



**DEVELOPING A PROCESS FOR DETERMINING THE OPTIMAL NUCLEAR
WEAPONS POSTURE**

GRADUATE RESEARCH PAPER

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USAF

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Abstract

For decades the United States (U.S.) has been the world leader in nuclear disarmament and non-proliferation of nuclear information and weapons systems. In the U.S.'s race to significantly lower the number of worldwide nuclear weapons a focus must remain on ensuring that the U.S. maintain a number of deployed nuclear weapons to ensure it can deter adversaries such as Russia, who continues to test the limits of North Atlantic Treaty Organization (NATO). Russia will be a focus of the study as it is the only peer adversary in nuclear weapons technology and forces. Russian leadership has made it very clear that its national policy views nuclear weapons as an extension of their conventional forces. In the most recent New START data exchange (March 1, 2015), Russia disclosed it deploys 1,582 strategic warheads on 515 Intercontinental Ballistic Missiles (ICBMs), Submarine-Launched Ballistic Missiles (SLBMs), and heavy bombers. Recently, President Barrack Obama has discussed lowering the U.S. number by one -third. The process and calculation the U.S. adopts must take into account the ever growing nuclear capabilities of Russia and other nuclear capable countries like her.

This research investigates the Department of Defense (DoD) process for calculating the necessary number of deployed nuclear weapons in the Triad to provide deterrence for the U.S. The deployed nuclear weapons are those weapons within the Triad which are either on strategic alert, as in the ICBMs and SLBMs or those that can be brought on alert quickly such as the Air Launch Cruise Missiles (ALCMs) and gravity bombs used by Air Force heavy bombers. This research will also explore the ability for the U.S. to continue to provide

a nuclear deterrence umbrella to her NATO allies. More specifically, this research will focus on the concepts utilized by the DoD in the development of the U.S. weapons posture. This research was informed by interviews with DoD leaders and senior Air Force officers. The researcher recommends a method to support the U.S. posture of deployed nuclear weapons.

To my wife and children, you are the shining light that leads me down the path of life

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THE OPTIMAL WEAPONS POSTURE TO PROVIDE NUCLEAR DETERRENCE

I. Introduction

Background

The U.S. continues to lower the number of her operationally deployed nuclear weapons since the end of the “Cold War.” The reduction began with then president George H.W. Bush who focused his strategy on “Massive Disarmament.” In September of 1991 President Bush ordered a unilateral reduction in U.S. strategic forces numbers, deployments, and research and development programs. Specifically, he announced that: 1) strategic bombers and Minuteman (MM) II Intercontinental Ballistic Missiles (ICBM) were to be taken off alert; 2) 450 MM II silos were placed in a stand-down status pending destruction; 3) all deployed ground-launched, short-range nuclear forces were recalled to the U.S. and slated for retirement and elimination; 4) non-strategic nuclear weapons were ordered removed from routine deployment on Navy ships and submarines; and 5) development programs for the mobile ICBM, small ICBM, and Short Range Attack Missile II (SRAM) were canceled or suspended (Introduction to U.S. Policy, 2015; pg 11). These actions were part of the first iteration of the U.S. employment of the new vision to reduce the number of nuclear weapons. This reduction was accomplished in the after-glow of winning the Cold War when the U.S. believed that nuclear weapons would never again be such a large focus in national security.

In order to properly research and address the optimum number of deployed nuclear weapons, this study will evaluate the initial process utilized in development of the U.S.

nuclear weapons policy. The first policy was created after the U.S. used nuclear weapons during WWII, where 220,000 people were killed during the attacks on Japan. The Truman administration understood the significance of such a weapon and began by asking fundamental questions during the initial development of the national nuclear weapons policy: How do we deter enemy aggression? What types of targets should we attack? Should the U.S. attack urban and industrial targets or military targets only? How many targets must we hold at risk? How many weapons must we hold in our stockpile? If deterrence fails, how should the U.S. nuclear arsenal be utilized? Are we a first strike or retaliation only nation? These questions still must be discussed before the U.S. can develop the optimum number of nuclear weapons to deploy. This study will re-address these initial questions to ascertain whether the current policy utilized by the presidential administrations truly meets the requirements needed to ensure the correct number of nuclear weapons are deployed to ensure deterrence for the U.S.

Problem Statement

For the past twenty years the number of nuclear weapons and delivery platforms in the U.S. arsenal has continued to decrease. The leadership of the U.S. has based its current operational deployment construct in presidential policy and global commitments. In the most recent presidential administration this was presented as an effort to lower the number of nuclear weapons around the world. The U.S. took unilateral action to decrease its weapons deployed. While the former president used his political power to drive down the number of deployed weapons, a calculated method to ensure the number does not impact national deterrence was not presented. National deterrence for the U.S. and her allies is the most critical benefit provided by nuclear

weapons. Deterrence is a word that means “to frighten from” or “to turn aside, discourage, or prevent from acting” (Payne, 2016). For those deterred, deterrence involves a process of weighing the benefits of a contemplated action against assessed risk or losses. If a certain risk is averted because of a belief that unacceptable loss or punishment will result as threatened, deterrence has been achieved. Deterrence is a communication process with elements of punishment and assurance. An adversary must believe that certain actions will result in unacceptable risk and losses and, conversely, that averting those actions will prevent the execution of threats (Kunsman and Lawson, 2001). This drives a fundamental problem for the country; is the current number of fielded weapons and their platforms correct to provide effective deterrence for the U.S. and her allies?

Purpose Statement

The purpose of this research paper is to investigate how the optimum level of nuclear weapons and delivery platforms could be reached in order to effectively provide U.S. national deterrence to her adversaries, extended global deterrence to her allies, and continue to lead against nuclear proliferation. This research will explore if other non-nuclear capable countries see the decrease in U.S. nuclear weapons as an incentive to develop their own nuclear capabilities. The study will assess the current nuclear capable allies such as Great Britain and France confidence in the U.S. to assist them if they are attacked by a nuclear capable adversary.

The intent of this study is to review the methodology utilized by the presidential administration and explore the opinions of senior military and political leaders when

deciding on the appropriate level of weapons. As part of this study, new opinions may differ from the current number of weapons, driving further exploration. The expected final outcome is an understanding of how to arrive at the optimum number of nuclear weapons deployed (Powell, 2003).

Research Objectives and Questions

The overarching research question and objective is to understand the methodology and process to arrive at the number of weapons deployed and explore if that number is the right number. The investigative questions in this study will explore how the number of weapons is calculated and whether the current number of fielded weapons and their platforms is the most optimum number to provide an effective deterrence for the U.S. and her allies. The following investigative questions explored and provided the foundation of this paper:

IQ1. At what point does the fall in the number of weapons embolden an adversary to regard U.S. deterrence as weak and believe that they can win a first strike nuclear war?

IQ2. Can the current number of weapons continue to deter our allies' adversaries and provide the nuclear umbrella they have come to rely upon?

IQ3. When does the number of U.S. weapons effect the calculus in her allies?

IQ4. How many allies are fully capable of creating and fielding their own nuclear weapons?

Scope, Assumptions and Limitations

While this research may be of relevance to all levels of government and military leadership, the emphasis of this research is focused on the personnel who develop the

recommendations provided to the President as well as the DoD leadership. The scope of this research will be focused on the methods used when developing presidential guidance and the individuals involved in the processes. The assumptions are that this research will be able to provide the data collected in an unclassified format. The interviews will be accomplished within the year and that the presidential elections will not affect the data collected. Limitations to this research is time and limited number of DoD and Air Force leadership that can be interviewed for this research. The limitations on this study are the interviews which will be based on a convenience sample due to the inherent difficulty and limited opportunity to interview senior leadership. Their expertise will be varied but directly related to the research allowing the study to gather a significant representation of the nuclear enterprise.

Consequently, there are some opinions which may not be represented in the study. There are also limitations to interviews. The quality of information provided during an interview is based on respondents' personal opinions and biases. There is also the possibility that the suggestions and ideas generated from the data collection will not be universally accepted; consequently, the recommendations may not be accepted as applicable methods when developing the number of deployed nuclear weapons.

Implications

The findings of this research have the potential to change the understanding and application of the methodology utilized when the U.S. makes decisions on the optimum number of deployed nuclear weapons for the nation and its allies around the world. The research could also identify a leg of the triad which may be more vulnerable to nuclear

weapons reductions or, in fact, identify a leg of the triad that must be strengthened. The study may identify flaws in the current presidential administrations methods and drive critical and well-founded discussions on the true requirements to maintain a credible nuclear deterrent force.

Discussion/Conclusion

The research will address the critical deterrence role maintained by the calculated number of nuclear weapons deployed. The final number agreed upon should ensure deterrence of U.S. adversaries as well as provide extended deterrence to NATO allies. The number will also provide assurance that should the unthinkable occur and they are attacked the U.S. will retaliate in their defense. There is significant data being collected by many different organizations across the DoD as well as academic universities and civilian organizations as the new presidential administration has stated that it will conduct a nuclear posture review. The last nuclear posture review was accomplished in 2010 by the Obama administration. The results and conclusion section summarizes the data and provides recommendations and suggestions to create a methodology when structuring the nuclear weapons posture.

II. Literature Review

The purpose of this chapter is to present a literature review related to U.S. deterrence theory, past and current nuclear postures, and historic literature regarding national deterrence decisions made by Presidents. The information is provided to the reader with a historical perspective of the development of policy and application of the nuclear triad deployment. During the study potential material for review will be obtained by reviewing the presidential nuclear posture review, senior leader speeches and public interviews. Former Secretary of Defense Robert S. McNamara published articles surrounding the methodology of the development of nuclear deployment methodology. Former Presidents and Secretaries of Defense directed policies and defined intents. Additional data sources are senior military and political leader interviews, original methodology describing the U.S. original nuclear weapons requirements, and historical data collected prior to and after the Cold War. Leadership observations, publications and journals will be reviewed and applicable works utilized.

National Deterrence Theory

In order to properly understand the material surrounding the U.S. nuclear arsenal it is important for the reader to understand what drives national deterrence policy and why there is such an emphasis placed on its value. The theory behind deterrence is the most important part to understand when discussing what is an effective deterrent. There are those who don't understand the value and complicated theory behind deterrence and may decide on an arbitrary number of weapons. These assertions seem to be made without applying the knowledge gained by our country's deterrence theorists. Before we begin to

discuss what the right method of calculating the nation's nuclear weapons is, we must first understand the theory behind their use and define what deterrence actually means.

According to the Merriam-Webster dictionary, Deterrence is defined as “The act of making someone decide not to do something: the act of preventing a particular act or behavior from happening, in politics it is: the policy of developing a lot of military power so that other countries will not attack your country” (Merriam Webster, 2016). The literature review is focused on many books and articles put forth by some of the greatest deterrence strategists of the 20th century, as well as former Secretaries of Defense and senior military leaders. These individuals applied great and inventive thought processes into recommendations that the U.S. would use as a basis for national nuclear deterrence policy.

The *Nuclear Matters Handbook (2016)* explains that the U.S. National Nuclear Strategy. The Strategy begins with “The *Quadrennial Defense Review (QDR)* which is a legislatively-mandated review of DoD strategy and priorities. The review sets the long-term course for the DoD as it assesses the threats and challenges the Nation faces. The review also re-balances DoD strategies, capabilities, and forces to address today's conflicts and tomorrow's threats. The fundamental role of U.S. nuclear forces is to deter nuclear and conventional attack on the U.S. as well as its allies and partners. The U.S. nuclear forces deter strategic attack on the homeland and provide the means for effective and very lethal responses, should deterrence fail. U.S. nuclear forces contribute to deterring all forms of large scale aggression against U.S. and allied interests in multiple regions. The U.S. also provides a credible extended nuclear deterrence umbrella to its allies guaranteeing that the

U.S. will defeat or counter any aggression should deterrence fail. “U.S. nuclear forces also help convince potential adversaries they cannot successfully escalate their way out of failed conventional aggression against the U.S. or its allies and partners” (Nuclear Matters Handbook, 2016; pg. 3). What theories led to this policy as our national deterrent strategy? How did the initial thoughts on deterrence shape our nation’s view, and how has our interpretation of how deterrence works changed over the presidential administrations? The literature reviewed below highlights the deterrence framework from which our elected officials operate.

