>98</sup> The report fails to provide a convincing answer to that very question. Indeed, credibility remains the crux of the issue with nuclear deterrence.

### **Terror Organizations**

In the two previous examples, the potential adversaries operated within well-defined territorial boundaries, owned important military and economic assets, and would strive to protect the current power base. An attempt to deter terror organizations creates a different playing field. The fundamental question that continues to arise is whether a terror organization can be deterred, especially by the United States who many of these groups identify as the ultimate enemy. Terrorist acts can be traced backed thousands of years, but for the United States, the start of the 21st century signaled the beginning of a cultural shift towards stopping terror organizations. The initial problem was how to stop the attacks from occurring. Derek Smith states, “The tragic events of 11 September 2001 challenged traditional conceptions of deterrence. Notwithstanding the immense retaliatory capabilities of the United States, an adversary was willing to attack and face

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<sup>97</sup> Lauren Caston et al., *The Future of the U.S. Intercontinental Ballistic Missile Force* (Santa Monica, CA: RAND, 2014), 10.

<sup>98</sup> Lauren Caston et al., *The Future of the U.S. Intercontinental Ballistic Missile Force* (Santa Monica, CA: RAND, 2014), 9.

the consequences. This was likely because an organization such as Al Qaeda is decentralized, and so is relatively insulated against US reprisals.”<sup>99</sup> The United States was at the height of its military power, yet could not easily identify and eliminate the enemy.

In a graduation speech to cadets at WestPoint, then-President George W. Bush remarked, “Deterrence—the promise of massive retaliation against nations—means nothing against shadowy terrorist networks with no nation or citizens to defend. Driven by intense zeal, they are not intimidated by a nuclear arsenal, nor deterred by fear of death.”<sup>100</sup> The President’s obvious inclusion of the nuclear arsenal brings into question the impact that nuclear weapons can have on these organizations. The President would have little difficulty finding proponents that would support this claim. Pulitzer Prize winning author, David Hoffman writes, “Nuclear weapons will hardly deter militias such as the Taliban, or terrorists such as those who attacked New York, Washington, London, Madrid, and Mumbai in recent years. The terrorists and militias seek to frighten and damage a more powerful foe.”<sup>101</sup> Beyond the basic element of simply creating panic and terror, the challenge lies in finding and holding targets at risk. The United States struggles with this concept using conventional forces. Nuclear forces are even less suitable. Michael Quinlan writes, “[Nuclear Weapons] certainly play no useful direct role against terrorists, who themselves have no evident asset base that nuclear weapons could credibly threaten.”<sup>102</sup> ICBMs remain ready for quick response, but a high-tech solution does not seem applicable to many of the low-tech adversaries who simply may not process a risk/reward calculus the same way as an American.

Steven Pifer and others from the Brookings Institute assert that the United States might be unable to persuade terror groups that the risk outweighs the gains. In an effort to simplify the discussion, they identify reasons that limit deterrence against terrorist groups. First is the difficulty in identifying the perpetrator. Second, lack of territory or

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<sup>99</sup> Derek D. Smith, *Deterring America* (Cambridge, UK: Cambridge University Press, 2006), 55-56.

<sup>100</sup> President George W. Bush (graduation address, West Point Academy, New York, 1 June 2002, from George W. Bush White House Archives, <http://georgewbush-whitehouse.archives.gov/news/releases/2002/06/20020601-3.html> (accessed 1 March 2015).

<sup>101</sup> David E. Hoffman, *The Dead Hand* (New York, NY: Anchor Books, 2009), 476.

<sup>102</sup> Michael Quinlan, *Thinking About Nuclear Weapons: Principles, Problems, Prospects* (New York, NY: Oxford University Press, Inc., 2009), 32.

valued assets by the terror group means nothing to strike against in retaliation. Finally, the act of destruction against the United States might be the ultimate goal itself.<sup>103</sup> These basic ideas might not be universally accepted, but the logic remains convincing. Furthermore, the inability of the international community, not just the United States, of deterring the numerous terror organizations lends credibility to Pifer's ideas.

