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MASTER OF MILITARY STUDIES

**SETTING THE FUTURE COURSE OF THE UNITED STATES NUCLEAR
STOCKPILE THROUGH JUST WAR**

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF MILITARY STUDIES

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Executive Summary

Title: Setting The Future Course Of The United States Nuclear Stockpile Through Just War

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Thesis: An examination of the Just War Theory supports and requires that the U.S. nuclear stockpile, delivery systems, and triad be maintained and modernized, to include capability increases, and be targeted using a counterforce methodology in order for the U.S. to adhere to the Just War principles of Proportionality and Reasonable Chance of Success.

Discussion: The U.S. nuclear stockpile is facing many challenges in the near and long-term that must be addressed by U.S. policy. Decisions on these challenges must be founded in Just War Theory which is the long-standing basis for U.S. security policies. Four issues facing the U.S. nuclear arsenal are addressed in this examination. First, the viability of the long standing nuclear triad of bombers, intercontinental ballistic missiles, and submarines and the unique capabilities each portion brings has been challenged in a report by a commission chaired by the former Vice Chairman of the Joint Chiefs of Staff and co-authored by the newly confirmed Secretary of Defense. However, the changes to the current triad construct have implications to the Just War principle of Reasonable Chance of Success. Second, the nuclear weapons and infrastructure that support them are aging, and subsequently, they are declining in reliability which has direct impact on the Just War principle of Proportionality. Third, the weapon systems that deliver the weapons are aging as well and are in need of modernization and capability improvements in order to maintain viability. The status of the delivery systems impacts the both the principles of Proportionality and Reasonable Chance of Success. Finally, there is a debate whether the U.S. should utilize countervalue or counterforce targeting methodology. This decision also impacts the principles of Noncombatant Immunity and Proportionality. In order for the U.S. to continue to adhere to long standing international agreements and traditions, decisions on how to deal with all of these issues must be addressed by applying Just War Theory.

Conclusion: The triad must be retained in its current form of bombers, ICBMs, and submarines in order to retain the unique capabilities of each portion so that the balance in the Just War principle of Reasonable Chance of Success will not be upset. Second, the U.S. must maintain and modernize the nuclear weapons stockpile and the infrastructure, so that the U.S. adheres to the Just War principle of Proportionality. Third, the delivery systems must be modernized in a manner that increases capabilities. Finally, the nuclear stockpile must be employed using a counterforce methodology to ensure the U.S. does not violate Just War Theory principles of Noncombatant Immunity and Proportionality.

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Preface

To my beautiful wife, Monica, for motivating me through this project and keeping me focused on task. Without you, this would still be a blank sheet of paper. Also, to Lilly and Andrew who sacrifice so much and ask for so little so that I may be able to serve. Your perseverance through so much sacrifice is truly inspiration. Finally, to Dr. Rebecca Johnson, for formulating logic and coherence from my random thoughts.

“I state clearly and with conviction America's commitment to seek the peace and security of a world without nuclear weapons...This goal will not be reached quickly -- perhaps not in my lifetime.” – President Barack Obama, April 5, 2009.¹

“...deterrence is still fundamentally about influencing an actor's decisions. It is about a solid policy foundation. It is about credible capabilities.” Gen Robert Kehler, Commander, U.S. Strategic Command, May 30, 2012.²

The fact that nuclear weapons exist cannot be changed. The President of the United States won a Nobel Peace Prize largely for laying out his vision of a world without nuclear weapons. However, even during that landmark speech, he conceded that his vision of zero nuclear weapons will not happen in the near future.³ The question then becomes, how should the United States oversee its stockpile to ensure maximum safety and security of the country and the rest of the world? The future of the U.S. nuclear stockpile must be shepherded with great care because of the immense destructive power of these weapons can yield. That destructive power coupled with the lessons learned from Fat Man and Little Boy of what happens when these weapons are used on civilian targets necessitates decisions on the stewardship and employment of the stockpile be made with the utmost scrutiny, caution, and forethought.

The future of the U.S. nuclear stockpile and the weapon systems that deliver them is at a critical juncture. After Senate ratification of the New Strategic Arms Reduction Treaty (START) in December 2010,⁴ the U.S. has committed to limiting its deployed nuclear stockpile to 1550 warheads on 700 deployed delivery systems.⁵ In order to adhere to the treaty requirements and continue on the path the President outlined, the United States must develop and implement a well thought out and warranted plan regarding its nuclear policy. In order to do so justifiably, the vision must be developed within the scope of broadly accepted moral standards for conducting warfare. The Just War Theory provides the framework required to apply moral standards to U.S. nuclear policy and the future of the structure, maintenance, modernization, and targeting of the

U.S. nuclear arsenal. At a time when the U.S. government is scrutinizing every aspect of the Department of Defense to ensure proper allocation of resources, it is imperative that a thorough examination of the U.S. nuclear arsenal be conducted that accounts for the moral requirements of the U.S. rather than merely fiscal constraints. An examination of the Just War Theory applied to the U.S. nuclear arsenal supports and requires that the U.S. nuclear stockpile, delivery systems, and triad be maintained and modernized, to include capability increases, and be targeted using a counterforce methodology.