The very essence of deterrence has been woven into the human psyche presumably from our very beginnings; the thought of projecting a consequence against an action taken would keep our adversaries from taking such an action or attempting something not in our best interests. In the early history kings and rulers provided demonstrations of extreme violence to project the idea that if you do something against my wishes then something extremely painful will befall you. The Romanian ruler Vlad the Impaler, for instance, would impale those who tried to conquer his lands thus providing visible deterrent to those who would think about invasion. These actions presented a potential adversary with a distinct repercussion if they chose to challenge him. He is deterred by this threat of immense violence (Pallardy, 2016). This is a basis by which our deterrence theory is founded.

Thomas C. Schelling described a version similar to this method and its application in his book, *Arms and Influence*, he describes the theory and process in which the U.S. could manipulate the psychology of the Soviet Union, our cold war adversary, as the basis

for deterrence and the goal of maintaining a stable balance of terror between the two countries is achieved. Schelling's premise was that the nuclear arsenal should be used as a tool which could convince the Soviet Union of the Mutual Assured Destruction which would await both countries should one choose to attack the other (Schelling, 1966, pg. 18).

Mutual Assured Destruction, Schelling explained, consisted of a balance of terror between both countries and that rational decision makers would equal caution. Neither country would want to begin a war that would end up destroying both countries. To ensure this balance of terror, Schelling also emphasized the following requirements. The countries would have to leave something to chance and share in the risk; neither country could feel secure in the ability to launch a first strike. To continue to dis-incentivize a first strike each country would maintain a secure second strike capability guaranteeing that even if one country was able to launch a successful first strike, the other country would be able to respond with an overwhelming retaliatory strike, putting each country in a cautious posture, never wanting to cross the line which could lead to nuclear escalation. In the Schelling book, the goal is not simply to attain an advantage and exploit it but rather to find avenues of convincing an opponent that they do not want to undertake the possibility of war.

According to Schelling, there is a method to this application and it involves the understanding of coercive violence in warfare. Schelling taught that:

“Coercion by threat of damage also requires that our interests and our opponent's not be absolutely opposed. If his pain were our greatest delight and our satisfaction his greatest woe, we would

just proceed to hurt and frustrate each other. It is when his pain gives up little or no satisfaction compared to what he can do for us and the action or inaction that satisfies us cost him less than the pain we cause, that there is room for coercion” (Schelling, 1966, pg. 2-5).

This allows an opponent to make the conscious choice to not engage in conflict because they would not believe it would be worth the possible pain which would result. For Schelling, deterrence was not about planning to meet and defeat the adversaries’ military capabilities; rather it “is about intentions-not just estimating enemy intentions but influencing them” (Schelling, pg. 8-9, 1966). The thoughts Schelling was developing were leading to the initial public policy of deterrence.

Schelling vs Kahn

Keith B. Payne’s book, *The Great American Gamble*, discussed and described the two leaders of thought on deterrence, Thomas Schelling and Herman Kahn. Kahn’s thoughts began with the same cold war knowledge but stood in stark contrast to Schelling’s. Payne explains that “each followed different trails of logic and judgment, and concluded with different recommended approaches to deterrence policy and U.S. strategic force requirements” (Payne, 2008, pg. 5). One of the main conflicts between the two schools revolved around expectations and how each country would respond. The country’s response would be dictated by applying a rational thought process. According to Payne, Schelling set forth the definition of and recommended as a U.S. policy goal – a “Stable” balance of terror with the Soviet Union. “Stable” deterrence could be orchestrated to proceed from mutual prudence born of mutual vulnerability. Schelling believed that a

relatively modest level of capabilities would be necessary to threaten Soviet society with destruction” (Payne, 2008, pg. 44-42). This was essentially the most optimistic view of what each nation would have to consider in a war time scenario. Schelling would further state that “Any situation that scared one side will scare both sides with the danger of a war that neither wants and both will have to pick their way carefully through the crisis, never quite sure that the other knows how to avoid stumbling over the brink.” He famously labeled this approach to deterrence, “The threat that leaves something to chance.” Payne said, “In short, according to this view, the U.S. capability to deter the Soviet leadership was not necessarily dependent on the Soviet fear of a deliberate U.S. decision to retaliate with nuclear weapons. Rather, the Soviet leadership would be deterred by the possibility that the U.S. nuclear escalation could follow from irrationality, or accident, or the fog of war” (Payne, 2008, pg. 44-46).

Schelling envisioned this as a choice between the two countries. This “Brinkmanship” is basically a maneuver of pushing a situation with your opponent to the brink and is successful when you force your opponent to back down and make concessions. There are various ways of doing this. Some situations would call for diplomatic options such as condemning an action on the world stage and by creating the impression that you are willing to use extreme methods rather than concede. The threat of nuclear weapons use would be the ultimate diplomatic tool. The British theorist Bertrand Russell compared this “Nuclear Brinkmanship” to a game of chicken. In a game of chicken, two opponents head towards each other at top speed. The opponents resolve and unwillingness to lose face is the driving factor between the two opponents. The only two options are for one to swerve and give in or both stay the course and be destroyed. A situation like this would create

immense pressure until one country backs down, or both are annihilated. In “Chicken” the unknown of “if or when” the opponent will weaken and swerve is the chance that both countries face.

Kahn on the other hand stood in complete opposition and did not agree with this approach. According to Kahn:

“First a game of chicken is not a game it takes two to play.

If you are challenged to get off the road or to show your nerve by driving dangerously, you can perfectly well choose to get off the road. But to “Chicken out” early is not the same as evading the contest. Second, what is in dispute is usually not just the momentary right of way, but everyone’s expectations about how a participant will behave in the future.

To yield is to signal that one can be expected to yield. To yield often or continually may communicate an acknowledgement that that is one’s role. To yield readily to some limit and then say “enough,” may guarantee that the first show of obduracy loses the game for both sides” (Kahn, 2010, pg. 225-226).

Kahn had other points that he argued would put the U.S. in an unwanted and unneeded predicament. He insisted instead that the U.S. must project the credibility and resolution as a world power needed to convince adversaries that we would “win” a nuclear war. He recommended that the U.S. should maintain a credibility that would follow from a demonstrated capability to survive the execution of its opponent’s nuclear escalation threat.

He presented that the U.S. should be prepared to withstand a nuclear strike and effectively negate the opposition's capabilities. He believed that we should build hardened facilities in order to show the Soviets that we would destroy them because we did not fear their attack. Kahn was more defensive minded in order to apply an offensive threat. The logic is sound, if you cannot strike and "Hurt" our leadership, centers of gravity, and population, then why would we fear a first strike. The Soviets in this case would have to concede that their strategic forces do not pose a significant threat to the U.S. He believed that in order for the U.S. to have a credible threat there should be a basis in which the opponent understood that we do not fear their first strike capabilities. He argued that the only way to win a nuclear war was to be positioned to withstand the initial strike and then retaliate with full nuclear force. He did not believe the Soviet Union would be able to match the U.S. in creating hardened facilities and systems to withstand a retaliatory strike.

This significant difference in thought between Schelling and Kahn drove heated discussions on the best application of deterrence. One of the first immediate concerns brought against Kahn's theory was the argument, if the U.S. pressed with Kahn's plan and basically and very effectively negated the Soviet Union's first strike nuclear capabilities, this would put the Soviet Union in a "Use them or lose them" dilemma. In other words, if they could not hold the U.S. at risk with the possibility of a devastating first strike, then why would they withhold their weapons?

This logically led to Kahn's opponents presenting the next argument. If the U.S. pressed with Kahn's plan to strengthen and harden vitally strategic locations and building underground hardened bunkers for the U.S. population, then the U.S. would instigate an

arms race and thus create an inherently uneasy and unstable balance between the U.S. and the Soviet Union. Kahn's critics were unrelenting, rather than focusing on the truth and simplicity of his theory they viewed him as a calculating war monger who envisioned a winnable war in which millions of American lives would be put at risk. The politicians thought he was driving to create an even tenser situation between the U.S. and the Soviet Union. Kahn did not allow these negative comments to slow him down. He simply explained that it was necessary to think about the unthinkable in order to be prepared should deterrence fail. He saw no other option as reasonable in the possibility that if deterrence did fail and a war ensued, how many more American lives would be lost because the U.S. did not prepare to protect our way of life. The fact that the U.S. would allow itself to be utterly destroyed along with the Soviet Union, was more in-comprehensible than the premise that we could prepare for and win a nuclear exchange.

Herman Kahn also described another benefit of his views on nuclear weapons. While many scholars were theorizing on whether or not nuclear weapons should ever be used, Kahn described a theory in which their use was not only possible but actually presented an advantage in battle. Kahn utilized an example of this process he described as "The Escalation Ladder" when explaining how a situation between the U.S. and the Soviet Union could develop into full scale nuclear war. The ladder provides different levels of escalation and the corresponding reaction. The ladder provides various off ramps in order to deescalate the situation before going to the next "Rung". It is also important to understand that you do not have to step through each rung of the ladder when escalating through a given situation. According to Kahn, the escalation ladder also may be used to set a context for the discussion of escalations in terms of regions of the ladder steps up and

down, rungs of the ladder and so forth. The ladder concept is particularly useful when one attempts to examine the interrelations between the two basic sets of elements in any escalation situation-those related to a particular region on the ladder and those related to the dynamics of moving up and down the ladder” (Kahn, 2010, pg. 37-40). In Kahn’s book, he used a generalized or abstract scenario to demonstrate how the U.S. could be involved in a nuclear exchange with the Soviet Union. His example broke down the ladder into forty-four rungs divided into seven units. These units are sub crisis maneuvering, traditional crises, intense crises, bizarre crises, exemplary central attacks, military central wars and civilian central wars. In between the units are six spaces that represented “Firebreak” or thresholds. Those spaces are: don’t rock the boat, nuclear war is unthinkable, no nuclear use, central sanctuary, central war, and city targeting. This ladder provided a very plausible scenario which he uses to discuss the varying decision points a leader should be addressing when climbing the escalation ladder. National leaders do not view nuclear weapons use as an available option should the need arise. Leaders need to be educated on how the nuclear option might be used during an escalating situation. The U.S. should be prepared to engage and win the nuclear exchange. A viable option during such an exchange available to the decision makers is the opportunity to escalate in order to deescalate a situation. Kahn also uses the example when discussing what options would be stronger if the U.S. improved its defense position. He discusses crisis and damage limitation in relation to his deterrence theory. Kahn offered that based on his example of the escalation model the U.S. should not only be thinking of its assured second strike capability, but it also should be thinking about survival if deterrence fails.

According to Kahn, “While we can agree that deterrence of a major war is the highest priority task of the strategic force, the country still needs much more from its strategic forces than an adequate second-strike capability. Among other things, it needs some capability for limiting damage if, despite this second-strike capability, war occurs” (Kahn, 2010, pg. 37-40). Kahn presents the argument based on the understanding that there has been a reasonably widespread concurrence amongst analysts on a second-strike’s value. Kahn states that while some improvements to the second strike capability are possible, there is little change in the overall deterrence value. The U.S. has reached, basically, what it believes is an adequate second strike capability. Therefore adding equipment to this second-strike capability is not necessary and will do very little to change the balance of power. Schelling disagreed with this view and believed that such a move would increase tensions and destabilize the balance between the two countries. Kahn proposed different options to make the U.S. more survivable in a nuclear strike. He proposed different damage limitation options in order to meet these expectations. He recommended that the U.S. increase its Ballistic Missile Defense (BMD) options. Kahn believed that this shield of protection would increase the survivability of our society. He also wanted increases in air defense and civil defense.