Nonetheless, some theorists challenge the idea that terror organizations are not deterrable. Keith Payne acknowledges the commonly accepted principles that make a terrorist organization undeterrable: they lack cities, territories, and borders. Payne states, "A contemporary challenge is to identify any feasible approach to punitive deterrence when an opponent is motivated to inflict mass casualties as a goal itself and may attach transcendent value to doing so."<sup>104</sup> However, he challenges the old approach of deterrence and suggests adapting to a new opponent instead of trying to apply the old approach.<sup>105</sup> While the entire concept of Cold War nuclear deterrence may be antiquated, the facts remain unchanged. A terrorist organization often employs tactics to achieve public notoriety and instant fame. Indeed, a nuclear weapon in the hands of a terror organization could create death and destruction on an unprecedented scale. Such a concern is often the driving factor in attempting to deter a terror organization. Payne's idea that the Cold War model of nuclear deterrence does not apply against terrorists resonates with truth. However, the challenge may not lie in altering the deterrence strategy. For these adversaries, the challenge might lie in creating a new strategy.

Does the acceptance of this need for a different strategy completely negate the effectiveness of ICBMs as a deterrent threat? Michael Quinlan posits a theory of how the US arsenal, used in a deterrence role, can influence terror organizations: "Major terrorists do not often function without support or at least tolerance from states, directly or indirectly. Since states or their governing regimes have something to lose, deterrence...can be brought to bear upon them."<sup>106</sup> While Quinlan's proposition contains

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<sup>103</sup> Steven Pifer, et al, "US Nuclear and Extended Deterrence: Considerations and Challenges," 49. [http://www.brookings.edu/~media/research/files/papers/2010/6/nuclear%20deterrence/06\\_nuclear\\_deterrence.pdf](http://www.brookings.edu/~media/research/files/papers/2010/6/nuclear%20deterrence/06_nuclear_deterrence.pdf) (accessed 18 January 2015).

<sup>104</sup> Keith B. Payne, *The Great American Gamble* (Fairfax, VA: National Institute Press, 2008), 365.

<sup>105</sup> Keith B. Payne, *The Great American Gamble*, 232.

<sup>106</sup> Michael Quinlan, *Thinking About Nuclear Weapons: Principles, Problems, Prospects* (New York, NY: Oxford University Press, Inc., 2009), 74.

merit, the idea circles the discussion back to deterring rogue states. A primary concern and potential indicator of a rogue state is the support given to terrorist organizations. Certainly, applying pressure to a sponsoring state could influence the terror organization, but the pressure will not likely defeat the organization. As Al Qaeda was defeated in Afghanistan, the organization relocated to compounds within Pakistan, and other branches appeared in countries like Iraq and Yemen.

Notwithstanding Quinlan's observation, the deterrent value of US forces against a terror state appears limited. From the perspective of ICBMs, the utility against this type of adversary is practically non-existent. The organization committing the act may be difficult to identify and prove even more challenging to locate. Even when the United States tracks the position of the terror organizations, very few targets appear for a weapon like the MMIII. With such an obvious limitation, any credibility would be nearly impossible to achieve. Moreover, Osama Bin Laden and the leaders of Al Qaeda would have likely welcomed an ICBM strike into the cave complexes of mountainous Afghanistan. The public outcry would have benefitted the terror organization in future recruiting and gaining state sponsorship, while casting the United States in a negative light.

### **Summary**

The 2014 Quadrennial Defense Review clearly states the US position on nuclear deterrence: "[US] nuclear deterrent is the ultimate protection against a nuclear attack on the United States, and through extended deterrence, it also serves to reassure our distant allies of their security against regional aggression."<sup>107</sup> Using the model that was developed and applied during the Cold War continues to present the best opportunity for successful nuclear deterrence. The United States will comply with New Strategic Arms Reduction Treaty (START) and reduce the number of warheads and delivery platforms. Although progress has occurred that lessens the global nuclear footprint, the fact remains that compliance with New START means maintaining 1,550 deployed warheads.<sup>108</sup>

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<sup>107</sup> Department of Defense, *Quadrennial Defense Review 2014* (Washington DC: Government Printing Office, 2014), 12.

