AU/ACSC/Giacomazza/AY10

AIR COMMAND AND STAFF COLLEGE

AIR UNIVERSITY

The United States and the Future of its Nuclear Arsenal

by

Daniel R. Giacomazza Major, USAF

A Research Report Submitted to the Faculty

In Partial Fulfillment of the Graduation Requirements

Advisor: Dr. Charles R. Costanzo

Maxwell Air Force Base, Alabama

April 2010

Disclaimer

Contents

Introduction

The Cold War ended somewhere in the early 1990s. Although historians will debate on what event officially marked the end of the Cold War, the exact date is not as important as what the end of the Cold War meant to the nations who possessed nuclear weapons. For many people it meant that they were finally free from the fear of nuclear war and the nuclear weapons that had protected them now seemed unnecessary. This belief can be seen in the United States nuclear weapons program as it has fallen into a state of hibernation since the end of the Cold War, when the United States began the practice of extending the lifespan of its aging nuclear weapons rather than building new ones. The same cannot be said for the other nuclear powers. Take a quick look around the world and you will see that the other nuclear powers are continuing to modernize their nuclear arsenals, and the list of nations striving for their own nuclear weapons programs is growing. The emergence of North Korea's nuclear capabilities and the impending advancement of Iran onto the nuclear scene have demonstrated that the Cold War may be over, but nuclear weapons still play an important role in international security. The United States must recognize that as long as other nations place great value in their nuclear weapons, it must do the same. Even when considering arms reduction treaties, the US should negotiate from a position of power. As current US nuclear weapon systems continue to age they will eventually no longer provide that power or a credible deterrence. Failing to modernize our aging nuclear arsenal, weakens our long term deterrence and may even lead to greater nuclear proliferation as our allies no longer feel protected by extended deterrence and engage in nuclear programs of their own.

The Current Force

In 2007 the United States Air Force and the Department of Defense (DoD) were embarrassed by revealing of the fact that the nuclear mission had been neglected for decades.

The unauthorized movement of nuclear weapons demonstrated to the military that nuclear weapons demand constant attention even when they appear to be less important. The end of the Cold War caused a loss of emphasis that allowed the nuclear mission to fade into the background. The numerous reports that have been published since 2007 have pointed to a great deal of factors, the greatest being a loss of focus.[1] The DoD has spent the better part of two years reinvigorating its nuclear mission. The lesson has been a painful one for all involved, but our military has learned that neglecting nuclear weapons is a very dangerous course of action. However while many of the training and procedural issues are being addressed, the actual weapon systems and delivery vehicles are still being handled with the same mindset. Instead of creating newer weapons the United States is focused on making the older weapons viable through life extension programs. The very talk of modernizing our nuclear arsenal brings about an emotional argument on both sides. The nuclear arsenal is still viewed by many as an unnecessary relic of the Cold War. There are more and more voices in the United States calling for the abolishment of nuclear weapons. Why this appears to be a very just cause, the United States must thoroughly examine the effects of allowing its nuclear arsenal to age with no replacement plans.

The Air Force nuclear arsenal today consists of Intercontinental Ballistic Missiles (ICBMs), strategic bombers and the weapons and warheads associated with each. The newest of these assets is the B-2. The B-2 was first seen in the late 1980s.[2] It has been in service for over 16 years. Although there are only 20 B-2s in the Air Force today, they still play an important role in our nuclear deterrence by providing a recallable nuclear option. Armed with the B-61, a gravity bomb fielded in 1960s, and the newer B-83, the B-2 was designed to deliver nuclear weapons over highly defended targets.[3] Despite its modern technology, the B-2 has two major

limitations; the lack of a nuclear standoff capability and the high cost has limited the number aircraft produced.

