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The Third Offset: The U.S. Strategy to Combat Future Threats

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THE THIRD OFFSET: THE U.S. STRATEGY TO COMBAT FUTURE

THREATS

A Masters Thesis

Presented to

The Graduate College of

Missouri State University

In Partial Fulfillment

Of the Requirements for the Degree

Master of Science, Defense and Strategic Studies

By

Brian C. Kempf

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THE THIRD OFFSET: THE U.S. STRATEGY TO COMBAT FUTURE

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Defense and Strategic Studies

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ABSTRACT

Since the collapse of the Soviet Union and into the 21st Century, the United States (U.S.) has continued to maintain global commitments and a global presence. In addition, the U.S. has expanded its aspirations to address a more diverse range of global security challenges than in previous periods; from conventional conflicts to climate change. In order to meet the demands of a 21st century superpower, the U.S. Department of Defense is expected to conduct a broad range of operations across a spectrum of threats. Indeed, U.S. technological superiority is a hallmark of U.S. military prowess and has been instrumental in supporting Department of Defense functions. While the U.S. is currently considered to have the most technologically advanced military in the world, the U.S. technological advantage is dwindling. In response to the unpredictable security environment and the dwindling U.S. technological edge, the U.S. Department of Defense is pursuing a new strategy to offset future threats and maintain U.S. technological superiority known as the "third offset" strategy. The third offset strategy consists of three major thrusts: to develop cutting-edge technologies, to explore new operational concepts utilizing cutting-edge technologies, and to acquire and retain the best and brightest workforce to achieve the other two goals. Although still in its inchoate stages, it is yet to be seen if the strategy will come to fruition and achieve the intended results.

This abstract is approved as to form and content

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John P. Rose, PhD
Chairperson, Advisory Committee
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INTRODUCTION

The current global security environment is often characterized as uncertain and unpredictable. Since the collapse of the Soviet Union, the U.S. has expanded its role in addressing a diverse range of global security challenges. The U.S. is determined to combat traditional security issues such as, conventional armed conflicts, and confront new challenges like, the effects of climate change and guaranteeing U.S. energy security. In order to meet these demands, the U.S. Department of Defense continues to conduct a broad range of operations, across a spectrum of threats. Not only has the U.S. increased the scope of its security missions, U.S. global commitments and partnerships remain numerous with approximately 450,000 personnel deployed overseas and on U.S. vessels, around the globe.[1]

Indeed, successfully managing U.S. commitments, as well as, addressing global security challenges, is a formidable task. Moreover, the U.S. role as a global security provider cannot be assumed to continue in an unpredictable future. To date, U.S. technological superiority has been instrumental in facilitating the U.S. to meet its commitments and address the ever increasing security challenges. The U.S. military is the most technologically savvy, efficient, and effective military in the world. However, the U.S. technological advantage is dwindling, and the U.S. freedom to navigate the globe and intervene is being threatened.[2] Near peers, like Russia and China, are

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1. "About the Department of Defense (DOD)," U.S. Department of Defense, January 27, 2017, https://www.defense.gov/About, paragraph 6.
2. Joint Chiefs of Staff, *The National Military Strategy of the United States of America 2015*, 3, http://www.jcs.mil/Portals/36/Documents/Publications/2015_National_Military_ Strategy.pdf.

countering and copying U.S. technologies like precision munitions, surveillance

platforms, and command and control networks, in an effort to close the technological

gap.[3] Additionally, features of the future security environment such as demographic

shifts, the diffusion of technology through globalization, new centers of power, and

unique strategies to upset the traditional power structure, could undermine U.S. influence,

power projections, and commitments.[4]

Globalization has created an environment where technologies that were once

reserved for major powers, with defense infrastructures, have proliferated and have

become easier for state and non-state actors to access and develop.[5] For example,

autonomous aircraft, like drones, were once an exclusive capability of major states.

Now, drones have become smaller, more versatile, inexpensive, and commonplace. This

reality is illustrated by a quick internet search; drones are available to private citizens and

enthusiasts through the internet and retail stores, some costing less than US$100.[6]

Recreational drones utilize similar technology to their military counterparts and could

easily be converted to suit a terrorist organization's, a criminal network's, or a state

actor's needs without having to develop a robust manufacturing infrastructure. This

reality highlights the dual use nature of emerging technologies; many have military and

civilian uses and can easily be converted to suit any actor's objective.

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3. U.S. Department of Defense, *Quadrennial Defense Review 2014*, 4, http://archive. defense.gov/pubs/2014_Quadrennial_Defense_Review.pdf.

4. Joint Chiefs of Staff, *National Military Strategy*, 1.

5. U.S. Department of Defense, *Quadrennial Defense Review*, 7.

6. A Google.com search of "drone" resulted in information pertaining to the purchase of recreational drones and a link to BestBuy.com, where one can find a drone for under US$100.