<sup>108</sup> Department of Defense, *Quadrennial Defense Review 2014*, 41.

Assuming similar compliance from Russia, the primary nuclear rival continues to deploy enough nuclear destructive power to annihilate much of the United States. The US ICBM force played a key role in nuclear deterrence during the Cold War against a peer competitor. Continued usage of the MMIII as a nuclear deterrent for peer/near-peer competitors seems like the logical choice. In addition, a leader of a rogue state may have an agenda that seems illogical to the American way of thinking, but the country has borders to defend, important targets that can be struck, and a leadership regime that wants to continue in power. Similar to the peer adversary, these rogue states can be susceptible to the nuclear deterrence imposed upon it by the MMIII. States offer a certain amount of reliable predictability. However, attempting to quantify specific aspects of terror organizations into usable data has proven to be extremely difficult. Deterrence in any form fails with regularity; attempting to deter terror with a MMIII simply does not appear to be a viable option.

In short, the ICBM appears to have utility in a nuclear deterrence capacity in specific instances. Indeed, states know the capabilities that the MMIII possesses and will make decisions with these weapons in mind. Conversely, the MMII does not provide feasible options in other areas of the conflict spectrum. The final chapter will analyze the capabilities and limitations of the ICBM and evaluate the applicability in a continued nuclear deterrence role as discussed in this chapter. The analysis will lead to acceptance or rejection of the hypothesis. Additionally, based on the limits, this study could not thoroughly evaluate many topics. A few of these propositions are presented as ideas for future studies.

## Chapter 4

### What Does It All Mean?

*It seems by now abundantly clear that total nuclear disarmament is not a reasonable objective.*

—Dr. Bernard Brodie

*Deterrence is, and since the end of World War II has been, the primary rationale for US nuclear weapons.*

—Dr. Keith Payne

The Intercontinental Ballistic Missile (ICBM) has been a part of the US military arsenal performing nuclear deterrence for more than sixty years. During that time, improvements in technology have culminated with the current force of highly dependable and accurate Minuteman III (MMIII) missiles. However, the international system changed dramatically since the end of the Cold War. What does this mean for the future? According to James Scouras, “The situation is crystal clear: Nuclear deterrence is relied upon when other options do not exist or are impractical. This was true during the Cold War and remains true today.”<sup>109</sup> He further explains how major powers like the United States, China, and Russia, as well as smaller states like Israel, Pakistan, India, the United Kingdom, and France all still rely upon nuclear deterrence.<sup>110</sup> Other countries continue to employ nuclear deterrence strategies, in many cases against the United States.

### Future of Nuclear Deterrence

The central question of this study is, “Should ICBMs continue to play a vital role in nuclear deterrence?” The study conducted an analysis of the capabilities and threats and evaluated the future of ICBMs for the United States. The following information outlines the findings as detailed in previous chapters.

### Capabilities

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<sup>109</sup> James Scouras, “Post-Cold War Nuclear Scenarios: Implications for a New Strategic Calculus,” In *Deterrence and Nuclear Proliferation in the Twenty-First Century*, ed. by Stephen J. Cimbala (Westport, CT: Praeger Publishers, 2001), 60.

<sup>110</sup> James Scouras, “Post-Cold War Nuclear Scenarios: Implications for a New Strategic Calculus,” 59.