According to Payne, these recommendations met with both periods of “intense favor and equally intense disdain, but there was no serious deployment of BMD during the cold war. Secretary of Defense McNamara, for example, strongly opposed the deployment of the 1960’s Nike-X BMD program for the defense of U.S. cities against Soviet missile attack. In 1967, however, he announced the Johnson Administration’s decision to deploy the *Sentinel* BMD system to provide societal protection against a potential Chinese nuclear

attack” (Payne, 2008, pg. 85-87). During the 1960’s the U.S. perceived that there was a missile gap between the U.S. and Soviet Union. According to Thomas Reed and Danny Stallman’s book, *The Nuclear Express*, “In the 1960’s, at the height of the Khrushchev years, and at a time of the alleged: missile gap” in U.S. policy, the Soviet Union only had three SS-6 intercontinental rockets on operational alert” (Payne, 2008, pg. 85-87). These concerns kept the U.S. reassessing the policy discussions and decisions happening in the highest levels of U.S. leadership. This was the very reason for developing the *Sentinel* program. In Kahn’s view this would be a step in the right direction to address damage limiting actions. Instead, during the Nixon Administration, “there was a heated public and Congressional debate about the *Sentinel* program, with the criticism largely derived from the stable balance of terror desiderata. In response, the Nixon Administration renamed the BMD program *Safeguard* and reoriented it to provide protection not for cities, but for U.S. strategic capabilities” (Reed and Stillman, pg. 189-192, 2010). This decision once again leaned towards Schelling’s deterrence model. A decade later, as the Brezhnev’s priorities took hold, hundreds of far more effective Soviet ICBMs had been deployed. By 1980, thousands of Soviet nuclear warheads sat atop over three hundred SS-9 and SS-18 monster rockets, each capable of delivering more than seven tons of payload to the far side of the earth.” Once again the discussion of BMD was in political arenas. With such a massive force to contend with the option of defensive missiles was at the front. President Ronald Reagan then proposed the Strategic Defense Initiative (SDI or more famously, Star Wars) to the world. The purpose of this system was to provide a space based defense against missile attack. This created a missile defense race that the Soviet Union ultimately couldn’t maintain. “By the end of the Brezhnev era, the Soviets had spent over a decade and no small portion of their gross domestic product on an ABM system that was massive, that

would have blanketed Moscow with hundreds of H-bomb detonations, and that was ineffective” (Reed and Stillman, 2010, pg. 189-192). Ultimately, the U.S. followed Schelling’s deterrence model predominantly because it was more cost effective and for the most part controlled each countries actions and responses. Even at the height of tensions during the Cuban missile crisis, neither nation launched a nuclear weapon in anger. These discussions paved the path for the U.S. and were the foundation for policies pushed forward by Secretaries of Defense and senior military leaders.

The lessons learned from these early strategic deterrence thinkers informed the presidential policies that were developed for the U.S. Each President and his Secretary of Defense played a crucial role in the development of deterrence policy. In the following section, the literature reviewed describes how each President applied his own interpretation of national deterrence. The literature review provides a historical context for the calculation, at that time, for weapons deployed. The majority of them have had a position presented by policy directives. The first policy that included nuclear weapons was following the first atomic weapons use on Japan, created during the Truman Administration.

The Presidential Administration’s Nuclear Policies

President Harry S. Truman was the first and only President to have authorized and executed a nuclear attack during wartime. President Truman’s Secretary of War was James Forrestal. The scientists and military personnel commissioned during the Manhattan Project opened the door to a new way of warfare. They were able to basically harness the power of the sun with the incredible leaps in weapons technology with the development of

the Atomic bomb. President Truman's *NSC-30: U.S. Policy on Atomic Warfare* set the standard in weapons use. In the policy he stated the U.S. would "utilize promptly and effectively all appropriate means available, including atomic weapons, in the interest of national security. He also solidified that such use had to be approved at the highest level of the U.S. leadership, which the decision itself could only be made by the president himself. NSC-30 stated, "Decision as to the employment of atomic weapons are made by the Chief Executive" (Introduction to U.S. Policy, 2016, pg 11). Truman's Administration presented their policy as one of "Appropriate Response", allowing employment of any and all weapons deemed necessary by the U.S., but not to be utilized in an aggressive attack of another country. During this time the U.S. was able to leverage its weapons as the only ones in existence. The rest of the world thought the U.S. had a large amount of nuclear weapons when in fact there was only two at the end of 1945. Nonetheless this allowed the U.S. an unequaled position as a nuclear world power. As World War II ended the Soviet Union emerged at odds with the U.S. and shortly after the NSC-30 was issued, then Secretary of Defense James Forrestal requested that the Joint Chiefs of Staff examine what, if any, impact a decision to employ all of the U.S. nuclear weapons against the Soviet Union would be (Introduction to U.S. Policy, 2016, pg 11). In truth, many did not believe the weapons would make a significant impact in a full out war. The Soviet Union would likely take most of Europe and the Middle East. Thus, the only option would be to use atomic weapons in order to "Hold the line" in the British Isles until the ground forces could be built up (Introduction to U.S. Policy, pg 13, 2016). This was concerning because the prevailing thought was that the U.S. would most likely face aggression from the Soviet Union within the next three years. By 1948 the U.S. had stock piled fifty nuclear weapons and had begun to use them as a tool based in response to military action against the U.S.

As the Cold War began to take shape two surprises occurred in 1949. First, the Chinese civil war was decided and the Communist People's Republic of China under its leader Mao Tse-tung took control of China. This was shocking because now there were two communist-led countries, causing fear that democratic societies would be in jeopardy. The second surprise was the first Soviet nuclear test in August. This was well ahead of the administration advisors' projections. These events fed into the NSC-68, in which the Truman administration sought a comprehensive review of the U.S. national security policy and strategy. The fear of communist expansion is realized in NSC-68 and asserted that the Soviet Union "Seeks to impose its absolute authority over the rest of the world". This new policy identified specific options for the U.S. to pursue in the future. The first option presented to the President was to continue the currently existing approach. The next option offered was to return to an isolationist approach, focusing only on the Western Hemisphere, ultimately allowing the Soviet Union to do as they pleased. The final option presented to launch a preventative war and a buildup, across the board, of U.S. power (Kunsman and Lawson, 2001, pg 36).

The administration followed up these concerns with NSC-68 which didn't reach the president's desk until his final day in office. All agreed that the Soviet Union threat was growing and continued emphasis in atomic weapons would be needed for the foreseeable future. These were the challenges faced by the incoming administration.

The Eisenhower Administration 1953-1961

Dwight D. Eisenhower was a well-known former five-star Army General who had been a very successful leader during the World Wars. His administration strategy was one

of “Massive Retaliation” and continued Truman’s containment policy toward the Soviet Union, but he accelerated the trend started under Truman toward using nuclear weapons as a “lower cost substitute for conventional forces” (Kunsman and Lawson, 2001, pg 37). Eisenhower wanted a “New Look” and a full review of the U.S. basic National Security Policy which occurred in NSC 162 and was drafted into two versions. Each version had specific highlights. The first draft placed military security as the primary focus and the other acknowledged military spending could weaken the U.S. as a society. Eisenhower wanted to maintain a clear message to the Soviets, and the Secretary of State John Foster articulated it in his speech of January 1954. He stated, “Threatening to retaliate ‘massively’ against Soviet aggression.” This did not only mean nuclear aggression but conventional based aggression as well. The growing fear was the size of the Soviet conventional forces, nuclear retaliation was believed to be the only way to halt and deter Soviet aggression. So vivid was the concern for Soviet aggression, Eisenhower commissioned the Science Advisory Committee of the Office of Defense Mobilization to create a Technological Capabilities Panel to examine the U.S. vulnerabilities to surprise attack (Kunsman and Lawson, 2001, pg 36-37).

The panel identified four periods in response. Period I, the present, in which, “because of our air-atomic power we have an offensive advantage but are vulnerable to surprise attack.” Period II, between 1956/57-1958/60, in which “We will have a very great offensive advantage relative to surprise attack.” Period III, this period of transition from Period II to Period IV. Period IV, “Indefinite in length; possible beginning within a decade. An attack by either side would result in mutual destruction” (Introduction to U.S. Policy, 2016, pg 18). Towards the end of Eisenhower’s administration the first national war plan,

SIOP-62 (Single Integrated Operational Plan) was developed. Under SIOP-62 the president would have launched “All available forces against every nation in the Sino-Soviet bloc” (Kunsman and Lawson, 2001, pg 44). The administration truly focused on a massive retaliation which would have killed 285 million people in the Soviet Union and China. Figure 1 below demonstrates the growth of the U.S. nuclear weapons based on the administrations weapons calculations. The administration choose to increase its nuclear weapons from the first weapon created until an initial decrease in 1960. The Kennedy Administration that followed picked up where Eisenhower’s Administration left off in the continued evolution of National Policy.

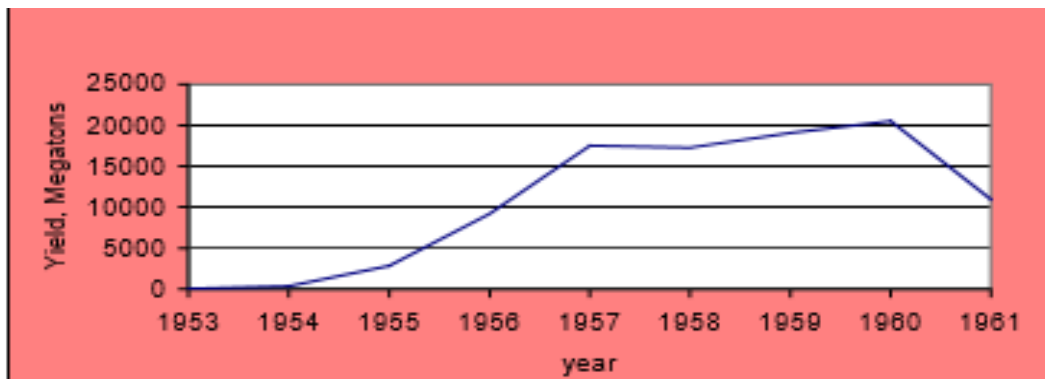


Figure 1: Eisenhower Nuclear Weapons Trend's 1954-1960 (Kunsman and Lawson, 2001, pg 33)

The Kennedy/Johnson Administration 1961-1969

President John F. Kennedy's Administration continued to refine the nation's nuclear policy. Kennedy's view was one of flexible response and assured destruction. The deterrence implementation used by Eisenhower was a massive retaliation, Secretary of Defense Robert McNamara's and other of Kennedy's advisors did not believe that a single, credible, deterrent strategy existed for every crisis that could arise (Introduction to U.S.

Policy, 2016, pg 21). SIOP-63 was counter force driven with an optimum mix of Flexible Response Options that the president could execute. Within the target set that the President could execute were counter military targets, other military targets and urban-industrial targets. The perceived “Missile Gap” drove the administration to develop a different level of strategic thinking. The administration’s thought process was to assure destruction, which was “War is best deterred by threats to destroy a significant portion of an adversary’s population and industry.” The balance sought in deterrence was the “Assured Destruction” which would result if either nation chose to strike first. “Stable deterrence is best maintained when both the U.S. and the Soviet Union have a credible threat to destroy the other” (Kunsman and Lawson, 2001, pg 49). After the assassination of President Kennedy, President Lyndon B. Johnson continued with Kennedy’s policy. Later in his administration Secretary McNamara presented a new draft presidential memorandum in which he stated that counterforce “May not hold great promise” and that extra expenditures to try to achieve it were not warranted. Instead he proposed that rather than fight a nuclear war it was better to deter nuclear war (Kunsman and Lawson, 2001, pg 53). The focus was now shifting to deterring a first strike by maintaining a force which could respond even after a significant first strike and still destroy a large portion of the population and industrial capacity. The next two administrations would maintain this deterrence posture with its own adjustments to the policy.

The Nixon/Ford Administration 1969-1977

President Richard M. Nixon’s policy centered on “Essential Equivalence”. By the end of the 1960’s the Soviet Union had more ICBM’s than the U.S. Nixon viewed improvements to the national arsenal as crucial to our continued deterrence. President

Nixon focused on various forms of modernization and with the help of Dr. Henry Kissinger, who served as first the Secretary of Defense and then the Secretary of State. Dr. Kissinger was followed by James R. Schlesinger as the new Secretary of defense, and with him a new thought emerged. Nixon stated in his 1970 State of the Union address, “Is the assured destruction of both Soviet and U.S. citizens the only alternative a president had?” President Nixon sought to ease the hostility which had been between the two countries. Nixon pushed for greater arms control with multiple control solutions, beginning with the Strategic Arms Limitation Talks (SALT).