The United States adheres to the traditions of Just War Theory as its foundation for determining the acceptability of conducting military operations. Just War Theory is rooted in a long lineage that dates back to the medieval writings of St. Thomas Aquinas. Despite its foundation (and even some recent definitions) being based on religious writings, Just War Theory has gained nearly universally accepted norms through international agreements, conventions, and treaties.⁶ This examination will focus on two aspects of the Just War Theory: *Jus ad Bellum*: Justice in the Resort to War and *Jus in Bello*: Justice in the Conduct of War⁷ and principles of each as they apply to nuclear deterrence. This examination will also explore the moral responsibility of the United States with regards to the maintenance, modernization, and targeting of its nuclear stockpile and the issues facing the stockpile in the immediate future.

Addressing the Just War Theory to the Nuclear Stockpile

“At its best, Just War thinking holds back the sword.” – Peter S. Themes.⁸

Just War Theory applies to the guiding set of norms, principles, rules, and laws that “Justify and limit war.”⁹ In essence, Just War Theory is what all nations must adhere to when considering the moral justice of an armed conflict. Applying the Just War Theory to a stockpile of weapons and the force structure of their delivery systems may at first appear to be

inappropriate because a war by the traditional sense is not imminent or being conducted.

However, the first priority of nuclear weapons in the U.S. arsenal is to deter nations from nuclear aggression as well as assure allies that the United States will protect them from nuclear aggression.¹⁰ This can then be equated to a constant deterrence war being fought by nuclear-capable nations. John Langen went so far as to elevate nuclear deterrence to the same level as open warfare in the sense of Carl von Clausewitz's definition by stating, "The arms race, no less than war, is the continuation of politics by other means."¹¹ Therefore, the United States is fighting a deterrence war every day and has done so since the dropping of Fat Man and Little Boy. Making that point even more relevant is the fact that a major part of the nation's deterrent strategy is the ability to provide devastating strikes with alert-ready forces within minutes.¹² However, although positive control measures ensure nuclear weapons can only be executed by Presidential authority, the nuclear arsenal stands minutes away from war at all times if the need arises.¹³ It is, therefore, appropriate that the Just War Theory be applied to the U.S. nuclear stockpile and its alert readiness status. Temes claims that applying Just War Theory is especially relevant in the United States because it is a citizen's duty to "say no and yes" to war.¹⁴ U.S. citizens have rights not afforded everywhere, and it is their responsibility to ensure the state fights in accordance with Just War Theory. Therefore, the future of the U.S. nuclear arsenal must be shaped in accordance with Just War Theory.

U.S. Nuclear Stockpile and Delivery Systems Background

In order to develop a plan for the future of the U.S. nuclear arsenal based on Just War Theory, the current structure of the arsenal must be outlined. The outline of the arsenal begins with the most recent document that defines its structure, New START. It prescribes that both the U.S. and Russia will possess no more than 1550 warheads & 700 deployed delivery systems by

2017.¹⁵ At that time when the U.S. is in full compliance with the treaty, the U.S. will have 7 types of nuclear weapons in its active inventory, which is unchanged from today's structure. The weapons will consist of two bombs (the B-61 [in 4 modifications] and B-83), two Submarine Launched Ballistic Missile (SLBM) warheads (W-76 and W-88), two Intercontinental Ballistic Missile (ICBM) warheads (W-78 and W-88), and one cruise missile warhead (W-80).¹⁶

Not only are the weapons intricate to the U.S. nuclear arsenal, but the makeup of the triad is as well. Just War Theory must also drive decisions for the future of the delivery systems. To deliver the warheads, the U.S. will continue to employ, as it currently does, four weapons delivery systems that make up the three legs of the U.S. nuclear triad: the B-52H and B-2 bombers, the Minuteman III ICBM, and the Ohio Class Submarine that uses the Trident D5 SLBM. In order to apply Just War Theory to the delivery systems, the characteristics, capabilities and limitations of each leg of the triad must also be outlined. The land-based leg, ICBMs, is responsive in that they can be retargeted and launched the most quickly of the three legs, but the drawback of ICBMs is that they are located in known, fixed locations and a large portion of them are expected to be destroyed in a massive nuclear first strike. Additionally, ICBMs cannot be recalled once they have been launched. The sea-based leg, submarines, are considered the most survivable leg because they operate nearly undetectable in the ocean, but they are not as responsive as ICBMs nor can they be recalled once the missiles have been launched. The final leg of the triad, bombers, offer the greatest flexibility in that they can be recalled after they are launched in addition to the ability to change targets mid-flight. Their drawback is that they have a much longer "launch to impact" time, and they are vulnerable to a surprise attack while they are still on the ground.¹⁷ How these benefits and drawbacks apply to

Just War Theory must be weighed in determining the future makeup of the delivery system structure.

Decision Points for the U.S. Nuclear Stockpile

There are four major issues facing the U.S. nuclear stockpile that have or will soon reach decision points that need to be addressed using Just War Theory. They are 1) whether to retain the U.S. nuclear triad in its current construct or restructure it and its readiness status, 2) aging of the weapons stockpile and infrastructure, 3) aging and capability of the nuclear delivery weapon systems, and 4) the nuclear targeting methodology and the number of weapons required. All four of these issues are at a point where the U.S. is going to make a decision on how to address each one for the future. For each decision point, the background will first be explored, and then Just War theory will be applied in order to determine the best course of action.