The B-52 is the other half of our nuclear bomber fleet. Designed in the early 1950's the B-52 is a tribute to its builders and symbol of decay in the nuclear enterprise. The fact that an aircraft designed almost 60 years still plays a major role in the US nuclear arsenal demonstrates the neglect that the arsenal has suffered since the end of the Cold War. The Air Force fielded numerous bombers during the Cold War, that were designed to replace the B-52, and yet none have been able to. Even the B-2 has proven to be too expensive to fully replace the B-52 fleet. Instead, the two are now partners in the delicate task of balancing the nuclear and conventional missions. Thankfully the B-52 was so well designed that it still plays a valuable in the nuclear arsenal. The addition of Air Launched Cruise Missile (ALCM) in 1977 has extended the viability of the platform, but both the B-52 and ALCM are aging.[4] The ALCM is over 30 years old as well as its warhead. At some point, relatively soon, both the B-52 and the ALCM will need to be replaced.

The state of US ICBM fleet is not much different. First fielded in 1960s the Minuteman III (MM III) is the sole surviving ICBM.[5] Similar to the B-52 the MM III has outlived more modern weapon systems meant to replace it. Recently there has been a great deal of work on the MM III to extend its lifespan. The MM III program has been closely monitored and was expected to last until 2020.[6] Now an additional ten year extension has begun to raise questions with Air Force leadership on how well the system will fare after 2020. When asked how he felt about the ICBM fleet, Gen. Hoffman, commander of Air Force Material Command appeared skeptical with his answer. "If you ask me [what is] my confidence in that fleet responding to 2020, I'd have one set of confidence factors…but given the task of looking to make it stretch out

to 2030. My confidence in that is considerably less."[7] Even if the MM III makes it to 2030, 20 years is not a long time to develop and field a new ICBM in today's acquisition world.

According to James Schlesinger's report on the DoD's nuclear mission, the United States Navy has continued to keep up with its nuclear mission. "The Task Force found that the Navy has maintained its commitment to the nuclear mission..."[8] The Navy relies on the Trident D5 along with the support of the Tomahawk Land Attack Cruise Missile/Nuclear (TLAM/N) to fulfill its nuclear mission. The Trident D5 was fielded in the 1990s, is currently projected to last until 2020.[9] The Ohio Class ballistic missile submarine fleet is used to deploy the Trident. These submarines were built starting in 1981, but 24 have been produced since. The Ohio class is expected to serve an important role in US nuclear operations beyond 2027.[10] Although slightly newer than the rest of the nuclear arsenal, the Navy's nuclear arsenal is still not projected to last much past 2030.

The final element of the nuclear arsenal, and the most difficult to assess, are the warheads themselves. In 1991, the United States built its last nuclear warhead.[11] Since then the nuclear stockpile has been refurbished and modified to stay ahead of problems associated with aging. Stephen Younger, a former senior fellow at Los Alamos, concluded that the effect of these Lifetime Extension Programs (LEPs) on the warhead reliability is unknown.[12] Yet a recent unclassified portion a JASON Defense Advisory Group report seems to agree with the "basic scientific approach" to the LEP.[13] Reports on the reliability of nuclear weapons are classified and are therefore outside the realm of this discussion, but Sectary Gates has argued that "the information on which we base our annual certification of stockpile grows increasingly dated and incomplete."[14] The reality is that nuclear weapons are complicated and it is a tremendous risk to

rely on LEP with no future weapons planned, because we can never be sure of how long the weapons will last under LEP.

The Future Force

An inventory of US nuclear forces demonstrates that both the nuclear warheads and their delivery vehicles are reaching key points in their service life. Secretary Gates has described the future of nuclear arsenal as "bleak."[15] The United States is entering a critical period in its life as a nuclear power. The majority of its nuclear force is old and facing future sustainment issues. Many newer systems, intended to replace or augment the older ones, have in fact themselves been retired. The Advanced Cruise Missile (ACM) was added to the nuclear fleet in 1992.[16] A newer, stealthy design the ACM shared the same warhead as the ALCM, but had increased performance and range. The ACM is an example of newer technology that has been phased out, leaving the older weapons in place, and making the inventory much older than it was only a few years ago.