Secretary Schlesinger reiterated the importance of solutions and options when in 1974 when he stated, “that the destruction of enemy cities should not be the only option and possibility not the primary option” (Introduction to U.S. Policy, 2016, pg 25). Even though he was looking for better relations with the Soviets, Nixon still wanted to ensure the improvement of the U.S. nuclear options. Secretary Schlesinger presented the National Security Decision Memorandum 242 which presented two major components: first, for the U.S. to develop a wider array of limited nuclear options in order to provide a more credible deterrence; and, second, to providing new guidance for Assured Destruction emphasizing counter recovery targeting (Kunsman and Lawson, 2001, pg 59). With Nixon’s impeachment in 1974, President Ford continued with the policy Nixon had begun with continued focus on better relations. President Ford continued working for increased arms reductions and a push away from Assured Destruction or as it became known “Mutually Assured Destruction”. This was the administrations way of showing how Assured Destruction could only result in catastrophe for both societies.

The Carter Administration 1977-1981

President Carter's administration focused on the strategy of offsetting or "Countervailing" instead of "Counterforce". President Carter's appointment of Harold Brown as Secretary of State drove major changes in how targeting was done. Brown stated, "A countervailing strategy is a strategy that denies the other side any possibility that it could win – but it doesn't say that our side would win" (Introduction to U.S. Policy, 2016, pg 26). The focus being to emphasize the U.S.' capability to deny Soviet war aims was an essential component of nuclear deterrence (Introduction to U.S. Policy, 2016, pg 27). The strategy was aimed at what the Soviets believe was important to them as a country.

Secretary Brown stated,

"I believe they are motivated by all the same human emotions as the rest of us. They love their kids and so forth, and they don't want to see their country destroyed. What motivates them most, however, is their personal power in a way that is not easily understood by someone who has come up through the American system. In a time of great crisis what they most need to be deterred by is the thought that their power structure will not survive. That is even more important to them than their personal survival of 10, 20, or 30 million of their fellow countrymen" (Introduction to U.S. Policy, 2016, pg 28).

This emphasized the difference between the two cultures involved in this Cold War. In 1980, Presidential Directive 59 changed U.S. nuclear policy in three fundamental ways: First, it emphasized counter leadership targeting. Second, it increased counterforce capabilities. Third, it reduced the emphasis on counter recovery. Instead, it focused on

industry providing immediate support to the Soviet war effort (Introduction to U.S. Policy, 2016, pg 32). This strategy allowed for even more flexibility for the President. This was the shift when the administration failed to get re-elected and new administration took charge.

The Regan Administration 1981-1989

President Ronald R. Reagan's Administration chose to toughen up the national stance with his "Prevailing" strategy. He took Carter's countervailing strategy forward with a very significant change in focus. With the issuance of National Security Decision Directive-13 issued in 1981, Reagan outlined instead of denying victory to the Soviets, its goal was a decisive victory for the U.S. (Kunsman and Lawson, 2001, pg 53). This shift drove the biggest shift in the power of the national strategy in years. He increased spending across the board, emphasizing that the U.S. would do what was necessary to ensure victory. He began the Strategic Defense Initiative which became known as Star Wars. This program's intent was to be able to stop Soviet ICBMs before they could impact the U.S. He moved the U.S. farthest away from "Mutual Assured Destruction" than any administration before. He specifically rejected the belief that "deterrence must rest on the threat to destroy a high percentage of the Soviet population." Instead of targeting the Soviet population directly, his administration focused on "More selective, discriminate, and controlled response to enhance nuclear deterrence." This included targeting the Soviet leadership themselves. This was a striking revelation to the Soviet Union who now had to contend with the problem set of being the target of nuclear weapons. This would drive them into more investment than was sustainable. By the end of President Reagan's two terms the Soviet Union had collapsed and the Cold War was over. The U.S. had indeed

prevailed. This posed a different set of issues for the newly elected administration (Kunsman and Lawson, 2001, pg 64).

The Bush Administration 1989-1993

President George H.W. Bush served as the Vice-President for President Reagan. After the fall of the Soviet Union he faced a different set of challenges, his focus and strategy was “Massive Disarmament”. In September of 1991 he ordered a unilateral reduction in U.S. strategic forces numbers, deployments, and research and development programs. Specifically, he announced that: 1) strategic bombers and Minuteman (MM) II ICBMs were taken off alert; 2) 450 MM II silos were placed in a stand-down status pending destruction; 3) all deployed ground-launched, short-range nuclear forces were recalled to the U.S. and slated for retirement and elimination; 4) non-strategic nuclear weapons were ordered removed from routine deployment on Navy ships and submarines; and 5) development programs for the mobile ICBM, small ICBM, and SRAM II missiles were canceled or suspended (Introduction to U.S. Policy, 2016, pg 32). Bush also orchestrated the Strategic Arms Reductions Treaty (START I) and START II which were the largest and most complex arms control treaties in history. He also led the unilateral nuclear test moratorium. President Bush led the greatest arms reduction campaign in the history of the U.S. During Desert Storm a nuclear policy issue arose. How would we be able to deter chemical and biological attacks? Secretary Baker informed Tariq Aziz that if those types of weapons were used the U.S. reserved the right to use nuclear weapons. The threat worked and the Iraqi leadership did not use any of their chemical and biological weapons for fear of nuclear retaliation (Introduction to U.S. Policy, 2016, pg 34).

The Clinton Administration 1993-2001

President William J. Clinton's administration continued to focus on nuclear reductions and would continue to be the maintained policy. President Clinton's policy focus was to "Lead but hedge" meaning that the U.S. would lead the world in nuclear arms reductions and in programs to prevent the proliferation of nuclear weapons while at the same time maintaining a nuclear deterrent force that hedged against adverse geopolitical developments (Kunsman and Lawson, 2001, pg 67). President Clinton issued the 1994 Nuclear Posture Review (NPR) to reexamine nuclear policy and forces in light of the end of the Cold War and recommended a revised nuclear posture (Introduction to U.S. Policy, 2016, pg 7). This was a change that the nuclear forces are still feeling today.

The NPR stated that nuclear weapons are playing a smaller role now than at any other time in the nuclear age, the U.S. now requires a much smaller nuclear arsenal under present circumstances, the U.S. will maintain the Triad and capability to deploy larger force if needed and the U.S. would maintain stockpile capabilities without testing, new design production, or new fissile material production (Kunsman and Lawson, 2001, pg 67). The Presidential Decision Directive (PDD)-60 issued in 1997 also removed the ability to win a protracted nuclear war (Introduction to U.S. Policy, 2016, pg 37-38). This was in complete contradiction to the national policy of the last two decades. Clinton then signed the Comprehensive Test Ban Treaty which effectively stopped all nuclear testing. President Clinton saw a limited usefulness in nuclear weapons and as a result significantly impacted the status to the nuclear forces.

The G. W. Bush Administration 2001-2009

President George W. Bush's administration began a new era in national policy. After the attacks of 9/11, the entire nation turned its focus to the Middle East, this also drove a change in policy. President Bush saw the utility of nuclear weapons versus a range of threats and the need to "transform" nuclear capabilities accordingly. His administration thus created the "New Triad". This model contains the original strategic triad placed inside a larger triad. Within the larger triad also reside non-nuclear strike capabilities, active and passive defenses, and infrastructure. He also sought at the same time to build up non-nuclear strategic capabilities – BDM and Global Strike. The U.S. also withdrew from the BM treaty. In 2001's NPR the focus was to Assure, Dissuade, Deter and Defeat (Introduction to U.S. Policy, 2016, pg 41).

The Barack Obama Administration 2009-2016

President Barack Obama's administration policy as stated in the NPR is to place non-proliferation and nuclear terrorism as the nation's top priority. President Obama pulled no punches in his 2009 Prague speech in which he presented his vision for "Peace and security of a world without nuclear weapons". His long-term transformational goal advanced a near-term agenda: rhetoric; abolition and moral high ground; rally the world to strengthen non-proliferation regime and deal with current and would be "Nuclear Rogues"; and re-engage in non-proliferation diplomacy and arms control as well as show restraint in weapons policies (Introduction to U.S. Policy, 2016, pg 48). In the 2010 NPR the focus identifies reducing the role of nuclear weapons, maintaining a strategic deterrent at reduced levels, and managing international perceptions of U.S. policy. Of significant note in the NPR, even with the strong minimalist language the NPR recognizes the requirement to

maintain a safe, secure and reliable arsenal as long as nuclear weapons exist in the world (Introduction to U.S. Policy, 2016, pg 48).

President Obama continued to reduce the number of deployed weapons and in 2011 ratified the New START. This effectively reduced the number of operationally deployed warheads to 1,550 while establishing new inspection and verification procedures. In 2013, Obama once again indicated that he would reduce that number even lower. He stated, “After a comprehensive review I have determined that we can ensure the security of America and our allies, and maintain a strong and credible strategic deterrent, while reducing our deployed strategic weapons by up to one third” (Introduction to U.S. Policy, 2016, pg 48). This could prove very detrimental to the nation’s security as other countries like Russia and China continue to build and modernize their nuclear capabilities.

The Donald J. Trump Administration 2017-Future

The Trump administration has shown a very strong focus on continuing to improve the nuclear enterprise. One of his first actions as Commander in Chief was to meet with top Air Force generals to discuss the current state of the enterprise and soon after stated that there needed to be continued effort and improvement placed on the ICBM and bomber legs of the Triad. The new presidential administration has not yet identified what its nuclear policies will be. The trend over the last forty years has been a decrease in the number of nuclear weapons. Figure 2 below demonstrates the decreasing stockpile which largely began with President Carter and continued through President Obama. The nuclear enterprise will wait and see what the new Presidential administrations has in mind for it.

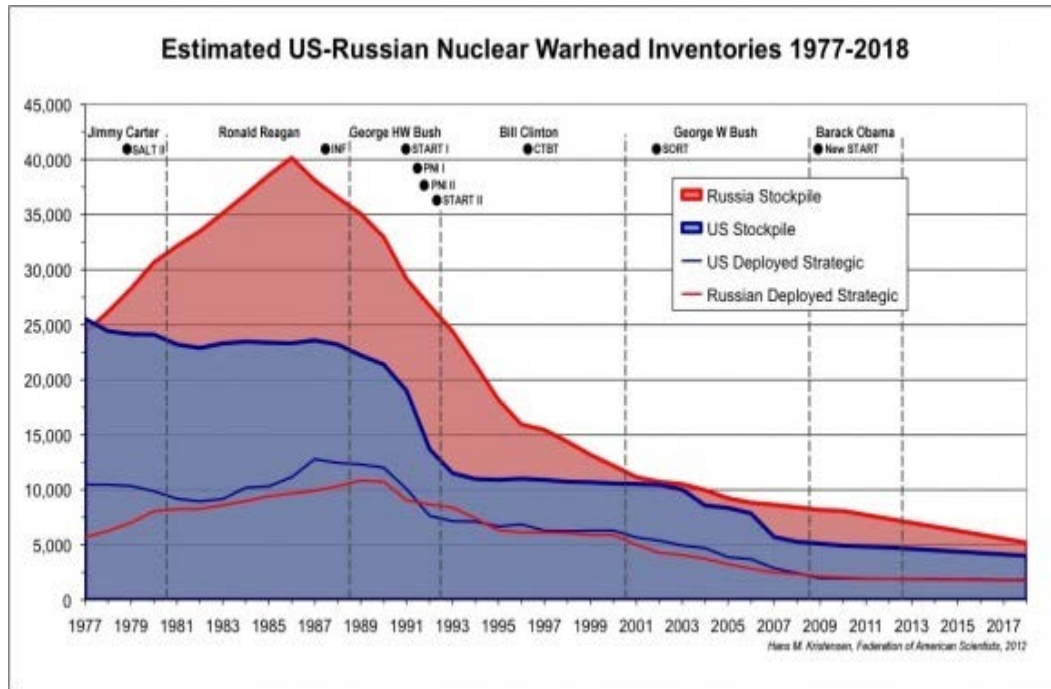


Figure 2: U.S. Nuclear Weapons Trends 1977-2017 (Kristensen, Federation of American Scientists, 2010 briefing, Slide 4)