The U.S. Nuclear Triad

The nuclear age of warfare was born in August 1945 with the U.S. attacks on Hiroshima and Nagasaki. Since then, alert-ready nuclear forces have served throughout the Cold War and beyond to today. The U.S. nuclear triad has existed in its current form of bombers, ICBMs, and submarines since 1960.¹⁸ Of the three legs of the triad, only the bomber portion is not in a day-to-day alert-ready status. Bombers were taken off alert-ready status in 1991, but retain the capability to regenerate.¹⁹ The triad has served peacefully thorough the ebbs and flows of tensions between the U.S. and Soviet Union/Russia.

The current structure of the U.S. Nuclear triad faces potential changes. In particular, a strong case is made for eliminating nuclear ICBMs from the force structure. The reasons for this are varied. The first justification of cutting ICBMs is the pragmatic rationale of the money saved by eliminating them. At a time when budgets are shrinking and every U.S. government dollar

spent becomes more precious, it may seem prudent to eliminate ICBMs. As outlined by former Secretary of Defense Leon Panetta, the DoD could save \$8 billion if ICBMs alone were removed from the United States' inventory.²⁰ This is just the cost to the DoD. It does not include costs the DOE would save by no longer having to provide and maintain the warheads.

Another justification for the elimination of ICBMs is the theorized increased risk in accidental or inadvertent detonation of a nuclear weapon that ICBMs inherently bring. The Global Zero organization released a commission report chaired by a former commander of U.S. Strategic Command and Vice Chairman of the Joint Chiefs of Staff, Gen (ret) James Cartwright, and co-authored by the current Secretary of Defense Chuck Hagel that makes this claim.²¹ The report claims the benefit of ICBMs' responsiveness is the very reason why they should be eliminated. Today's nuclear forces are postured in a status ready to respond to Presidential orders within minutes. The report goes on to state that the Cold War construct of ICBMs in "launch-ready postures" creates an environment that could potentially lead to the President of the United States having mere minutes to make a decision on whether to authorize a nuclear response.²² The Global Zero report claims that the launch-ready status is potentially destabilizing because it creates an atmosphere where a "...miscalculation, mistake, false warning, bad judgment or unauthorized action..." could force both the United States and Russia to make split-second decisions on whether or not execute nuclear weapons.²³ This responsiveness creates a potentially moral dilemma that could be catastrophic because leaders in control of these forces could be faced with a situation where they may feel compelled to execute nuclear forces on a very short timeline with incomplete information.

The commission proposes a change in the alert status of U.S. nuclear weapons in order to mitigate these potentially negative aspects. The report advocates for the forces in ready status be

“...stood down and aligned with current U.S.-Russian relationship.”²⁴ The commission’s theory is that mutually reducing the responsiveness of nuclear forces would allow for a rational discussion between nations before hasty, ill-informed decisions could be made. In order to maintain current levels of deterrence, the Global Zero report recommends instituting a conventional ICBM force in place of nuclear-armed missiles and states that a robust conventional force is a stronger deterrent against regional threats. The commission also claims that “Precision-guided conventional munitions hold at risk nearly the entire spectrum of potential targets, and they are useable.”²⁵ This would be a dramatic shift to the long-standing U.S. policy of nuclear deterrence. Because of the influence of the high profile authors within the DoD and beyond, the report’s recommendation on the change to the nuclear triad must be explored responsibly using Just War Theory.

Changes to the nuclear triad and force readiness have a direct impact on the *Jus ad Bellum* principle of “Reasonable Chance of Success.”²⁶ The requirement for the principle of Reasonable Chance of Success is that a nation cannot fight an armed conflict if it is futile to do so.²⁷ The current structure of the U.S. nuclear triad balances flexibility, response time, and vulnerability against other nuclear armed nations. The changes proposed to the nuclear triad and force readiness create an imbalance in the nuclear deterrence between the U.S. and the other nuclear nations because the U.S. can no longer match the responsiveness and survivability of the other nations. The proposed changes decrease the United States’ reasonable chance of success, thus creating an imbalance. As over 60 years of nuclear deterrence has demonstrated, the balanced capabilities created by the triad have provided a stable nuclear deterrence environment.

An imbalance in the stability of nuclear capabilities will increased the possibility of a nation using nuclear weapons. This is the theory commonly known as Mutual Assured

Destruction. The triad is critical to this because it hedges against all forms of aggression, thus making an attack futile. Former Secretary of Defense Robert McNamara stated, "...the balance is the understanding that if either side initiates the use of nuclear weapons, the other side will respond with sufficient power to inflict unacceptable damage...It's not mad, it's logical."²⁸ The resoluteness, robustness, and ability of the triad to retaliate after any form of attack ensure there is no circumstance in which a nation can justify a nuclear war; therefore, any potential nuclear conflict is rendered futile.