In order to replace many of the aging systems money and time must be spent to develop the next generation of nuclear forces. But first there needs to be a general consensus of where the United States is heading with its nuclear weapons program. Currently the government and the military are divided on what direction to take. Because of this, acquiring money for future nuclear weapons has been difficult. The Reliable Replacement Warhead (RRW) program failed to receive the necessary funding and is now dormant despite the urging of Secretary Gates.[17] Even dual use delivery vehicles are having difficulty getting going as the 2018 bomber has now changed names and has been pushed further into the future.

Building a new nuclear weapon is a slow process. Even though the current inventory is safe and secure for the time being, a production capability of only 10 pits a year, demonstrates

the need to act soon.[18] The RRW program represented a reasonable way the United States could modernize its nuclear inventory. The program was designed to increase the reliability of the nuclear arsenal without provoking the other nuclear powers. However the program was not without its problems. Many doubted the credibility of a new warhead that was had not been tested, although a 2007 JASON Defense Advisory Group report agreed that the scientific approach was sound.[19] Others believed that the United States building new nuclear weapons would inspire a new arms race, even though many other nations continue to modernize their own nuclear weapons.[20] When the funding was pulled from the RRW portion of the Department of Energy's budget, any thoughts of a new nuclear weapon being developed in the near future disappeared.[21] For now the United States has decided to stay with the status quo with regards to modernizing its nuclear program. The next section will address how a refusal to modernize the arsenal could affect the United States security and that of its allies.

Why the United State Must Modernize

The reason why the United States must modernize its nuclear arsenal is simple. Nuclear weapons are needed to deter other nations with nuclear weapons. As long as other nations, friends and others, maintain and continue to build their nuclear weapons capabilities, the United States must continue to maintain its own.[22] By not modernizing the arsenal the United States could cause other nations to question the credibility of its nuclear arsenal. "[F]or deterrence to have any value there must be a perception, on both sides, that nuclear weapons will be used in certain extreme circumstances and that they will function as designed if called upon to do so."[23] Currently the nuclear arsenal is viable, but the concern is more for the future of the weapons program and the role it plays. There are three important areas that demonstrate the importance of deterrence to the United States. First, although the United States is no longer locked in an arms

race with the Former Soviet Union, Russia and China continue to remain nuclear competitors. Second, currently North Korea and Iran are two nations that are emerging on the nuclear scene and could pose a threat in the future. Third, the United States has a history of providing protection under the nuclear umbrella to its closest allies. As long as the United States seeks to deter other nuclear weapons and offer deterrence to our allies it must maintain modern, capable nuclear weapons systems.

Russia and China are the two biggest competitors to the United States in the nuclear arena. If the United States is considering what to do with its nuclear arsenal, it should pay close attention to what the Russians and Chinese are doing. Each of these countries has their own reasons for maintain and modernizing their nuclear forces. For Russia, its nuclear forces counter its ailing conventional forces. Russia's poor economy has forced it to rely more heavily on nuclear weapons for national defense. In recent years it has "increased reliance on its nuclear forces with new ICBM and sea-based missiles, as well as a fully functional infrastructure that can manufacture a significant number of warheads each year."[24] China is also not allowing its nuclear program to become stagnant. "It is qualitatively and quantitatively modernizing its nuclear forces, developing and deploying new classes of missiles, upgrading older missile systems, and developing methods to counter ballistic missiles."[25]

The nations of North Korea and Iran are actively pursuing nuclear programs of their own. Assuming Iran becomes a nuclear power within the next 5 years, these two nations could pose a serious threat to the United States. "The only real threat to U.S. military forces comes from nuclear, chemical, or biological weapons…only nuclear weapons could inflict tactical defeat upon our forces."[26] These states would most likely seek to use their weapons to counter an overwhelming conventional advantage held by the United States. Although the US conventional

forces offer a significant deterrent to these states, nuclear weapons aid in deterring while the convention forces are engaged in Iraq and Afghanistan.