The current MMIII force provides unique capabilities that are unmatched in the US arsenal. First, the rapid reaction inherent in the force structure affords the President an instantaneous deterrent option. Other forces, even nuclear forces, possess the means to react quickly, but none offers the ability to strike a target almost anywhere on the globe in less than half an hour. Second, single-warhead MMIIIs on alert allow the United States to hold 450 high-value targets at risk 24-hours a day. Third, the unique deployment footprint of the MMIIIs creates a warhead sponge that works against an adversary's nuclear strikes. Finally, the ICBM force provides qualitative benefits such as stability for the other two legs of the nuclear triad, visible presence upon which allies can rely, and an aura of power for the United States. These unique characteristics combine with reliability that approaches 100 per cent, a circular error probability around 400 feet, and a blast yield 23 times greater than the atomic bomb delivered against Hiroshima in World War II.<sup>111</sup>

In addition to these capabilities, the MMIII does possess limiting factors. First, the stationary aspect of ICBMs makes them a target that is easy to identify and locate, even if destroying them remains extremely difficult. Second, the yield on these powerful weapons limits (or eliminates) their utility in smaller scale conflicts. Lastly, launching a MMIII could be misinterpreted by the Russians and lead to unexpected conflict between the United States and Russia. Stephen Cimbala explains, "Forces that require prompt launch may stimulate a reciprocal fear of surprise attack leading to a mistaken decision for preemption."<sup>112</sup> A Russian ICBM launch in response to a MMIII launch could occur because the Russians may not have adequate time to determine the MMIII's target.

## **Replacement Options**

In addition to the capabilities, a review of possible replacement options detailed the feasibility of using conventional forces, nuclear bombers, or nuclear submarine-launched ballistic missiles (SLBMs). Conventional forces simply do not possess a

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<sup>111</sup> The calculation uses the estimated 13-kiloton yield from the atomic bomb used on Hiroshima and the approximately 300-kiloton yield of a Minuteman III.

<sup>112</sup> Stephen J. Cimbala, "Triage of Triads: Does the United States Really Need Three Strategic-Retaliatory Forces?" In *Deterrence and Nuclear Proliferation in the Twenty-First Century*, ed. by Stephen J. Cimbala (Westport, CT: Praeger Publishers, 2001), 127.

comparable blast yield to replace the MMIII in a deterrent or strike role. Nuclear bombers provide the yield and range. However, aircraft generation times prevent bombers from providing a response in rapid fashion similar to ICBMs. Additionally, the concentrated basing of bombers allows adversaries to neutralize bombers much easier than the MMIII force.

SLBMs represent the final replacement option, and the only viable one. Midget Nuclear-armed submarines constantly patrol the oceans and waterways. The weapon generates similar blast yield with almost identical accuracy to the MMIII. Similar to the bombers, the submarines bases present easier targets. Unlike ICBMs, submarines on alert are virtually undetectable. However, the quantitative difference means less targeting options are available. In short, replacement options exist. However, none currently provide the visible deterrent umbrella engendering the confidence of allies, nor do they create the extreme targeting challenges similar to the geographically separated ICBM force.

## **Threats**

Without a quality replacement option, this study proceeds to evaluate the MMIII against potential threats. Originally, the United States designed and employed ICBMs to counter and threaten the Soviet Union. In the decades since the conclusion of the Cold War, other adversaries emerged. The study analyzed three distinct threat categories: peer/near peer, rogue states, and terror organization. In evaluating a peer/near-peer adversary, very little has changed with respect to ICBMs since the Cold War. Russia continues to be the primary adversary with regards to nuclear conflict. However, China's economy and nuclear capabilities have also matured to the point of concern. Both countries, as well as future threats in this category, possess numerous fixed targets, including ICBM silos and command and control centers. The MMIII provides an appropriate means to hold these targets at risk, thus providing the United States with maximum nuclear deterrence against these adversaries.

Against adversaries smaller than peer competitors, the ICBM loses utility. In this study, the second category is rogue states. On the surface, every state possesses the target sets upon which an ICBM could be used. Leaders of each state desire to maintain power,

and thus fear any existential threat to his or her regime. However, the probability of a nuclear strike against a small state appears very slim. Furthermore, the in-kind response for the majority of small states would not be nuclear, as very few countries possess that capability. As a result, an attack against this level of opponent would almost assuredly stay conventional. Derek Smith discusses the limited effectiveness of US policy and nuclear deterrence on rogue states. He explains that rogue states may choose to threaten and initiate weapons of mass destruction attacks against the United States or its allies. The escalation in violence may lead to US officials backing down from confrontations, not the rogue state being deterred from action.<sup>113</sup> In sum, nuclear forces are very unlikely to be used against rogue states, and the chances of using an ICBM are even more remote.