This proper balance of the Just War principle of Reasonable Chance of Success must take into account all current and future nations which the U.S. needs to deter from nuclear aggression. Those are nations that have the capability and the will to do harm to the U.S. through the use of nuclear weapons. The Global Zero report's assessments are all predicated on the notion that "Russia and China are not enemies of the United States."²⁹ While that statement can certainly be supported, it could also have easily been made in 1945, just before the onset of the most massive arms race in history. Because of such generalized logic of the future political landscape, calls have been made for the elimination of the ICBM leg and either elimination or reduction of the bomber leg.³⁰ It is fortunate that the nation did not then base its future defense decisions on broad optimistic statements such as that. Gen Robert Kehler, Commander U.S. Strategic Command has stated that all three portions of the triad are a military necessity to, among other things, "...hedge against technical failure or geopolitical change." All three legs of the triad must remain intact in order to provide the assurance of the capability to respond to nuclear aggressors and retain proper balance to the principle of Reasonable Chance of Success.

It might be possible to make the proposed cuts to the triad and retain a balance in the principle of Reasonable Chance of Success if it were a bilateral situation only. However, there

are eight declared nuclear-capable nations, and more on the verge of becoming so.³¹ Nations such as North Korea and Iran are investing massive amounts of resources into the development of ballistic missiles capable of delivering nuclear warheads.³² Both nations have shown a determined propensity to thwart international non-proliferation efforts, to the point of incurring harsh international sanctions.³³ Should nations develop and acquire ballistic missile technology and the U.S. simultaneously eliminate it from its arsenal, it could very well create an imbalance in deterrence enough to the point where a nation may feel a potential nuclear war is in fact not futile, but rather, it is winnable.

Additionally, eliminating one or more portions of the triad greatly increases the risk to the U.S. nuclear deterrent itself which only goes further to imbalance the principle of Reasonable Chance of Success. The current U.S. ICBM fleet consists of 450 Minuteman III missiles. In order for an aggressor to remove this nuclear deterrent, that actor would have to strike 450 geographically separated targets nearly simultaneously.³⁴ These are 450 targets that are some of the most hardened and secure in the world. This is not something that could be accomplished with any conceivable conventional force that exists today or in the near- to mid-term. By contrast, the bombers assigned to the nuclear triad are currently assigned to only three home bases.³⁵ This makes them extremely vulnerable to a surprise conventional or terrorist attack, let alone a “bolt out of the blue” nuclear attack.

The final leg of the nuclear triad, submarines, is the most survivable portion of the triad today.³⁶ While the fleet of Ohio Class submarines currently has a technological advantage that allows almost complete freedom of movement under the sea, this may not always be the case. China, for example is making large strides in the field of anti-submarine warfare. In 2006, a RAND security review commission of China found that “its anti-submarine warfare technology

is weak.”³⁷ However, in an assessment of anti-submarine warfare capabilities in Asia, Defence Review Asia countered that “China’s focus on developing advanced submarine technology has many of its neighbours (sic)...readdressing their own ability to face submarine aggression.”³⁸ The U.S. currently holds a large technical advantage, but the U.S. would be inducing a great amount of risk to assume that it will always be the case. The triad, as Gen Kehler stated, is required to protect the U.S. against technological threats. This is another example of how eliminating portions of the triad could very well create a “winnable” situation in the eyes of a nuclear aggressor, and one in which the U.S. is engaged in a futile cause.

The same logic of creating a situation with a reasonable chance of success holds true for advocates of replacing elements of nuclear deterrence with a more robust conventional deterrent. The fault in the logic of replacing nuclear forces with conventional ones is that it assumes equal deterrence value of a conventional strike to a nuclear strike. This is a faulty correlation. First, a nuclear strike on the same target will be exponentially more damaging than a conventional one. Second, a precision-guided conventional strike of hundreds of weapons in itself does not have the capability to provide an existential threat. However, a mere handful of nuclear weapons can. Therefore, the deterrence value of a nuclear weapon is much higher than that of a precision-guided conventional force. A precision-guided conventional force does not solely have the capability to render a conflict “unwinnable.” There must be a credible nuclear deterrent to back it up. Yet another example of how all three nuclear legs of the triad is required to maintain the balance of Reasonable Chance of Success at an unacceptable level.

The multi-national deterrence and assurance requirement of the United States necessitates the nuclear triad be retained in its current form. Eliminating any portion of the nuclear triad and the deterrence value it provides will create an imbalance of strike capability and reprisal that

could create a scenario where a nation determines it has a high reasonable chance of success. Thus, Just War Theory necessitates the triad remain intact to provide the required deterrence. The status quo in regards to the U.S. nuclear arsenal structure is just the start to meeting Just War requirements.

Aging Weapons and Infrastructure

“Weapons of mass destruction are particularly horrific threats because they endanger not only our present population, but the people and environment of the future.” – Eric Patterson.³⁹

Patterson rightly makes the case that particular care must be taken in applying the principle of Proportionality to nuclear weapons because of the lasting devastation they can potentially bring.⁴⁰ The principle of Proportionality is unique in that it applies to both *Jus ad Bellum* and *Jus in Bello*. The principle that applies to the aging of the weapons and infrastructure ultimately is manifested in *Jus in Bello*. This principle states “...efforts must be made to attain military objectives with no more force than is militarily necessary and to avoid disproportionate collateral damage to civilian life and property...”⁴¹ It is important to note that the argument that morality and Just War Theory do not apply to nuclear weapons does not hold up because, even in the event where survival is at stake, it is the state’s responsibility to conduct any war by appropriately applying Proportionality in order to ensure the world that survives is one that is livable.⁴² In the case of nuclear weapons, how well the weapons are maintained has a direct impact on how they are employed. As will be outlined, the U.S. must take significant action to maintain and modernize its nuclear weapons to increase the reliability and decrease the yield of weapons, along with the requisite support infrastructure, in order to comply with the Just War Theory principle of Proportionality requirements. Maintaining and modernizing the

weapons allow fewer weapons with lower yields to be used to provide deterrence, and therefore, minimize noncombatant casualties to the maximum extent possible.