In order to persuade its allies not to develop nuclear weapons, the United States has been engaged in providing extended deterrence for decades. US extended deterrence has allowed US allies to feel protected with smaller nuclear arsenals or no nuclear arsenals. US extended deterrence has helped control proliferation of nuclear weapons as many nations chose to rely on the US nuclear weapons for protection rather than develop their own nuclear weapons. "The formidable US nuclear arsenal makes its extended deterrence commitment effective and credible…" [27] Japan is an excellent example of a state that has enjoyed the benefits of extended deterrence despite having the capability of developing their own nuclear weapons. "Tokyo sees the US extended deterrence commitment as the central pillar of its nuclear policy."[28] If that deterrence should become questionable Japan could easily develop its own weapon. "Japan may become the next ally to develop its own nuclear weapons capability as American numbers and credibility decline."[29] Japan is not the only nation that relies on US extended deterrence; countries around the world have relied on the United States for their security. An aging nuclear arsenal could decrease the effectiveness of extended deterrence because deterrence relies on perceptions of both friends and enemies.

The perception that the United States is turning away from its nuclear forces could force other nations to take on their own nuclear programs. Many point to Pakistan as an example of a state that lost confidence in the ability or desire of the United States to protect it.[30] "In the absence of either sufficient influence over the adversary or a security guarantee, a recipient's nuclear choices become constrained to either obtaining an indigenous deterrent or accepting a subjugated security status."[31] Most states are simply not willing to risk their own security. States

could be forced to pursue nuclear program to protect the void left from a US arsenal that can no longer provide a credible deterrence. In effect the United States failing to pay the proper attention to its nuclear arsenal and modernize the aging weapons could lead a state becoming a new nuclear power or it could lead to a nuclear proliferation outbreak. In the 2009 a Congressional Commission on the Strategic Posture of the United States, wrote"…modernization is essential to the non-proliferation benefits derived from the extended deterrent."[32]

Challenges

The challenges to a nuclear modernization program are large. The United States currently finds itself involved in a pair of ongoing conflicts. Despite a renewed focus on nuclear weapons, the military must still pay the proper respects to the conventional forces. The economy is struggling and an expensive weapons program would seem to be counter to the public desires especially since the usefulness of nuclear weapons has been called into question. The Non-Proliferation Treaty (NPT) has also been used to argue against building new weapons. However, since the majority of nuclear powers continue to modernize while still supporting the NPT; it seems unlikely that US weapon modernization program would be any different.

Perhaps the greatest challenge to the developing new nuclear weapons is the stigma attached to the nuclear weapons themselves, specifically the RRW. In a briefing at Maxwell AFB a speaker described the need for "RRW-like characteristics…under a different name."[33] The RRW title has become controversial, despite the fact that it was named to indicate the reasons it is necessary. The current administration seems unlikely to pursue a new nuclear program, although there has been some talk of using the program as an enticement for Congress to sign-off on the Comprehensive Nuclear-Test-Ban Treaty (CBTB).[34] Others argue that we should be cutting the number of warheads not creating new ones. Recent arms talks have

discussed further reducing the number of warheads held by the United States and Russia. Reducing the number of warheads is still acceptable because the RRW would allow the United States to reduce the number of weapons because, many weapons are held in reserve due to reliability issues.[35]

The last argument against the RRW is the need to test it. Since the United States has not tested a nuclear weapon since 1992, there are questions on how the RRW would be certified operational.[36] Computer modeling is used to verify the force today and would most likely be used again. There is always the ability of the United States to test a new weapon, because it did not sign the CTBT, but this seems unlikely under current conditions. While it is a difficult choice to decide between keeping an aging arsenal that will be questionable in the near future or building a new weapon that will not be tested, the fact is that the nuclear arsenal of the future will be a product of computer certification no matter which route is taken.