The final category of adversary analyzed in this study is the terror organization. The structure of these organizations (i.e., no defined boundaries, lacking valued assets, atypical goals) creates a challenge for the US military. For ICBMs, the structure precludes any opportunity for employment. The objective of many terror groups is to induce panic and fear. Furthermore, the terror organizations do not fear the United States. David Hoffman writes, “Driven by intense zeal, they are not intimidated by a nuclear arsenal, nor deterred by fear of death.”<sup>114</sup> They lack any targets of real value that would warrant an ICBM strike. Indeed, many of these organizations would welcome a strike to their remote locations because of the international support they would receive, and the international condemnation directed at the United States. Simply stated, the MMIII is not the appropriate option for this type of warfare. Moreover, the United States would find it difficult to garner international support for an ICBM strike, even if an appropriate target emerged. Consequently, nuclear deterrence using ICBMs fails against terror organizations because the international community understands the will is not present to launch an ICBM against these type of adversaries.

### **Hypothesis Accepted**

Based upon the evidence and analysis, this study accepts the hypothesis that ICBMs should have a future role in US nuclear deterrence. As previously mentioned, the

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<sup>113</sup> Derek D. Smith, *Deterring America* (Cambridge, UK: Cambridge University Press, 2006), 5.

<sup>114</sup> David E. Hoffman, *The Dead Hand* (New York, NY: Anchor Books, 2009), 476.

capabilities remain consistent in a manner that creates a limited role. Indeed, this limited role is deterring nuclear strikes from a peer competitor. The primary concern for US leaders and the military should be national security and the preservation of the United States. Even though the role of ICBMs may be limited, it remains extremely important. The United States should continue to accept that ICBMs play a significant role in countering these threats to national security by holding at risk targets that would otherwise be safe from an immediate strike from the United States. The possibility exists that future roles for these weapons might develop. The 2014 RAND report on ICBMs states, “US strategic nuclear forces may be called on to play a role in a widening set of security situations. ICBMs in particular may find some new relevance in extending deterrence and assuring allies because they present a serious threat to newly emerged nuclear states.”<sup>115</sup> The risk to national security is too great to remove such an important cog as the MMIII.

### **Lessons Learned**

The study considered numerous factors in evaluating the utility of ICBMs against potential adversaries. For the ICBM, the capabilities never changed dramatically, just improved with time. However, the will of US leadership to launch a strike using ICBMs fluctuates depending upon the threat and the adversary. Ultimately, if a surprise nuclear strike occurred against the United States, or if an existential threat arose, then ICBMs could be employed. Conversely, anything short of those two criteria would not likely provoke an ICBM strike. The US leadership does not possess the will to launch a MMIII in response to anything below that threshold. This plays a significant role in using ICBMs as a deterrent. A peer competitor, such as Russia, knows the limits.

Keith Payne addresses the fact that nuclear deterrence is based upon Cold War thinking that is now outdated. He acknowledges the continued importance of deterrence with the understanding that it comes with uncertainty.<sup>116</sup> Even with proper intelligence, the United States cannot eliminate the unpredictability of conflict. The United States

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<sup>115</sup> Lauren Caston et al., *The Future of the U.S. Intercontinental Ballistic Missile Force* (Santa Monica, CA: RAND, 2014), 115.

<sup>116</sup> Keith B. Payne, *The Great American Gamble* (Fairfax, VA: National Institute Press, 2008), 13, 208.

should use its past success with nuclear deterrence strategy to create the foundation for a successful future. A significant portion of that nuclear deterrence strategy includes a robust ICBM force. Ideally, the adversary would understand the thought process of US leaders and be deterred from using its nuclear force for fear of receiving a nuclear counterstrike from the United States.