The U.S. stockpile of nuclear weapons and the infrastructure used to support them are atrophying at an alarming rate. The newest warhead was manufactured 25 years ago in 1988. Most of the warheads in the current stockpile were produced between 1979 and 1988, making the average warhead 28-30 years old.⁴³ The ever-increasing age of the stockpile is causing a great deal of consternation because of the effects it has on the warheads' reliability to perform as required.⁴⁴ Weapons that have low reliability have two negative impacts. First, the ability of the U.S. to provide dependable nuclear deterrence is greatly diminished. This is akin to being uncertain if a gun will fire as needed when the trigger is pulled. Second, the likelihood that a weapon will function and therefore, destroy its target is decreased. As a result, additional weapons need to be allocated in order to ensure destruction of a target.

Aging concerns of warheads are something the Department of Energy (DOE) and Department of Defense (DoD) did not previously have to be concerned with. In the early years of nuclear weapons development, warheads were generally replaced with a new design and/or modification before aging effects (natural atrophy and degradation of performance as weapons sit unused) were an issue.⁴⁵ Therefore, aging concerns were not a major factor when the warheads were designed. Aging effects on the current warheads forced the DOE and DoD to undergo and seek funding for a very costly Life Extension Program (LEP) for the warheads. Six of the seven warheads in the current stockpile are either currently undergoing an LEP or will require one in the immediate future.⁴⁶

The W-76 warhead is a typical example of the LEP required for the current stockpile and the many challenges facing it. The W-76 was originally deployed by the U.S. Navy in 1978, and

was designed for a service life of 20 years.⁴⁷ However, because the U.S. shifted its policy from replacing nuclear warheads to maintaining them, the W-76 required an LEP if it was to remain in service.⁴⁸ A major challenge facing the W-76 LEP was the refurbishment of a material called “Fogbank” that the DOE complex had stopped manufacturing. Almost immediately, the DOE found that reproducing Fogbank was much more difficult than they first planned.⁴⁹ Poor recordkeeping of the original manufacturing process exacerbated the effort. Eventually, after many trials and errors and over a year past the original deadline, the DOE managed to adequately reproduce the material. However, they only did so after a significant delay and additional costs of approximately \$92 million.⁵⁰ This is but one example of the challenges facing the DOE and as nuclear weapons provide service well beyond the timeframe originally designed.

At the core of the problem with the W-76 was the atrophy and loss of critical infrastructure to the Nuclear Weapons Complex. The Nuclear Weapons Complex is responsible for the cradle-to-grave stewardship of U.S. nuclear weapons, and without it, the U.S. could not maintain an effective nuclear arsenal. At its zenith in the early 1960s, the Nuclear Weapons Complex consisted of 21 facilities across the nation. Today, that number is down to eight. Many of the facilities that are no longer in operation are those associated with the production of weapons-grade Uranium and Plutonium which was discontinued. Additionally, the DOE underwent a series of process consolidations at its facilities in order to reduce costs.⁵¹ As the example of the Fogbank production highlighted, the consequences of such downsizing have cost the DOE a great deal in capability. Whereas the nuclear weapons face aging and capability issues, so too do the weapons systems that are designed to deliver them.

It is clear that the U.S. stockpile of nuclear weapons is in need of maintenance in order to remain safe and reliable. However, when appropriately applied, Proportionality requires that

simply maintaining the weapons in the stockpile is not sufficient. Two objectives should be sought for the nuclear weapons stockpile: 1) retain and/or increase reliability, and 2) modernize weapons to increase service life and adjust yield to appropriate levels. These should be done in order to continue to provide a credible deterrent with as few weapons as possible while at the same time reducing the yield of the weapons so as to cause much less collateral damage. In order to accomplish the maintenance and modernization required to meet Proportionality requirements, the Nuclear Weapons Complex infrastructure needed to accomplish these changes must be funded and modernization.

As stated previously, the weapons in the current stockpile were not intended to incur the length of service they have already provided. Gen Kehler has stated that he has a greater concern over the investment of national resources in maintaining the weapons, specifically those in need of refurbishment, than he does investing in the delivery systems.⁵² Therefore, refurbishing the weapons so that they can continue to provide credible deterrence and assurance must be done.

As the weapons undergo refurbishment, the yield they provide should be adjusted in order to meet current targeting requirements and Just War principles. Table 1 is a list of the weapons in the current stockpile and the yields of the weapons as identified by Jane's. To give perspective on the size of the weapons in the inventory, the weapon dropped on Hiroshima (Little Boy) had a yield of 15-16 kilotons.⁵³ The weapons in the current stockpile provide a yield ranging from *5 to 80 times* that of Little Boy. This provides a great deal of room to lower the yields of the current stockpile. A weapon with a higher yield will correspondingly cause a great deal more collateral damage. Therefore, in order to adhere to the Just War principle of Proportionality, the yields must be reduced to the lowest level possible while still providing a

credible deterrent. This will limit the amount of collateral damage below that which is currently incurred. However, lowering the yields cannot be the only action taken.