Conclusion

The topic of nuclear weapons is one that will always be connected with controversy and emotions. However, the United States must not allow a desire for more arms reductions or nuclear abolishment to obscure reality. Nuclear weapons are as much a part of global security today as they have ever been. The amount of nuclear weapon states is continuing to grow and the United States can ill afford to have its nuclear arsenal and resolve called into question. The age of our current nuclear arsenal demonstrates that the United States has neglected to accept the necessity of a future nuclear arsenal. The Air Force's nuclear surety issues should serve as an example to the nation that nuclear weapons cannot be neglected. The Air Force loss of focus resulted in an unauthorized movement of nuclear weapons. The United States loss of focus

would be much more devastating. The United States must continue to modernize the nuclear force in order to ensure its own security as well as that of its allies.

---

[1] Secretary of Defense Task Force on DoD Nuclear Weapons Management, *Phase I: The Air Force's Nuclear Mission*, 2

[2] USAF Fact Sheet, B-2

[3] NNSA Public Affairs, *NNSA Achieves Significant Milestone for B61 Bomb*

[4] USAF Fact Sheet, AGM-86

[5] USAF Fact Sheet, LGM-30G

[6] Sirak, "Nuclear Forces: Lots of Progress, But a Long Way to Go", 31

[7] Ibid, 31

[8] Secretary of Defense Task Force on DoD Nuclear Weapons Management, *Phase II: Review of the DoD's Nuclear Mission*, vii

[9] USN Fact File, Trident

[10] Secretary of Defense Task Force on DoD Nuclear Weapons Management, *Phase II: Review of the DoD's Nuclear Mission*, 30

[11] Office of the Deputy Assistant to the Secretary of Defense, *US Nuclear Deterrence*

[12] Younger, *The Bomb*, 97

[13] NNSA Public Affairs, *NNSA Thanks JASONs for Technical Review of LEP Programs*

[14] Secretary Robert Gates, *Nuclear Weapons and Deterrence in the 21st Century*, 6

[15] Ibid., 5

[16] USAF Fact Sheet, AGM-129

[17] Secretary Robert Gates, *Nuclear Weapons and Deterrence in the 21st Century*, 6

[18] Secretary of Defense & Secretary of Energy Report: *National Security and Nuclear Weapons in the 21st Century*, 21

[19] NNSA Public Affairs, *Independent Scientific Review Confirms Technical Approach to RRW*

[20] Secretary Robert Gates, *Nuclear Weapons and Deterrence in the 21st Century*, 5

[21] Wirtz, "*United States: Nuclear Policies and Strategies*, 129

[22] Joint Working Group: American Association of the Advancement of Science, the American Physical Society, and the Center for Strategic and International Studies, *Nuclear Weapons in 21st Century US National Security*, 3

[23] Younger, 128

[24] Secretary Robert Gates, *Nuclear Weapons and Deterrence in the 21st Century*, 5

[25] Secretary of Defense & Secretary of Energy Report: *National Security and Nuclear Weapons in the 21st Century*, 6

[26] Younger, 2

[27] Alagappa, *Nuclear Weapons and National Security: Far-Reaching Influence and Deterrence Dominance*, 502

[28] Ibid, 503

[29] Lowther, "The Logic of the Nuclear Arsenal.", 15

[30] Theis, "*Airpower Security Cooperation as an Instrument of National Power: Lessons for Iraq from the Cases of Pakistan and Egypt."*, 76

[31] Ibid, 77

[32] Congressional Commission on the Strategic Posture of the United States, *America's Strategic Posture*, 44

[33] Anonymous Speaker, 2009

[34] Barry, "Barack Obama Wants the Bomb…"

[35] Secretary of Defense & Secretary of Energy Report: *National Security and Nuclear Weapons in the 21st Century*, 20

[36] Office of the Deputy Assistant to the Secretary of Defense, *US Nuclear Deterrence*

Bibliography

Alagappa, Muthiah. "Nuclear Weapons and National Security: Far-Reaching Influence and Deterrence Dominance." In *The Long Shadow: Nuclear Weapons and Security in 21st Century Asia*, by Muthiah Alagappa, 479-507. Stanford: Stanford University Press, 2008.