This example not only highlights how ubiquitous the systems have become, but also the pivotal role private industry is beginning to play in producing cutting-edge technologies. Current technological advancements are occurring within the private sector for commercial uses and are considered to be outpacing the technological development occurring within the Federal government.[7] This is in contrast to the historic flow of technology which was restricted to major defense contractors and the government which then spread to the private sector for commercial exploitation.[8] Radar, global positioning systems, and the Internet are examples of government initiated technologies that became widespread for civilian consumption. The inverted nature of the current technology flow means the government must seek outside technologies for its own use and applications.[9] The military modernization efforts by U.S. adversaries, the diffusion of technology due to globalization, and the inverted nature of technological development are viewed by U.S. leaders as contributing to the dwindling U.S. technological advantage.

In response to the unpredictable security environment and the dwindling U.S. technological edge, the Pentagon recently released plans for a new "offset" strategy; commonly referred to as the "third offset". The third offset strategy was introduced in 2014 as part of a larger U.S. Department of Defense initiative. Laid out in the keynote address before the Reagan National Defense Forum, former Secretary of Defense Hagel announced the Defense Innovation Initiative. The foremost goal of this initiative is to

7. National Science and Technology Council Committee on Homeland and National Security, *A 21st Century Science, Technology, and Innovation Strategy for America's National Security*, (2016), 5, https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/NSTC/national_s ecurity_s_and_t_strategy.pdf.
8. Ibid., 5.
9. Ibid., 1.

terminate the loss of the U.S. technological advantage to ensure the U.S. maintains a

robust and effective conventional deterrence.[10] This extensive initiative is aimed with:

1) Developing cutting-edge technologies by focusing on fields such as robotics, autonomous systems, miniaturization, analyzing big data, and advanced manufacturing, like 3-D printing.
2) Exploring new operational concepts and approaches to warfighting by utilizing the cutting-edge technologies developed.
3) Acquiring and retaining the best and brightest minds to pursue the previous objectives.[11]

In short, technical innovation, coupled with the development of operational concepts and

doctrine, will comprise the third offset strategy.

An offset strategy is not novel. In fact, the U.S. has pursued an offset strategy on

two previous occasions since the end of World War II and the advent of the nuclear age.

The Pentagon defines the first offset as President Eisenhower's "New Look" strategy

which offset Soviet conventional strength by bolstering U.S. nuclear forces.[12] The

ultimate objective of the New Look was to deter Soviet aggression and increase security

"on the cheap" by investing in unconventional forces, which were considered less

expensive to field than conventional forces.[13]

As defined by the Pentagon, the second offset strategy began in the 1970s when

Pentagon leaders established the Long Range Research and Development Planning

Program (LRRDPP) that "helped develop and field revolutionary new systems such as

extended-range precision-guided munitions, stealth aircraft, and new intelligence,

10. Chuck Hagel, "Reagan National Defense Forum Keynote Address", United States Department of Defense, November 15, 2014, http://www.defense.gov/News/Speeches/Speech-View/Article/606635.
11. Ibid.
12. Ibid.
13. Patrick Garrity, "A New Look at the New Look", *Claremont Institute*, December 14, 2012, http://www.claremont.org/crb/basicpage/a-new-look-at-the-new-look/.

surveillance and reconnaissance platforms".[14] The second offset period continued

through the 1980s with the investment and fielding of those technologies. The Pentagon

definition of the second offset is vague. While these technologies are important in the

U.S. military enterprise today, this definition fails to include doctrinal transformations

and training reforms that occurred alongside the advent of new technologies.

The first two offsets will be explained in greater detail in the following sections.

Also, it is important to note that these are Department of Defense delineations of offset

periods and not the author's. It is accepted that others may have differing opinions as to

what constitutes an "offset" period in U.S. strategy. However, to limit the scope of

research, the Department of Defense periods are utilized since this is the organization

pursuing an offset strategy for the third time. The author's explanation of historical

events and influencing factors are meant to add context to the Pentagon definitions of the

offset periods. In addition, a thorough research of each offset is helpful as it provides

historical lessons and a lens through which to examine the third offset.

In addition, since the prime topic of this discussion pertains to offset strategies, it

is important to define an "offset strategy" for the purposes of this document.

Fundamentally, an offset strategy seeks to counterbalance an adversary's strength with a

technology, weapon, platform, and/or policy that serve as force multipliers thus

undermining the adversary's strengths while enhancing one's ability to deter or fight a

numerically superior enemy. In short, it is a strategy of quality and effectiveness over

quantity of capabilities; the objective is to not field troop for troop or tank for tank. A

portion of this definition, namely in regards to a *numerically* superior enemy, may not

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14. Hagel, "Keynote Address".

seem as applicable today as it was during the Cold War. However, taking into account the number of contingencies and operations the U.S. may become involved in, coupled with the broad spectrum of threats, have produced, in sum, a multiplicity of adversaries and challenges that can be considered numerically superior.