Table 1. Nuclear Weapons Inventory⁵⁴

Warhead	Delivery Platform	Production Date	Yield (kilotons)
B-61	Bomber	1979-1997 (numerous modifications)	10-500*
B-83	Bomber	1983	1000-2000*
W-76	Submarine	1978	100
W-78	ICBM	1979	335-350
W-80	Bomber	1981	200*
W-87	ICBM	1986	300-475
W-88	Submarine	1988	475

*Multiple yields

It will not be possible to provide the refurbishments and modernizations to reliably lower yields of the weapons prescribed above without major investments in the Nuclear Weapons Complex infrastructure. As the case of the LEP of the W-76 warhead demonstrated, the infrastructure is in dire need of resources and attention. That is but one case of a litany of facilities that need addressing. Again, the military leader of the U.S. nuclear arsenal, Gen Kehler provides insight into the criticality of the investment in the infrastructure. In his opinion, “I am most concerned that we make sure that we have the appropriate investment in place for the weapons complexes.”⁵⁵ Additionally, the 2010 Nuclear Posture Review called for a modernization and a “highly capable” workforce to support the U.S. nuclear stockpile.⁵⁶ The President and Congress have demonstrated their agreement by increasing funding in 2010 for this very purpose.⁵⁷ Investments in weapon refurbishments and modernization along with an equal investment in the complex that provides and maintains the weapons are required in order for the U.S. to meet the Just War principle of Proportionality in regards to providing strategic

nuclear deterrence. However, merely maintaining and modernizing the weapons alone is not enough to meet Just War requirements

Nuclear Delivery Systems' Aging and Capabilities

Increasing the reliability of the weapons and lowering yields does not go far enough in meeting Just War Theory requirements. The U.S. must also modernize the weapon systems that deliver nuclear weapons. This is applicable to all three legs of the triad, and will likely be the highest cost of any of the recommendations. Modernizing the delivery systems goes hand-in-hand with maintaining and modernizing weapons and will meet the intent of the *Jus in Bello* principle of Proportionality because the weapons' yields cannot be lowered without increasing the capabilities of the delivery systems. When the explosive power of the weapons is decreased (as is required by Proportionality), the probability of the weapon arriving at the intended target must be increased. This is done by increasing the accuracy of the weapon systems.

Additionally, modernizing the delivery systems will continue to maintain a proper balance in the principle of Reasonable Chance of Success. As the delivery systems are modernized, they will retain their characteristics that complete the nuclear triad.

All of the weapon systems require major modifications and upgrades to maintain their capability to safely and securely provide nuclear deterrence. One example is a replacement for the Air-launched Cruise Missile. According to the DoD Fiscal Year 2011 President's Budget, "The current system is experiencing obsolescence of parts/components."⁵⁸ This has resulted in a weapon system that is not able to meet DoD requirements. In order to replace this, the DoD has requested \$800 million dollars in funding through the year 2015 to ensure it has an effective weapon.⁵⁹ This is but one example of the high cost associated with modernization of nuclear delivery systems.

Additionally, the submarine leg of the triad is in need of a major upgrade. While the Ohio Class Submarine has performed admirably, it has been in operational service since 1981. The current expectation is that it will be in service until 2032, making a total of 51 years' service.⁶⁰ In order to remain effective and credible, the submarine leg of the triad must be modernized to meet emerging threats and capabilities of potential nuclear aggressors. The DoD has developed a plan to replace the existing fleet of Ohio Class submarines. The total cost of the replacement project is expected to be approximately \$85 billion.⁶¹ This is another example of the costs of providing a safe, secure, reliable, and effective strategic deterrent.

By remaining proportionate, the triad modernization program must include the objective to increase the accuracy of the delivery systems. This is an absolutely essential requirement in order to achieve the objective for the weapons stockpile of reducing yield in order to minimize noncombatant casualties to the maximum extent possible. Increasing the accuracy of the delivery system has a beneficial domino effect. When the accuracy is increased, the amount of firepower required to ensure a target is destroyed is reduced. This is analogous the thousand-sortie bomber raids used in World War II to destroy factories. Such numbers were required because the accuracy of the delivery systems were so poor. As a result, noncombatant casualties were at rates that are almost incomprehensible today. The same targets could be destroyed with a handful of modern precision-guided munitions dropped from a single aircraft. The combination of increasing accuracy and decreasing yield directly meets the requirements of Proportionality. This increase in capability will allow nuclear planners to minimize the amount of noncombatant casualties to a scale previously unreachable due to the size of the weapons and accuracy of the delivery systems.