### **Counterpoints**

At this start of this study, certain parameters were established and assumptions made. One important factor was the acceptance of nuclear deterrence using the Joint Publication 1-02 definition for deterrence. Moreover, the framework for nuclear deterrence is based upon the Cold War implementation that resulted in a stalemate without escalation to nuclear conflict. These premises have strongly influenced this study, which has identified a future utility for ICBMs in the role of nuclear deterrence. However, the aforementioned concepts are not universally accepted. If one believes either nuclear deterrence does not work as advertised or the adversarial threats have completely changed, then an argument against a future with ICBMs becomes much stronger. Proponents of the elimination of ICBMs could make arguments on multiple levels, as discussed below.

First, a nuclear dyad of submarines and bombers could effectively perform the nuclear deterrent mission. While this may be true for many adversaries, the example scenarios in Chapter 3 identify situations where this particular dyad could fail. By assuming that a current or emerging peer or near-peer adversary will not initiate nuclear hostilities places the security of the United States at greater risk.

A second argument involves the complete transition to conventional forces with the drawn down of all nuclear forces. Wolfgang Panofsky writes, “There is simply no reason for nuclear weapons to play a central role in US defense policy any longer.”<sup>117</sup> Ultimately, this philosophy contends that conventional forces can provide adequate deterrence, and the interwoven web of economic and diplomatic connectedness between

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<sup>117</sup> Wolfgang K.H. Panofsky, “Nuclear Insecurity,” *Foreign Affairs*, September/October 2007, <http://www.foreignaffairs.com/articles/62832/wolfgang-k-h-panofsky/nuclear-insecurity> (accessed 23 November 2014), 117.

countries will prevent a nuclear escalation from occurring. Indeed, arguments could be made that the inherent risk associated with eliminating US nuclear weapons while other countries such as Russia and China continue to maintain a nuclear arsenal is not as significant as it might seem. The interdependent and interconnected nature of the international community can offset these risks.

In both cases, a single factor arises that simply cannot be overlooked: increased risk. While the arguments may attempt to demonstrate how the risks are reduced, or even manageable, one question remains. Should US leaders allow Americans to face greater risk when the capability to reduce that risk already exists and is in place? ICBMs currently provide the strongest possible nuclear deterrence against these potential existential threats, and the only weapon system that provides instantaneous deterrence. The 2014 RAND Report states, “In their primary deterrent role, US strategic forces will need all the same basic capabilities that they have always had...Historically, the main threat to ICBMs has always been other ICBMs.”<sup>118</sup> Unless the United States eliminates the nuclear threat from abroad, removing ICBMs from their current role only reduces the security of the United States. The National Security Strategy unequivocally states, “[The United States] will protect [its] investment in foundational capabilities like the nuclear deterrent.”<sup>119</sup> Further, “As long as nuclear weapons exist, the United States must invest the resources necessary to maintain—without testing—a safe, secure, and effective nuclear deterrent that preserves strategic stability.”<sup>120</sup> ICBMs need this investment because the risk associated with removing them is unacceptable.

### **Unfinished Business**

This study analyzes the future utility of ICBMs based upon a capability versus threat dichotomy. In doing so, a number of concepts emerged that are simply beyond the scope of this work. The cursory analysis conducted on the economic aspect of ICBMs did not provide adequate depth. A truly detailed endeavor analyzing all economic aspects

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<sup>118</sup> Lauren Caston et al., *The Future of the U.S. Intercontinental Ballistic Missile Force* (Santa Monica, CA: RAND, 2014), 4.

<sup>119</sup> The White House, *National Security Strategy* (Washington, DC: Government Printing Office, February 2015), 8.

<sup>120</sup> The White House, *National Security Strategy*, 11.

and costs (e.g., annual operating, research and development, contracted support, maintenance, etc.) would prove beneficial. As previously mentioned in Chapter 2, only complete closure of ICBM-only bases will create the maximum amount of savings. Therefore, in conjunction with the economic analysis, a political study needs to evaluate the likelihood of conducting base closures.