American Association for the Advancement of Science, The American Physical Society, and the Center for Strategic and International Studies. "Nuclear Weapons in 21st Century US National Security." *Office of the Deputy Assistant to the Secretary of Defense for Nuclear Matters.* December 2008. http:aps.org/policy/reports/popa-reports/upload/nuclear-weapons.pdf (accessed December 1, 2009).

Anonymous Speaker. Wood Auditorium, Air Command and Staff College. October 2009.

Barry, John. "Barak Obama Wants the Bomb..." *Newsweek.* August 15, 2009. http://www.newsweek.com/id/212153 (accessed December 2, 2009).

Congressional Commission on the Strategic Posture of the United States. "America's Strategic Posture." *United States Institute of Peace.* 2009. http:media.usip.org/reports/strat_posture_report.pdf (accessed December 12, 2009).

Gates, Robert. "Gates: Nuclear Weapons and Deterrence in the 21st Century." *Carnegie Endowment for International Peace.* Washington DC: Federal News Service, October 28, 2008.

Lowther, Adam. "The Logic of the Nuclear Arsenal." *Strategic Studies Quarterly*, Winter 2009: 8-21.

NNSA Public Affairs. *NNSA Achieves Significant Milestone for B61 Bomb.* June 30, 2006. http://nnsa.energy.gov/news/print/1272.htm (accessed December 13, 2009).

NNSA Public Affairs. *Independent Scientific Review Confirms Technical Approach to RRW.* September 28, 2007. http://nnsa.energy.gov/news/print/894.htm (accessed November 18, 2009).

NNSA Public Affairs. *NNSA Thanks JASONs for Technical Review of LEP Programs.* November 19, 2009. http://nnsa.energy.gov/news/print/1272.htm (accessed December 13, 2009).

Office fo the Deputy Assistant to the Secretary of Defense for Nuclear Matters. *US Nuclear Deterrence.* n.d. http://www.acq.osd.mil/ncbdp/nm/USNuclearDeterrence.html (accessed November 16, 2009).

Secretary of Defense & Secretary of Energy. "National Security and Nuclear Weapons in the 21st Century." September 2008. http://www.defense.gov/news/nuclearweaponspolicy.pdf (accessed November 10, 2009).

Secretary of Defense Task Force on DoD Nulear Weapons Management. "Phase I: The Air Force's Nuclear Mission." 2008.

Secretary of Defense Task Force on DoD Nulear Weapons Management. "Phase II: Review of the DoD Nuclear Mission." 2008.

Sirak, Michael C. "Nuclear Forces: Lots of Progress, But a Long Way to Go." *Air Force:*

Journal of the Air Force Association, November 2009: 30-31.

Theis, Douglas G. "Airpower Security Cooperation as an Instrument of National Power: Lessons for Iraq from the Cases of Pakistan and Egypt." *Air& Space Power Jounal*, Fall 2009: 69-81.

USAF. *United States Air Force Fact Sheet.* n.d. http://www.af.mil/information/factsheets/index.asp (accessed December 10, 2009).

USN. *United States Navy Fact File.* n.d. http://www.navy.mil/navydata/fact.asp (accessed December 9, 2009).

Wirtz, James J. "United States: Nuclear Policy at a Crossroads." In *The Long Shadow: Nuclear Weapons and Security in 21st Century Asia*, by Muthiah Alagappa, 111-133. Stanford: Stanford University Press, 2008.

Younger, Stephen M. *The Bomb.* New York: HarperCollins Publishers, 2009.