According to Paul Bracken in his book, *The Second Nuclear Age*, “nearly all the major powers with the bomb have undertaken significant modernization efforts in recent years. Only the U.S. holds back from this, in the increasingly vain hope of demonstrating to the world that these weapons have no utility” (Bracken, 2012, pg 94-95). This new nuclear age, or as Bracken calls it, “The Second Nuclear Age” carries with it the stark reality that we are no longer in a bi-polar world. We are now in a multi-polar world. The days of the cold war are in fact not gone, and our adversaries have not disappeared. The number of nuclear players has, in fact, increased with the addition of countries like India, France, Israel, Pakistan and North Korea. Russia has paid attention to the growing threat and continues to modernize and grow its capabilities. China has fully committed to becoming a truly great nuclear power house. While the current threat is no longer based between super powers armed with nuclear weapons, it is in many ways more dangerous than a cold war with a single opponent. The threat now is more likely to come from two or

more regional states engaging in nuclear conflict. These regional conflicts threaten to involve other countries that may not have initially engaged in war against each other. It is not far-fetched to believe that a regional skirmish between regional states, North Korea or Syria for example, near Russia or China could lead to increased hostilities and possible use of nuclear weapons. The U.S. current nuclear policy seems weak in addressing these concerns. According to Bracken, “If the U.S. doesn’t have a framework to manage the second nuclear age, the second nuclear age is going to manage the U.S. Short-term pressure and crises will determine policy, rather than the other way around. Alternatives won’t be clearly defined. More facts will be collected-about Iran’s centrifuges, Pakistan’s plutonium, and China’s missiles- but there will be little comprehension of what these facts mean” (Bracken, 2012, pg 249).

There has been a new evolution of deterrence thinking which posits that the U.S. is capable of decreasing the number of deployed weapons to a much lower arsenal and still maintain the strategic threat. In 2010, Gary Schaub Jr., an assistant professor of strategy at the Air War College, and James Forsyth Jr., a professor of strategy at the School of Advanced Air and Space Studies, proposed a new calculation of what would be an effective deterrence force. In their research article, “*An Arsenal We Can All Live With*”, the researchers assess that the U.S. is capable of reducing the current number of deployed weapons to 311 weapons dispersed among the three legs of the nuclear triad. “Indeed, we have calculated that the country could address its conceivable national defense and military concerns with only 311 strategic nuclear weapons” (Schaub and Forsyth, 2010). The DoD developed the methodology by assuming various objectives that were the nation’s best interests, assigning appropriate target sets, and identifying the number of weapons needed

to accomplish these objectives. Their process revealed a significantly lower number of deployed weapons than that of the current arsenal. However, they did clarify that to be effective with a smaller arsenal the U.S. would need to continue its reliance on the nuclear triad. This flexibility was imperative to be able to meet objectives with fewer nuclear weapons.

As recently as March of 2016, two researchers also addressed the lack of a process in the calculation of deployed nuclear weapons. Dr. Erik Gartzke and Dr. Matthew Kroenig researched a quantitative method for arriving at the correct number of nuclear weapons required to ensure the deterrence for the nation. “The toolkit for studying nuclear security had long been bereft of quantitative approaches, undermining the virtuous cycle between theory and evidence. New data and growing confidence in statistical approaches have finally produced a systematic empirical literature on the consequences of nuclear weapons” (Gartzke and Kroenig, 2016).

In the summer of 2016, Dr. Keith Payne published an article in *Strategic Studies Quarterly*, identifying the concerns of why the number of deployed weapons is important to the nation. Dr. Payne presents the question, “For effective deterrence, does the United States need greater numbers and different types of nuclear capabilities than the very limited numbers and types of nuclear weapons deemed necessary to threaten an opponent’s society?” (Payne, 2016). His article re-emphasizes the need to understand the ramifications in the identification of the number of nuclear weapons needed. The article discussed the concern in misunderstanding and therefore misstating the intent of the national weapon posture. Dr. Payne contrast’s the minimalist theory presented by Schaub

and Forsyth in 2010. He assesses, “The problem with all such claims is that no one knows with precision the minimal U.S. nuclear capability necessary to deter attack—now or in the future. Omniscience would be required to predict how many and what types of weapons will deter across a spectrum of circumstances and opposing leaderships.” The correct number according to Dr. Payne is not so simply calculated and requires much more thought and discussion in order to meet the deterrence requirement. He further states, “The U.S. requirement for effective deterrence is not some known, set number of weapons or capability; it will change depending on the opponent, the time, and the context.”

The U.S. must rethink the current policies on nuclear weapons. If the U.S. chooses to ignore those countries developing nuclear weapons it runs the risk of losing the ability to project a clear deterrent threat and will ultimately be faced with the possibility that another nation may become the dominant nuclear world power.

III. Methodology

During this phase of the study the researcher used a qualitative approach with a Grounded Theory design. This was accomplished by conducting a broad content analysis to investigate the opinions of nuclear experts in the field and explore the process utilized to determine the appropriate size of the nuclear arsenal. The researcher utilized the questions identified in chapter 1 to create a questionnaire used to interview experts in the nuclear enterprise. During the study, potential respondents were senior military and political leaders. The researcher attempted to determine if all of the proposed questions above were taken into the calculation to decide upon the final number of weapons and delivery platform numbers to ensure credible deterrence for the nation and her allies.

Qualitative Research design and procedures

The qualitative method was chosen as a means for exploring and understanding each individual's understanding of the weapons calculations. According to Leedy and Ormrod, when conducting the study the researcher should be involved in the emerging questions and procedures. This allows the researcher to utilize all the data collected and properly analyze each part. The researcher should build from particular to general themes and use them to make interpretations of the meaning of the data (Leedy and Ormrod, 2016, pg. 253). The qualitative approach sought to understand information provided by the respondents in the interviews and identify the understood steps in the weapons calculations. During the literature review, the researcher recognized certain requirements that indicated a framework for a weapons calculation. These requirements stood out as the beginnings of a method which would be a starting point for the study. The researcher identified what he thought the required step would be. These steps were: 1) identifying targets, 2) identifying

platforms required and 3) calculating the number of platforms and weapons required to meet the identified targets. This type of research is not numerically based and is created by conducting interviews which will allow the researcher to collect the data needed. The researcher must be prepared to let the interviews lead the research and allow the paper to evolve over the course of the investigation (Leedy and Ormrod, 2016, pg. 253).

During the study potential data sources are thirteen senior military and political leader interviews. The senior leaders were chosen by the researcher based on certain criteria. The two main criteria were: 1) individual and unique experiences in the nuclear enterprise and; 2) the specific contribution made by each individual to the development of the nation's nuclear policy.

The researcher chose individuals who had experience at multiple levels in developing and applying nuclear policy. The individuals must have had experience at both the leadership and lower levels. These leaders will be those involved in the DoD and have been or are currently involved in the nuclear enterprise, some examples are Major Air Force Command (MAJCOM) commanders, Numbered Air Forces (NAF) Commanders, civilian nuclear policy experts, ambassadors, senior Joint Staff leadership, and current and/or prior Combatant Commanders. These interviews were based upon a convenience sample due to the inherent difficulty and limited opportunity to interview these individuals. Their expertise was varied but directly related to the research allowing the study to gather a significant representation of the nuclear enterprise

Interviews Design

The purpose of the interviews was to gather informed opinions from individuals from many different aspects of the nuclear enterprise. A sample of thirteen nuclear experts were chose to explain the perceived method of calculating the number of nuclear weapons deployed and the platform requirements. These individuals included former Major Air Force Command (MAJCOM) commanders, Numbered Air Forces (NAF) Commanders, Civilian nuclear experts and academics, ambassadors and Senior Joint Staff leadership who participated at some level in developing the weapons posture, studied it, or provided incite and recommendations to those working on the national deterrence recommendations ultimately approved and directed by the President of the U.S.

These interviews were conducted both face to face and on the phone. They were made up of personal opinions, knowledge built by experience, and information earned during their respective parts of the development. The researcher interviewed thirteen individuals with various levels of experience. Figure 3 below provides each respondents nuclear weapons planning and leadership experience. The researcher submitted a ten question interview sheet to each interviewee and then set up either a telephone or a face to face interview the respondent's schedule allowed. Not every interviewee was able to accomplish a telephone interview so their written responses were recorded and utilized for analysis. Each interview, as approved by the respondent, was recorded via audio recording devices and saved to a writable disk for inclusion in the research data. Once the interviews were complete the researcher began the content analysis of each interview in order to identify a standard method involved in the calculation of nuclear weapons to ensure effective deterrence. The

researcher also looked for previously unidentified trends or information not presented in earlier data reviews.

Senior Leader	Nuclear Experience	Command Level	Joint Staff	STRATCOM Staff	START experience	DoD advisor	Presidential policy input
Respondent A	50 Yrs	No	No	No	Yes	Yes	Yes
Respondent B	10 Yrs	No	No	No	No	Yes	Yes
Respondent C	30 Yrs	Multiple levels	Yes	No	Yes	Yes	Yes
Respondent D	39 Yrs	Multiple levels	Yes	Yes	Yes	Yes	Yes
Respondent E	18 Yrs	Multiple levels	Yes	Yes	No	No	No
Respondent F	34 Yrs	Multiple Levels	Yes	Yes	Yes	Yes	Yes
Respondent G	35 Yrs	Multiple Levels	Yes	Yes	Yes	Yes	Yes
Respondent H	29 Yrs	No	Yes	Yes	Yes	Yes	Yes
Respondent I	38 Yrs	No	Yes	No	Yes	Yes	Yes
Respondent J	33 Yrs	No	Yes	Yes	Yes	Yes	Yes
Respondent K	12 Yrs	No	No	Yes	No	No	No
Respondent L	28 Yrs	Multiple Levels	No	Yes	No	No	No
Respondent M	15 Yrs	No	No	No	Yes	Yes	No

Figure 3: Respondents Nuclear Weapons Planning and Leadership Experience

Validating the information collected

Once the information was collected and reviewed, the researcher applied the qualitative data analysis process identified by Creswell (2014). The analysis process described below is a seven-step process in which Creswell suggests a linear, hierarchical approach to qualitative data analysis, building from the bottom to the top, but applying it in a more interactive way (Creswell, 2014, pg. 196-197). The researcher used the following steps in this process.

Step 1. Organize the Data:

In the initial step Creswell recommends that the researcher organizes and prepares the data for analysis (Creswell, 2014, pg. 197). In this step the researcher collected the recorded interviews and notes taken during the each interview. The researcher then typed up all collected interview notes. Next a folder was created on the primary computer in order to maintain any and all data collected while accomplishing the research paper. The researcher created multiple subfolders in order to store all interviews, responses and data collected labeled according to each individual. The researcher collected the questionnaires sent back to the researcher with respondents answers filled out and stored them in individual folders. During the interviews the respondents tended to expand on their original answers. These audio recording were saved to a disk and the researcher took notes during the interviews. The notes were also saved into each computer folder per respondent. These notes were consolidated and labeled according to each respondent. The notes were then transcribed and saved in the folder for each respondent. The researcher then organized notes from each interview, consolidated, and arranged all collected data, and prepared the raw data for review and analysis.

Step 2. Read through all the data:

During the second step, Creswell recommends that the researcher read and look at all the data. This provides the researcher an opportunity to reflect on its overall meaning (Creswell, 2014, pg. 197). In this step the data and recordings were read and reviewed for an understanding of what the participants were saying during the interviews. In this step the researcher reviewed the recorded interviews and collaborated the notes taken during the each interview. The notes were then reviewed with the audio recording to ensure the information collected on the notes contained all the pertinent information as it pertained to the interview and the questions. The researcher gathered information from these interviews to begin to frame an understanding of the weapons calculation. Trends and similarities were noted for further expansion. The researcher also observed the credibility and usefulness of the information provided during the interviews.