Increasing the accuracy is a natural step in modernizing the delivery systems. The accuracy of the current nuclear delivery systems is based on technology developed during the nineties, eighties, or in the case of the Minuteman III ICBM, the seventies. The Minuteman III guidance system recently completed an upgrade to its entire fleet; however, the purpose of the upgrade was implemented to specifically “...increase the reliability and nuclear safety of the Minuteman III weapon system.”⁶² An increase in accuracy was nowhere in the requirements or desire for the upgrade. For its guidance both in flight and while on ground alert, the Minuteman III currently uses an assembly comprised of six electro-mechanic gyroscopes. The gyroscope assemblies in the upgraded systems use the very same physical gyroscopes that were used in the previous system. These are not new manufactures of the same design; they are literally *the same* assemblies. They were removed from the old guidance systems and placed in the upgrades.⁶³ The result is that accuracy of the Minuteman III is the same as it has been for nearly forty years. Similar cases can be made for each of the nuclear delivery systems in the triad.

Improving the accuracy of delivery systems is only the beginning. The United States must allocate resources in order to upgrade and modernize aging and/or obsolete components. Without such upgrades, the reliability of the systems to reach their designated targets will be greatly diminished. Eventually, it will be diminished to the point where it will no longer be a credible nuclear deterrent. Such is the case with the submarine portion of the triad. As described earlier, other nations are attempting to eliminate the technological edge the United States holds in order to assure survivability of its fleet. If a portion of the triad is no longer a credible deterrent, it will have the same effect on the principle of Reasonable Chance of Success as it would to eliminate one. Again, this runs the risk of an aggressor being in the position where a nuclear attack is not a futile effort.

Increasing accuracy and retaining required system capability comes at a very high cost to the taxpayer. This comes at a time of fiscal austerity not seen in the DoD for decades. The DoD already has planned for cuts in defense spending in the next decade for up to \$487 billion.⁶⁴ On the surface, it seems as though funding for the U.S. nuclear arsenal should be decreased in order to achieve savings. However, the contrary is just the case. At a time when the DoD is undergoing a shrinking budget and reducing the size of the conventional force, the nuclear deterrent will become even more crucial to the Nation's defense. As the nation becomes more reliant on its nuclear deterrent, it is vital that it maintain and modernize its delivery system in accordance with Just War Theory. Not only must the structure, weapons, and delivery systems of the nuclear arsenal be in keeping with Just War Theory, the targeting methodology must also strictly adhere to Just War Theory.

Countervalue vs. Counterforce Targeting

“Rule 18. Each party to the conflict must do everything feasible to assess whether the attack may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated.” – International Committee of the Red Cross, Customary International Humanitarian Law: Rules, Vol 1⁶⁵

The most directly applicable issue to Just War regarding the U.S. nuclear deterrent is that of countervalue vs. counterforce targeting. The first and most obviously applicable principle is the *Jus in Bello* principle of Noncombatant Immunity that states, “civilians may not be the object of direct attack, and military personnel must take due care to avoid and minimize indirect harm to civilians.”⁶⁶ The deaths of civilians are justified only if they are unavoidable victims of a legitimate attack on a military target.⁶⁷ The *Jus in Bello* principle of Proportionality described above is also directly applicable in regards to nuclear weapons targeting in that noncombatants must never be the intended target of U.S. nuclear weapons.⁶⁸

How to best target nuclear weapons against is a debate that has only one acceptable answer under Just War Theory. There are two targeting methods for nuclear weapons employment. The first is referred to as “countervalue.” Utilizing countervalue is when nuclear planners assign weapons against targets that are assessed to be highly valued by a nation. These can be targets such as key cities, resources, and/or infrastructure critical to the nation’s domestic and economic well-being. Namely, they are not targets of pure military value. The theory of countervalue is premised on the fact that because those assets and locations the nation values the most are held at risk, the deterrence factor of each weapon is increased.⁶⁹ Another benefit of theory of countervalue targeting is that fewer weapons are required to provide a deterrent effect. This allows nations to lower the cost and infrastructure required to maintain a nuclear force. The main drawback, however, is the fact that countervalue typically deliberately targets locations of mass civilian populations.

The second form of nuclear weapons targeting is referred to as “counterforce.” Unlike countervalue, counterforce targets are selected because they are reciprocal, military targets. In other words, nuclear bombers would be targeted against facilities that support either an aggressor’s nuclear strike or military capability. The benefit of counterforce targeting is that the intentions of the nuclear planning are to hold viable military and nuclear force targets at risk. A downside is that counterforce targeting usually requires a larger number of weapons.⁷⁰ More warheads are required because there are a greater number of military and nuclear targets to hold at risk than there are targets of “value.”

In nearly every military action, there is the possibility of noncombatant casualties. This is understood, and Just War Theory addresses this through the requirement to make every effort to avoid noncombatant casualties. It is accepted that at times such as when a military command

and control bunker is located under a civilian office building, noncombatant casualties are unavoidable. However, a direct correlation cannot be made to nuclear weapons because of the immense destructive power and residual effects from radiation and fallout.⁷¹ Almost without exception, countervalue targeting of nuclear weapons necessitates that a very high proportion of expected casualties will deliberately be noncombatants. That means that countervalue targeting of nuclear weapons seeks to achieve deterrence through holding noncombatants at risk. This is a strictly terror-based strategy that violates the principles of Just War in every way imaginable. It cannot be justified as a pre-planned means of nuclear deterrence.