Additionally, while this study argues the need for ICBMs to continue in their current role in US nuclear deterrence, it does not prescribe a specific number required to achieve stable deterrence. Dr. James Forsyth argues that a reduced number of nuclear weapons would be adequate. Indeed, his essay postulates that 100 MMIIIs would suffice.<sup>121</sup> A detailed, and likely classified, analysis could identify a specific number of ICBMs necessary to maintain national security. That study could work in conjunction with the economic investigation to maximize the potential for each one.

### **Final Thoughts**

The United States possesses a luxury that few dominant powers experienced throughout history: geographic isolation. The United Kingdom enjoyed the protection afforded them by the English Channel. However, that small strip of water was all that stood between them and the powers residing on the European mainland. From the US perspective, vast oceans on each side of the country separate the United States from potential adversaries. The significance of this, as it relates to ICBMs, cannot be overstated. The United States has little fear of an invasion by naval forces, ground troops, or aircraft. The one true existential threat that exists for the United States is a massive nuclear strike. Even in today's environment where the states that possess the capability (peer/near-peer) are very limited, the idea of removing the most capable deterrent to that attack, the MMII, is difficult to understand from a national security perspective. Certainly, a debate persists concerning the actual success of nuclear deterrence during the Cold War. What is undisputed, however, is that nuclear war did not occur with US ICBMs on alert.

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<sup>121</sup> James Wood Forsyth Jr., B. Chance Saltzman, and Gary Schaub Jr., "Remembrance of Things Past: The Enduring Value of Nuclear Weapons," *Strategic Studies Quarterly*, Spring 2010, 82.

If the question is should US ICBMs have a role in the future of nuclear deterrence, then the answer would be yes, if capabilities and utility were the only driving factors. Professor Forsyth explains quite simply that at the heart of deterrence lies a straightforward calculation. The adversary must determine if the reward for its actions outweighs the possible risks.<sup>122</sup> As explained in chapter four, ICBMs hold target sets across the globe at risk in a manner that other weapon systems cannot replicate. Therefore, major global powers like Russia and China understand the risk they face with the United States maintaining an arsenal of Minuteman IIIs. Even minor countries like Syria, Iran, and Pakistan understand the power of the MMIII. However, the capability of the weapon system is not the foremost question. The question shifts from the utility of the weapon to the will of employment. Any reduction in fear from adversaries emerges because US leaders lack the willingness to employ nuclear weapons, more specifically ICBMs. Questions arise concerning the threshold for the usage of nuclear weapons. However, many of the voices of dissent would fall silent if an adversary struck the United States with a nuclear weapon.

Currently, few countries possess the capability to attack the continental United States with nuclear weapons, but how many adversaries and how many threats does the United States need to justify the need for continued security? Moreover, the international order is not set in stone. Patrick Morgan claims, “Russia is now a friend.”<sup>123</sup> While at this time that may be true, it leads to the question: How well can the United States trust this friend? History shows the tenuous nature of that relationship. If Russia and the United States reach a mutual agreement to eliminate their nuclear weapons, could the Russian government be trusted to comply without holding something in secret? Even without a major power shift or the emergence of a different threat, the fluidity and uncertainty of the relationship between the United States and Russia provides enough concern to justify maintaining maximum security.

On a final note, the research to complete this study provided the author with a keener understanding of the nuances associated with nuclear deterrence and the

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<sup>122</sup> James Wood Forsyth Jr., B. Chance Saltzman, and Gary Schaub Jr., “Remembrance of Things Past: The Enduring Value of Nuclear Weapons,” *Strategic Studies Quarterly*, Spring 2010, 77-78.

<sup>123</sup> Patrick M. Morgan, *Deterrence Now* (Cambridge, UK: Cambridge University Press, 2003), 250.

importance of ICBMs in that capacity. In spite of a military background that is replete with ICBM experience, the author originally believed that evidence would show that ICBMs have outlived their utility and should be retired from the US arsenal. However, after much reading and deliberation, the original ideas opposing ICBMs could not be supported. The United States maintains and modernizes weapons every year in order to provide US decision makers with the widest range of choices. ICBMs have found a niche and continue to provide the President of the United States with a unique and unrivaled option that increases national security.



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