Step 3. Code the data:

In this step Creswell recommends to the researcher that they begin the process of the data into chunks or segments (Creswell, 2014, pg. 197). During this step, the researcher began to prepare to “Code” parts of the data by hand. “Coding” is the process of reviewing the data collected and organizing it by identified groups based on the respondent’s interviews. The coding process is used to generate a description of the setting or people as well as categories or themes for analysis (Creswell, pg. 199, 2014). The researcher had previously identified what he thought the required steps would be in the process. These were the pre-identified codes steps, these steps were: 1) identifying targets, 2) identifying platforms required and 3) calculating the number of platforms and weapons required to meet the identified targets.

Step 4. Describe the data:

During this step Creswell recommends that the researcher use the coding process to generate a description of the setting or people as well as categories or themes for analysis (Creswell, 2014, pg. 199). In this step the researcher began to identify themes across the interviews. The researcher initially created a list of what he assumed would be “key attributes” in the weapons calculation. The researcher then began to compare the initial assumptions against those becoming evident during the interview process. The researcher paid close attention to the groups of data that were being presented by the respondent’s interviews. Identified trends and themes in the discussion were similarly “Coded” in order to describe and organize the data in a workable manner. These “Coded” items became the identified “Key Attributes” discovered by the researcher. The list of identified “key attribute’ and themes were:

- 1) Art of weapons calculation
- 2) Initial strategic guidance
- 3) National objectives
- 4) Identify who is being deterred
- 5) Identify who is receiving extended deference
- 6) What will be held at risk
- 7) What if deterrence fails
- 8) What are the constraints
- 9) Diplomatic considerations
- 10) Triad platform considerations

Step 5. Describe how the themes are represented:

In Creswell's book this step is described as advancing how the description and themes will be represented in the qualitative narrative (Creswell, 2014, pg. 200). During this step, the researcher reviewed interrelating themes and trends in a descriptive manner in order to represent the data in the qualitative review process. The researcher then began to develop a narrative description of the analysis findings.

Step 6. Interpretation:

The final step Creswell describes in his book is to make an interpretation of the data in qualitative research of the findings or results, asking what are the lessons learned were (Creswell, 2014, pg. 197). In this final step the researcher interpreted the data analyzed in the research. The information collected by the interviews was compared and described in the new weapons calculation described by conveying the "Key Attributes" of developing the nation's nuclear posture and the correct number of weapons to deploy in order to maintain a strategic balance and provide a nuclear deterrent for the U.S. and her allies.

Research Findings

Once the researcher completed the analysis portion the information was translated into the analysis and findings section of this research paper. Upon review of the data the researcher found that there are many more aspects of national deterrence that initially anticipated and that there will be many opportunities for future studies on the subject matter.

IV. Analysis and Results

During the study, many individuals were interviewed and many deterrence documents reviewed. During these discussions and interviews the participants were asked a series of questions (refer to Appendix A). The researcher presented the questions to begin the conversation about the understood weapons calculations. The discussion then progressed to the development of nuclear deterrence policy and how it affected the weapons calculations and deciding what the appropriate number of weapons deployed is to be. The goal of the weapons calculation was to ensure national deterrence is projected in such a way it leaves no doubt in the adversaries' minds that an attack on the U.S. or its allies would lead to a devastating response that is unacceptable to them.

Throughout the study a method emerged. Weapons calculation is more of an “art” than a direct numerical calculation. The weapons calculation used in prior administration’s policy development was not written out and differed depending on the administration presenting it, but it allowed for the researcher to identify similar “key” attributes used to develop a nuclear deterrence posture and the weapons needed in order to enforce the administration’s deterrence policy. The data collected will list out these “key” attributes in a logical flow to explain what critical aspects are involved with these attributes. The experts interviewed have experience levels that range from those at the highest levels of the government who first receive the presidential direction all the way down to those who actually execute and enact the presidential policy. Figure four below illustrates a notional process model for policy development that can be applied using the recommendations presented in Ch. 5.

The knowledge of weapons calculation is spread out amongst these individuals but this research will, for the first time, capture all methods in order to deliver weapons calculation recommendations for those who will reassess the nation's nuclear deterrence posture and the number of weapons needed to project national deterrence for the U.S and her allies.

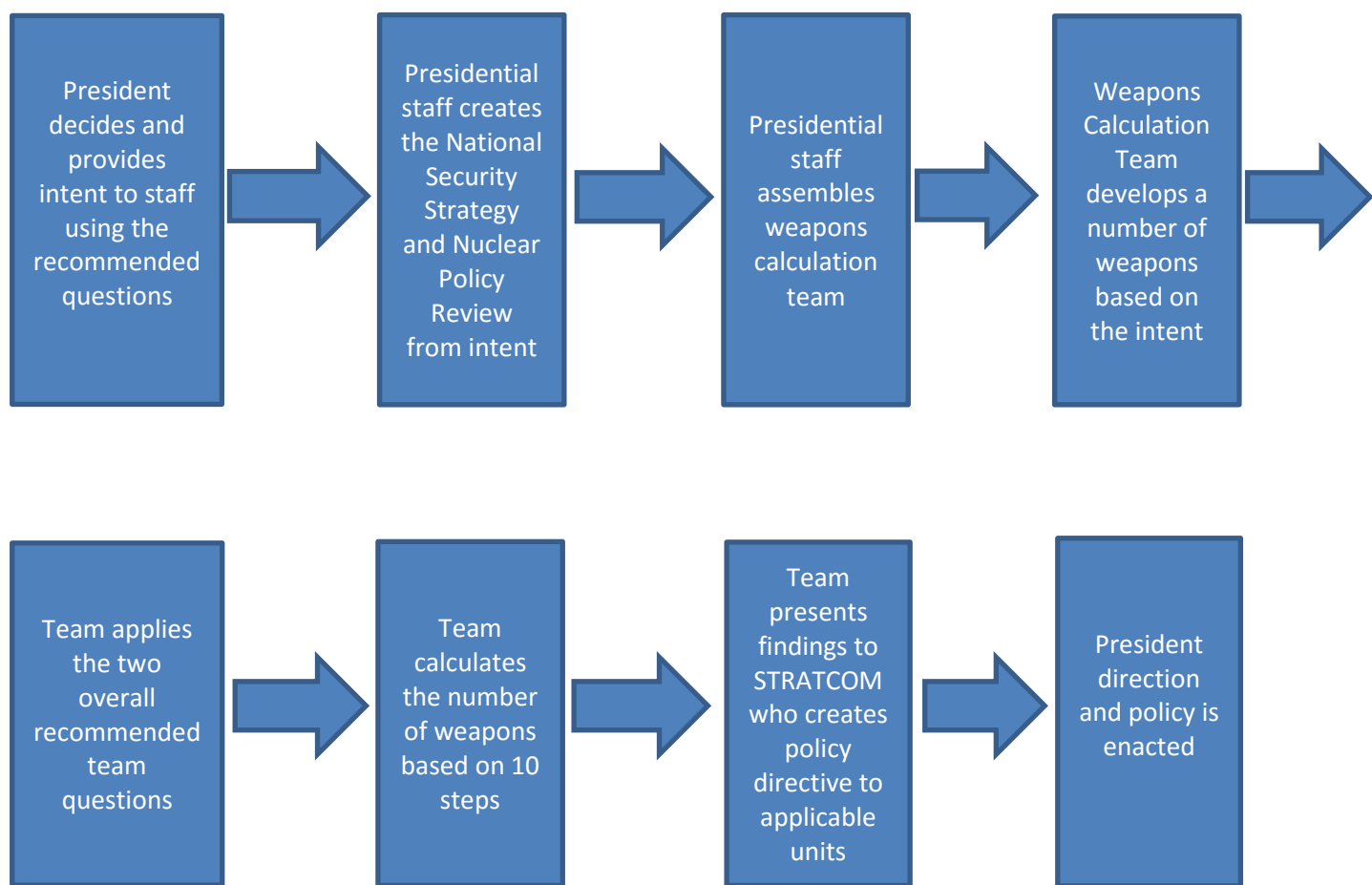


Figure 4: Researchers Notional Process Model for Policy Development

Initial guidance

During the interviews, every individual identified the first critical step in calculating the number of nuclear weapons as the initial guidance issued by the presidential administration. This directive guidance lays the ground work for the national policy. The guidance must contain critical and necessary information which allow the policy planners the ability to translate this direction into policy and ultimately into an actual number of weapons. The necessary information should answer the following questions:

Question 1: What are the national objectives?

This question presents the most important direction as it initializes the creation of national policy. The president must provide clear guidance in which he states what he considers the most critical objectives of the U.S. to prevent nuclear war. One interviewee stated that this is “The most critical piece: You MUST start with strategy.” The majority of the interviewees also stated that at no point should the U.S. fall below a strategic number of weapons that would allow a near peer to gain a strategic advantage over the U.S. by allowing them to have more nuclear weapons deployed than the U.S.

The president would also identify the “lines in the sand” that would open the door for nuclear weapons use. In past presidential administrations, chemical or nuclear weapons use was a “line” that would not be crossed without severe, possible nuclear, retaliation. Presidents have used the Nuclear Posture Reviews as a path to articulate their policy direction. This is a critical discussion to have and understand. The respondents made clear during the interviews that this is a critical discussion because it defines what the weapons requirements will be, based on national objectives. It is at this point that they also

recognized and praised the genius of the original creation of the nuclear triad. The respondents discussed that a set of objectives cannot be carried out by a single platform. There was discussion on the possibility of lowering or increasing the weapons numbers as the specific objectives dictated but the respondents were almost completely unified in the observation that what grants the U.S. the ability to change its numbers as needed is the inherent flexibility in the triad. The majority of the respondents made this point, especially when academia, military and political leaders argue shifting away from a triad to either a dyad or monad arises. There is significant loss in flexibility if one of these platforms is removed from the equation.

During the interviews, more than one respondent explained that many individuals seek to unilaterally remove a platform from the triad based on a perceived cost reduction without following a method to ensure this removal does not impact the U.S.'s ability to meet national objectives and provide national deterrence for the U.S. and her allies. There is caution presented here by the respondents to ensure all calculations and procedures are established to ensure deterrence is provided and not to begin as a cost saving measure which has already established a preconceived number of weapons or platforms. Once these objectives are defined, the process should continue.

Question 2: Who are we deterring?

This question is an integral part of the deterrence posture. Historically, the U.S. has had many adversaries. The beginning of the atomic age was during World War II when the Allies were at war with the Axis powers. The resulting nuclear weapons use against Japan at Hiroshima and Nagasaki forced the Japanese emperor to surrender to the U.S. The

question identifying who we are deterring is important because we no longer see Japan or Germany as bitter enemies.

The U.S. has historic and emerging adversaries. These may change in the very dynamic world we live in and it is critical to understand what may deter one country may not deter another. This information is essential in identifying the adversaries the U.S. intends to deter with the nuclear arsenal. There are adversaries that are very difficult to judge because not every country can be deterred with outrage and sanctions. Even in the face of such opposition, there are countries that have demonstrated that they will continue to develop what they consider their sovereign right to defend themselves against the world's nuclear powers. Clearly a starving population and loss of commerce are not enough to deter these types of countries. Understanding what would deter a country like this in conflict is not yet understood.

Question 3: Who is the U.S. providing extended deterrence to?

This question drives a discussion revolving around who the U.S. is providing an umbrella of deterrence to. During this discussion, the allies' adversaries and their capabilities. There will then be a discussion as to target sets and weapons needed to employ should the U.S. be called upon to launch a defensive or offensive nuclear strike on behalf of our allies. This will equate to a specific number of weapons which may already be part of the calculated number or will be added as additional requirements. The U.S. must be able to aid allies while still providing national deterrence. If needed, the U.S. must have enough weapons to fight on multiple fronts against multiple adversaries.

Question 4: What do you want the nation to hold at risk?