In contrast, counterforce targeting limits its targeting to warfighting forces and support capabilities. The vast majority of nuclear counterforce targeting would be applied to that of other nations' nuclear strike forces. A large portion of those forces are ICBM fields and other attack forces located in rather remote areas. While there will certainly be noncombatant casualties in strikes on those remote sites, the number will be vastly lower than if strikes were conducted solely against large metropolitan areas. Additionally, counterforce targeting does not preclude the targeting of areas with large civilian populations. However, it necessitates minimizing the casualties vice maximizing them. It is the difference between targeting the Kremlin with a 20 kiloton weapon and targeting St. Basil's Cathedral with a 10 megaton weapon. Counterforce seeks to destroy a viable military target with the least amount of casualties while countervalue seeks to terrorize a population.

In addition to minimizing noncombatant casualties, counterforce targeting is more advantageous in that it provides a much more credible nuclear deterrent. A weapon that an aggressor does not believe will be used has no deterrent value. This is what the U.S. nuclear arsenal is reduced to when a countervalue strategy is applied to it. This is because it is hard to

imagine a scenario in which the leader of a nation would approve an attack on a countervalue target. The only leader to do so was President Harry Truman. When he authorized the attacks, he sanctioned two strikes that killed over 100,000 noncombatants. However, those strikes were what ultimately drove the end to a World War that caused an estimated 50 million casualties.⁷² Even with this justification, Truman's decision to drop the weapons on Hiroshima and Nagasaki is still very much debated. Conversely, counterforce application provides a very credible nuclear deterrent. Counterforce provides leaders options which are based on a strategy that seeks to apply Just War to the maximum extent possible. This is the reason counterforce provides a credible nuclear deterrent. This deterrent is born out of aggressors' belief that there are possibilities in which nuclear weapons may be used and that threat influences their actions. This is the fundamental requirement of providing a deterrent, and it is achieved through in a manner consistent with Just War Theory.

The concern of how many weapons are required is a natural result of any discussion of the future of the U.S. nuclear stockpile. As stated, New START allows for a maximum of 1550 weapons, but there is nothing to preclude either the U.S. or Russia from going lower than that. The question then becomes how low can the U.S. go and maintain a credible deterrent? There are a number of advocates for specific numbers. Global Zero professes the U.S. can provide a credible deterrent by reducing its stockpile to 900 warheads over the next 10 years.⁷³ An article from *Strategic Studies Quarterly* claims that the appropriate number is 311 using a mixture of countervalue and counterforce targeting methodology.⁷⁴ The final amount of warheads required is not a fixed, magical number, nor should it be claimed as such. The appropriate number of weapons required is one that will ebb and flow with the changing security environment. To point to a number and claim that it is the definitive answer to nuclear deterrence is naïve and

irresponsible because it creates a nuclear arsenal with very limited flexibility to meet evolving security requirements. What is fixed and rigid is the methodology the number required should be based on; that methodology should be solely based on the military necessity to strike and defeat enemies using counterforce targeting. It should be threat-based and constantly assessed and adjusted accordingly with the flexibility to either increase (up to treaty limits) or decrease as required base on military necessity. This allows for a targeting methodology that can meet both security and Just War Theory requirements because it gives U.S. nuclear planners the flexibility and capability to meet threats.

Conclusion

Nuclear weapons are going to be around for the foreseeable future. No matter how desirable to do so, they cannot be wished away. While they exist and while nations that could potentially harm the United States possess them, the United States must continue to field a credible deterrent. The President stated as much in the very same speech in which he outlined his vision for a world without them.⁷⁵ The U.S. nuclear deterrent that will exist for the foreseeable future must be structured in a manner founded in Just War Theory. Failing to do so violates the basic principles the U.S. military and political strategy is based upon.

In order to structure the nuclear force based on Just War, a number of steps must be taken. First, the triad must be retained in its current form of bombers, ICBMs, and submarines. All three portions are necessary in order to provide deterrence against any current or potential nuclear aggressor. This will maintain the balance in the Just War principle of Reasonable Chance of Success that has existed since the triad's inception in 1960. Second, the U.S. must maintain and modernize the nuclear weapons stockpile and the infrastructure which supports it. This is required to maintain a credible nuclear threat. Additionally, this is required in order to

reduce the yield of as many weapons as possible while still meeting military requirements and meeting the Just War principle of Proportionality. Reductions in yield can only be achieved if they are coupled with the third requirement, modernization of the delivery systems. Specifically, the accuracy of the delivery systems must be increased so that the weapon yields can be lowered. This two-pronged modernization will allow for the reduction of noncombatant casualties while still achieving military objectives. Also, the modernization effort must also ensure that it maintains the attributes that is required of each portion of the triad to retain the balance of Reasonable Chance of Success. Finally, the nuclear stockpile must be employed using a counterforce methodology. This will ensure the U.S. does not violate Just War Theory principles of Noncombatant Immunity and Proportionality by deliberately targeting noncombatants in order to provide nuclear deterrence. Additionally, the number of warheads in the stockpile should be flexible based on assessments of military national security requirements. The numbers cannot be arbitrarily arrived at and inflexible.

The issues facing the U.S. nuclear stockpile are many and complex. Additionally, there is no easy solution that will satisfy all parties involved. However, by basing the future of the U.S. nuclear stockpile on the foundation of Just War, logical and defensible solutions are attained vice those that are arbitrary and idealistic.

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