This question seeks to inform the team of the presidential direction describing what types of targets he would want to hold at risk. This presidential policy has changed as our nation evolved. As previously presented in the literature review, our country initially held our adversary's cities at risk of attack because of low numbers of weapons. Holding populations at risk is known as "counter value" targeting. As the policies evolved and the number of weapons increased and became more accurate, the U.S began to target military objectives, which is known as "counter force" targeting. This is very important in the research because it identifies a "key attribute" of weapons calculation. Part of the research was identifying whether or not the country could lower its number of deployed weapons and still provide a strategic deterrent for the U.S. and our allies. As the interview data was examined each interviewee stated that it was possible to lower the numbers but they identified that if our nation continues to lower the number of weapons deployed, then the U.S. must consider returning to a "counter value" targeting policy. This discussion may drive a significant shift in national policy but it is a consequence the U.S. may face from lowering the number of deployed nuclear weapons.

Question 5: What do you want the military to do if deterrence fails?

This question addresses the implication that should an adversary decide that they are not deterred by the U.S. nuclear weapons, what does the president want the military to do. As one interviewee stated "What is the nuclear enterprise required to do?" This question is more complex than it seems because as Kahn explains in his book, escalation control, involves more than a simple retaliation. At one point the nation believed that the most probable exchange with the Russians would be a full weapons exchange from both sides.

The new version of nuclear combat is believed to be a limited exchange between nations, showing their will and capabilities. If the U.S. employs a nuclear weapon it must be in a very calculated method. During the discussions, this was the first identifiable part that directly related to a “number” of weapons based on what the inflicted damage expectations a president wished to inflict if deterrence in fact fails. A part of national deterrence is to have an executable plan in the event that deterrence fails and war becomes unavoidable. Deterrence is a theoretical equation in which deterrence equals “will” plus “capability” and both must be projected in the President’s direction.

Question 6: Define the constraints and damage expectations of the identified targets?

This is a very crucial question for the President and his staff. These questions clearly identify what the expectations are of the nuclear enterprise, if nuclear weapons are used. In layman’s terms, how bad do you want the targets damaged? On the surface this seems like an easy question but truthfully you have to consider whether the damage expectations allow the adversary to rebuild in 10 years or never. Many targets have a hardness level associated with them. This is the amount of yield required to inflict a certain amount of expected damage on a specific target. Based on this mathematical equation the plan would call for a specific number of weapons based on the President’s damage requirements. This should be calculated into a specific number of weapons.

Question 7: What are the desired numbers required for diplomatic interaction?

This was a unique question that arose from the interviews and a question the researcher had not considered. An important Presidential understanding is that whatever the number becomes is based on the direction and plans created but must also take into

account a number of additional weapons allowing the President room for negotiation in matters of nuclear reductions. The “Policy Team” must ensure the minimum number required to maintain strategic stability and national deterrence is met but also create a “Buffer” to meet treaty requirements that may arise from arms negotiations with other nuclear states.

These questions become the weapons calculation process that the national strategic deterrence plan is created from. The President’s staff will then direct the creation of the weapons calculation team and provide the guidance developed to the DoD. The “team” will begin the process of putting the guidance into DoD planning for issuance of direction. Based on the respondent’s interviews, the following questions were identified as the “team’s” initial requirements.

Team Questions:

What are the targets the President would want held at risk should deterrence fail?

When answering this question, the team planners must take into account what the force structure might look like. The current policy of “counter force” provides the team with a list of targets to apply nuclear weapons against. Due to the classification of this information, we will not discuss any level of the targeting options, but will instead identify the need for the team to build a number of weapons based on these targeting requirements. Once this information is collected it would be given to the U.S. Strategic Command (STRATCOM) for actual planning purposes. STRATCOM would then review the targets and apply one of the three weapons systems to each identified target. This would be divided by capability between the ICBMs, SLBMs and the bombers.

What are the number of weapons needed for reconstitution?

During the team reviews a significant amount of thought must be applied to the reconstitution of the forces after a nuclear exchange. This reconstitution process involves installing new weapons on any platform after its use. For example, after a bomber, SLBM or ICBM is launched, a procedure must be followed to “reload” the weapon system. The team must address many different scenarios in order to arrive at a number of weapons which can be used as a new deterrent to an adversary at nuclear war with the U.S. or a potential adversary that sees a perceived weakness in the U.S. after a nuclear exchange with another nation. The team must arrive at a number of reconstitution weapons that would provide this deterrence and ability to continue to attack as needed during a nuclear war. These thoughts are not pleasant but needed in order to ensure the correct number of weapons is retained in the U.S. nuclear arsenal.

V. Conclusions and Recommendations

The conclusions and recommendations reached by the researcher are based on the qualitative data provided by the subject matter experts interviewed during the research. This chapter seeks to provide a replicable method and outline the key attributes and processes any individual or team should be aware of as they calculate the number of nuclear weapons to provide a credible nuclear deterrence force for the U.S. and her allies. This is a very important subject because of the perceived lack of strategic vision and priority placed on the nuclear mission as identified in the Secretary of Defense Task Force on DoD Nuclear Weapons Management Report (Schlesinger Report, 2008, Pg. 25).

This study identifies the need for not only the right number but also the correct mix of weapon systems and their applicable platforms. Many of the subject matter respondents expressed the need for each of the legs of the nuclear triad. The concern identified often was that while the current method seems to account for a portion of their understood requirements, the current method seems almost entirely a political process with a projected number having been established prior rather than achieving a number based on a cumulative procedure. The goal is to establish a weapons calculation that is grounded in operational art not simply political statements. The U.S. ability to deter should not only assume it deters nuclear war, the nuclear weapons also deter conventional forces.

Since the use of the atomic weapon in World War II, large countries have not waged the same type of warfare on each other. There are wars to be sure, but large countries have stopped short of full blown warfare because of the fear of crossing into the

nuclear realm. In World War I and II approximately 98 million lives were lost. No war since has reached the level of lives lost.

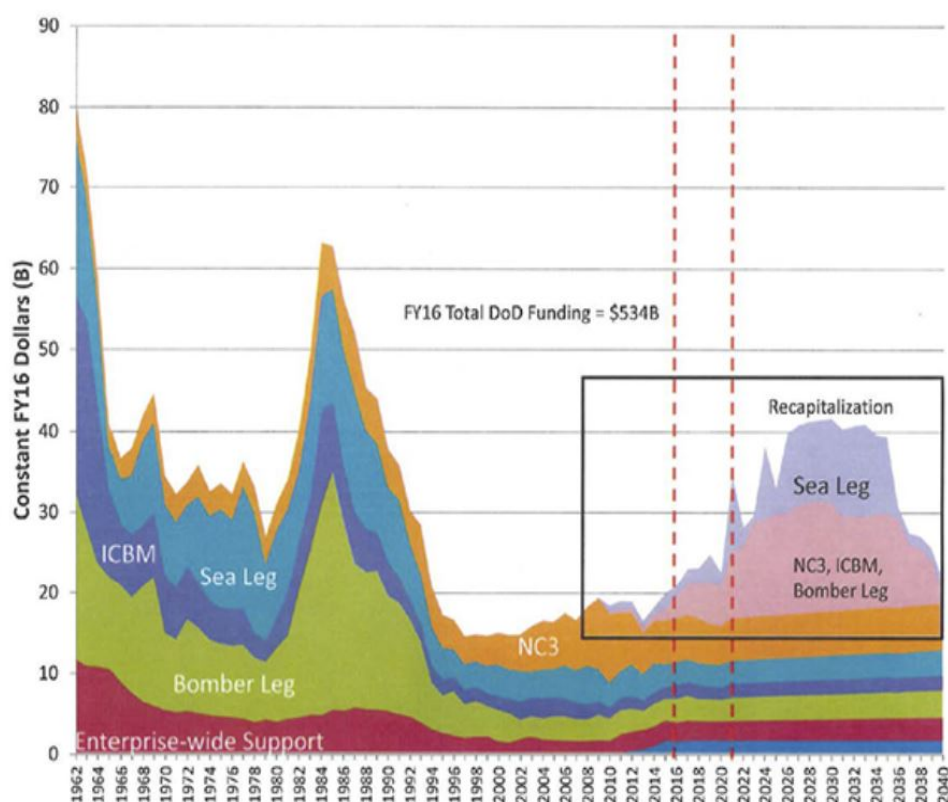
This leads to the researcher's two overall recommendations. First, there must be a discussion on nuclear weapons as both an operational weapon and a political weapon. There is no doubt that nuclear weapons have been and will continue to be used as a political weapon. The U.S. should continue to do so for the foreseeable future. The recommendation however comes from the seeming lack of operational discussion involving nuclear weapons. One respondent expressed that in their exercise experience, there seems to be an underlying fear of nuclear weapons being explored in an operational use, only as a political weapon. Many individuals will not even entertain the thought as to the usefulness of nuclear weapons in a combat situation. This is faulty logic because U.S. adversaries do not share the same fear. Some of our adversaries view nuclear weapons in a tactical role. Russian doctrine, in fact, envisions their tactical nuclear weapons as an extension of their conventional forces to be used as they deem, not necessarily only as a weapon of last resort (Kristensen & Norris, 2016). The U.S. must open the dialogue of various nuclear weapons use in order to be prepared for any scenario. Growing fear seems to limit operations exercises from fully exploring the use of nuclear weapons. The U.S. should review the different levels of conflict and how nuclear weapons can be applied not only against a resurgent Russia but also other nuclear-capable adversaries. The U.S. should strive to be prepared for any situation that may arise.

Second, the U.S. must continue its modernization efforts. The U.S. has not kept up with normal modernization efforts. According to the 2008 Schlesinger report, “No long-range nuclear capabilities roadmap exists for ensuring the sustainment and modernization of nuclear weapons, weapons systems and delivery platforms” (Schlesinger Report, 2008, Pg. VI). While the U.S. neglected its nuclear forces, almost all other nuclear capable countries have improved and modernized their nuclear forces (Kristensen, 2014, Pg. 8125). Not only have other countries continued to modernize, new nuclear capable countries like North Korea are emerging. The respondents stated that while it doesn’t seem to fit in with the calculation of the total numbers of weapons, it might, change the number required based on increased capabilities and/or effects. The number might be increased or decreased with new capabilities. These modernizations should be effects and operational requirements based, not based solely on cost effectiveness.

The respondents acknowledged in their interviews that there is a presumed fiscal “bill” that many view as too large to pay. One respondent argued that this is false, they stated “The nuclear force is the cheapest insurance plan there is and it provides the most bang for the buck”. The respondents acknowledged the U.S.’s future fiscal concerns, however, they reiterated that the focus should be on deterrence, not just money. Figure 4 below presents the projected nuclear enterprise recapitalization cost based on Cost Assessment and Program Evaluation provided to the Arms Control Association. The respondents all discussed the efforts being taken in modernizing the nuclear triad. Each identified the flexibility provided by the triad allows the U.S. to weigh multiple options when faced with an aggressive adversary. The triad also provides confidence to our allies

who choose to not invest in their own triad because of U.S. capabilities. As a result, modernization should be applied across the triad, not as individual services, but as a whole nuclear deterrent mission.

The Coming Nuclear Enterprise Recapitalization



Source: Cost Assessment and Program Evaluation (CAPE)

Figure 5: Projected Nuclear Enterprise Recapitalization Cost (Arms Control Association Fact Sheet, Feb, 2007)

Weapon calculation recommendations

The overall method of weapons calculation has changed from presidency to presidency but the research collected here will present the researcher's recommended procedure and steps to utilize when developing the number of weapons to recommend to the President. This procedure has proved to be a mix of calculations, policy objectives,

and projection of both capabilities and the will to use them. The most important aspect of providing nuclear deterrence is having the capabilities to employ them and an undeniable will to use them if needed. This must be part of the initial strategy and guidance provided by the presidential administration. As stated by one interviewee, “the number of weapons is not as important as the demonstrated capability and will to use them.” The following steps are recommended and correspond to the information and explanations provided in chapter 4.

Step 1: The presidential staff will outline the President’s national policy and intentions of national deterrence and provide them to the team charged with calculating the number of weapons required. This policy will be clearly understood and explained to all key members of the development team. This team should be made up of nuclear enterprise experts, national nuclear policy experts, Air Force and Navy nuclear personal, STRATCOM nuclear planning experts and any others identified by the team as the process develops. The presidential staff will oversee the process to ensure all requirements are met. This presents the most important direction as it initializes the creation of national policy. The President must provide clear guidance in which he states what he considers the most critical objectives of the U.S. to prevent nuclear war.

Step 2: The policy will list out what the intended national objectives are, identifying what are the most critical objectives to the U.S. The president’s staff would identify potential “Lines in the sand” that would open the door for nuclear weapons use. An example might be stating that chemical or nuclear weapons use is a “line” that would not be crossed without severe retaliation.

Step 3: The policy will identify the adversaries the U.S. is deterring for the current and foreseeable future would be. The U.S. has historic and emerging adversaries. These may change in the very dynamic world we live in and it is critical to understand what may deter one country may not deter another. This information is essential in identifying the adversaries the U.S. intends to deter with the nuclear arsenal.

Step 4: The policy will identify the targets that the president wants to hold at risk. This is crucial in determining if the nation will continue to maintain a counter force or establish a counter value policy. During this step, the discussion will be to decide the target sets and weapons needed to employ, should the U.S. be called upon to launch a defensive or offensive nuclear strike on behalf of our allies. This will equate to a specific number of weapons which may already be part of the calculated number or will be added as additional requirements.

Step 5: The policy will identify, to the maximum extent possible, what actions the President wants taken if deterrence fails. This part of the policy assumes that there will be directions which allow planners to build the required strategic targeting plan. While each situation is unique, the object is to create an executable plan should the President direct the use of nuclear weapons. The step will address the implication that should an adversary decide that they are not deterred by the U.S. nuclear weapons, what the president wants the military to do. If the U.S. employs a nuclear weapon it must be in a very calculated method. During the discussions, this was the first identifiable part that directly related to a “number” of weapons based on what the inflicted damage expectations a president wished to inflict if deterrence in fact fails. A part of national

deterrence is to have an executable plan in the event that deterrence fails and war becomes unavoidable. Deterrence is a theoretical equation in which deterrence equals “will” plus “capability” and both must be projected in the President’s direction.

Step 6: Identify the constraints and damage expectations of the identified targets. This is a very crucial question for the President’s staff. These questions clearly identify what the expectations are of the nuclear enterprise if nuclear weapons are used. Many targets have a hardness level associated with them. This is the amount of yield required to inflict a certain amount of expected damage on a specific target. Based on this mathematical equation the plan would call for a specific number of weapons based of the Presidents damage requirements. This translated into a specific number of weapons.

Step 7: Identify the desired numbers required for diplomatic interaction. A very important understanding for the administration is developing a number of weapons the President can use in a diplomatic scenario. This number is based on the direction and plans created but also takes into account the number of additional weapons allowing the President room for negotiation in matters of nuclear reductions. The “Policy Team” must ensure the minimum number required to maintain strategic stability and national deterrence is met, but also create a “Buffer” to meet treaty requirements that may arise from arms negotiations.

Step 8: Identify and establish the DoD team who will develop the policy which is the foundation that the national strategic deterrence plan. The team will begin the process of putting the guidance into DoD planning for issuance of direction. The team will then research further questions based on the presidential guidance.

Step 9: The team will apply the present the information collected to the U.S. Strategic Command (STRATCOM) for actual planning purposes. STRATCOM will create an operationally prioritized list for the application of weapons on targets previously identified should deterrence fail. STRATCOM will then review the targets and apply one of the three weapons platforms to each identified target. This would be divided by capability between the ICBMs, SLMBs and the bombers. Team planners must take into account what the force structure might look like. The current policy of “counter force” provides the team with a list of targets to apply nuclear weapons against. Due to the classification of this information, we will not discuss any level of the targeting options, but will instead identify the need for the team to build a number of weapons based on these targeting requirements.

Step 10: Identify the number of weapons needed for reconstitution. The team reviews a significant amount of thought must be applied to the reconstitution of the forces after a nuclear exchange. This reconstitution process involves installing new weapons on any platform after its use. For example, after a bomber, SLBM or ICBM is launched, a procedure must be followed to “reload” the weapon system. The team must address many different scenarios in order to arrive at a number of weapons which can be used as a new deterrent to an adversary at nuclear war with the U.S. or a potential adversary that sees a perceived weakness in the U.S. after a nuclear exchange with another nation. The team must arrive at a number of reconstitution weapons that would provide this deterrence and ability to continue to attack as needed during a nuclear war. These thoughts are not pleasant but needed in order to ensure the correct number of weapons is retained in the U.S. nuclear arsenal.

Recommendations for Action

The researcher recommends that the nuclear enterprise, led by the Headquarters Air Force A10, as the main custodian on two-thirds of the nation's nuclear forces and the Navy nuclear forces establish a review of weapons calculation recommendations to assess how feasible and applicable the recommendations are. The review should ensure that the "key attributes" are correct from a higher headquarters policy view.

Recommendations for Future Research

The researcher recommends that further study be accomplished on the correct number of nuclear weapons and the method to calculate them. The research opened many discussions and questions that were outside the scope of the original research project. The opportunity to further explore the opportunities for improvement are huge. This study incorporated a small sample set with individuals the researcher believed would be able to provide the data required for the research. The timeline to accomplish this study was 12 months. In order to accomplish a more comprehensive and complete assessment of the processes, more expert interviews should be accomplished and additional policies reviewed. The scope of the investigative process should be increased to other DoD organizations who may play a more significant part of the process than the researcher is aware.

Summary

The research presented offers an opportunity to understand and investigate how the optimum level of nuclear weapons and delivery platforms could be reached in order to effectively provide U.S. national deterrence to her adversaries, extended global deterrence to her allies and continue to lead against nuclear proliferation. This research explored some of the possibilities and ramifications if other non-nuclear capable countries see the decrease in U.S. nuclear weapons as an incentive to develop their own nuclear capabilities.

This study has reviewed the presumed methodology utilized by the presidential administrations and explored the opinions of senior military and political leaders who have participated in developing appropriate level of weapons. The research provided recommendations which may be developed further into a weapons calculation procedure. Others may have differing opinions which should drive further research and exploration. The researcher has met his expected final outcome of creating a better understanding of how best to arrive at the optimum number of nuclear weapons deployed.

Appendix A

2016/2017 AFIT Nuclear Weapons deployment Interview Questions

- 1) Good morning Sir/Ma'am, would you please tell me a little about yourself and what you do in the nuclear enterprise?
- 2) At the unclassified level for our discussion, how are you involved in the calculation of deployed nuclear weapons? And what part of the calculation of deployed nuclear weapons falls with in your area of responsibility?
- 3) What are the critical aspects of developing these numbers? Does our current process address all required aspects of national deterrence and extended deterrence for our allies?
- 4) Do you believe this is the most accurate method to follow? If not what other factors should be considered?
- 5) Do you believe we have the "Right" number of weapons deployed?
- 6) Does our projected deterrence lose credibility with the lowering of these numbers?
- 7) The U.S. has set the pace for nuclear disarmament, but other nations are lagging behind. Do you believe we should continue to drop our number of weapons or hold fast until other nations follow through with their reduction commitments?
- 8) At what point do you believe that our allies may be concerned about our number of deployed weapons? Do you think there is a "Red Line" we may reach that incentivizes them to seek their own nuclear capability?
- 9) If we are near this "Red Line" what can we do to reverse the possibility of losing nuclear credibility?
- 10) Are there any questions you'd like to ask me or anything you'd like to add?

Appendix B



Abstract

This research analysis investigates the DOD process for calculating the number of deployed nuclear weapons in the Triad essential to provide deterrence for the US. The deployed nuclear weapons are those weapons with in the Triad which are either on strategic alert as on the ICBMs, SLBMs, and ALCMs and bombs used by the bombers. This research explores the ability for the US to continue to provide deterrence for North Atlantic Treaty Organization allies. The US has been the world leader in nuclear disarmament and non-proliferation of nuclear information and weapons systems. In the US race to significantly lower the number of worldwide nuclear weapons a focus must remain on ensuring that the US maintains a number of deployed nuclear weapons to ensure it can deter adversaries such as Russia, who continues to test the limits of NATO. Specifically, this research will focus on the concepts utilized by the DOD in the development of the US weapons posture. This research will conduct interviews with Defense leaders and senior officers in the AF and intends to recommend a method to support the US posture of deployed nuclear weapons.

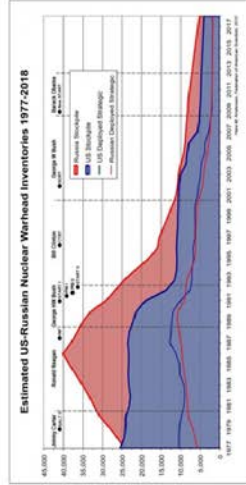
Research Goals

Objective

The overarching research question and objective is to understand the methodology and process to arrive at the number of weapons deployed and explore if that number is the right number. The investigative questions in this study will explore how the number of weapons is calculated and whether the current number of fielded weapons and their platforms is the most optimum number to provide an effective deterrence for the US and her allies. The following investigative questions in this study will explore and will provide the foundation of this paper:

- Q1: At what point does the fill in the number of weapons embodies an adversary to regard US deterrence as weak and believe that they can win a first strike nuclear war?
- Q2: Can the current number of weapons continue to deter our allies' adversaries and provide the nuclear umbrella they have come to rely upon?
- Q3: When does the number of US weapons effect the calculus in her allies?
- Q4: How many allies are fully capable of creating and fielding their own nuclear weapons?


Maj Ray Vann
Advisor: Lt Col Matthew A. Douglas, PhD
Advanced Nuclear Deterrence Studies (ENS)
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NEW RECOMMEND PROCESS

- Step 1: The presidential staff will outline the Presidents national policy and intentions of the national deterrence and provide it to the team charged with calculating the number of weapons required.
- Step 2: The policy will list out what the intended national objectives are, identifying what are the most critical objectives to the US.
- Step 3: The policy will identify who the adversaries the US is deterring for the current and foreseeable future would be.
- Step 4: The policy will identify the targets that the president wants to hold at risk.
- Step 5: The policy will identify, to the maximum extent possible, what actions the president wants taken if deterrence fails.
- Step 6: Identify the constraints and damage expectations of the identified targets.
- Step 7: Identify the desired numbers required for diplomatic interaction.
- Step 8: Identify and establish the team who will develop the policy which is the foundation that the national strategic deterrence plan.
- Step 9: The team will apply the targets held at risk should deterrence fail.
- Step 10: Present the information collected to the US Strategic Command (STRATCOM) for planning purposes.
- Step 11: Identify the number of weapons needed for reconstitution.

Methodology

The qualitative method was chosen to explore and understand each respondents understanding of the process. "The process of research involved emerging questions and procedures; collecting data in the participant setting; analyzing the data inductively, building from particular to general themes; and making interpretations of the meaning of the data. The qualitative approach sought to understand information provided by the respondents in the interviews and identify the understood steps in the process. The researcher identified presumed required steps for the research topic as a baseline. These steps were: 1) identifying targets, 2) identifying platforms required and 3) calculating the number of platforms and weapons required to meet the identified targets. This type of research is not numerically based and is created by conducting interviews which will allow the researcher to collect the data needed. During the study the potential data sources were thirteen senior military and political leader interviews.

Summary of Research

The research presented offers an opportunity to understand and investigate how the optimum level of nuclear weapons and delivery platforms could be reached in order to effectively provide US national deterrence to her adversaries, extended global deterrence to her allies and continue to lead against nuclear proliferation. The research explored what are some of the possibilities and ramifications if other non-nuclear capable countries see the decrease in US nuclear weapons as an incentive to develop their own nuclear capabilities as well as reviewed the presumed methodology utilized by the presidential administrations. The information presented in this study provides recommendations to establish the process used to develop the nuclear weapons calculation which has not been identified as part of a codified weapons calculation process. Others may have differing opinions which should drive further research and exploration. The researcher has met his expected final outcome of creating a better understanding of how best to arrive at the optimum number of nuclear weapons deployed.

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