Another useful topic to discuss before moving forward is the descriptive words that accompany the word *technology* throughout the document. *Current generation technology*, *current technology*, or *off-the-shelf technology* are those technologies that have been well developed for years, like computers. While advances are occurring in computer science and technology, that are enhancing computers, the machine itself is a current generation technology. *Over the horizon* or *advanced technology* are technologies that will become mainstream in the short term, three to five years. These types of technologies have not been developed to their full potential, are untried but have been under development long enough that their incorporation does not entail a great deal of risk.[15] *Leap-ahead technologies* are technologies that skip a generation of over the horizon technology. Leap-ahead technologies may take ten years to field but could offer greater benefit in the 15-20 year range.[16] Having delineated those terms, the discussion is left with the term *cutting-edge technology* from the third offset objectives. This term is equivocal. It seems that the term cutting-edge technology is used by the Pentagon to signify, emerging technologies to leap-ahead technologies, or any technology for that matter, that has the greatest potential for military utility.

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15. Frederick Kagan, *Finding the Target: The Transformation of American Military Policy* (New York, NY: Encounter Books, 2006), 71.

16. Richard Kugler, *Policy Analysis in National Security Affairs: New Methods for a New Era* (Washington, DC: National Defense University Press, 2006), 307, https://www.hsdl.org/?view&did=481962.

While the offset strategies share a common concept and name, they are indeed different from one another. The first two offsets were formulated to confront a contemporary enemy or threat; the Soviet Union. The third offset is targeted to confront future challenges and guarantee U.S. technological and military superiority. In explanation, this offset is intended to address state and non-state actors, as well as, ensure the U.S. has the freedom to conduct any operation, across the spectrum of threats, anywhere in the world. By pursuing an offset strategy at present, the U.S. expects to maintain its technological advantage ahead of any potential adversarial gains.

One can already begin to see problems with such a lofty strategy. Moreover, the obstacles to implementation are numerous. Obvious obstacles include funding, due to sequestration, and leadership changes, highlighted by the election of a new administration to the White House. Another obstacle includes a defense enterprise that is resistant to change. Even if the Department of Defense were to embrace change, the bureaucracy tends to stymie innovation. The current bureaucracy precludes quick research, development, testing, and fielding. A speedier process will be necessary for the future due to the fast pace associated with technological development.

Regardless of one's opinion concerning the necessity of the third offset, the strategy encourages a higher level of discussion. That is, can the U.S. continue to rely on technology to maintain its military superiority? Additionally, has the U.S. placed too much importance on technology? Technology has been a major driver in U.S. security since the beginning of the Cold War and a reversal would be a major change. Further, there is much to debate as to whether the advent of new technologies are positive developments. Also, if the diffusion of technology continues at the rate it is occurring

now, could the development of technologies, that will inevitably become widespread, eventually bankrupt the state that develops technology? With that said, how long does the U.S. expect this strategy to last? While the second offset granted the U.S. a technological advantage for several decades, the U.S. advantage from the New Look was brief.

The aforementioned issues raise a fundamental question; is this a judicious strategy to pursue at this time? The strategy is intended to compete in a future security environment that is admittedly unpredictable, and that, in it of itself, seems like a glaring issue. Also, has the diffusion of technology and military modernization efforts by U.S. adversaries created an environment where the U.S. technological superiority has "dwindled"? In addition, one could argue that defense officials are hyping the future threat to secure funding in austere times. With such a broad threat spectrum, can an adequate strategy be developed? A valid view is that if the U.S. prepares for an unlimited number of contingencies, it is not adequately preparing for any *one* contingency.

Additional considerations include: have the consequences on the future force been adequately examined? How will units be structured? What will the future force look like if it adopts the changes proposed in the third offset? The integration of more technology into the military enterprise has serious ramifications. Not only are robots expected to replace human jobs in the private sector, but one can almost guarantee this will occur in the military as well. How will this situation impact individuals who pursue the military as an option after high school or as a career? Will the U.S. military transform into an elite cadre of tech soldiers that are removed from society? New technologies have

ramifications for more than force structure. The rules and conduct of war may also undergo changes as new technologies become commonplace.

Indeed, the third offset is still in its inchoate stages and numerous questions abound concerning the strategy and its possible consequences. Military improvements are not without their growing pains. Obstacles and possible consequences need to be examined before the strategy is implemented to mitigate obstacles and address negative consequences. Fortunately, the first two offsets provide some key lessons for the third offset; some to be followed and some to be avoided. The third offset and its ramifications should be scrutinized, not for damaging purposes, but for constructive reasons, to benefit the U.S. defense enterprise.

THE FIRST OFFSET

Introduction to the New Look

The U.S. pursuit of an offset strategy is not novel. In fact, the U.S. has implemented offset strategies twice since the 1950s. The first U.S. offset strategy termed, the "New Look", was introduced in the 1950s by the Eisenhower administration. The New Look strategy strove to offset the Soviet Union's conventional strength and reduce the U.S. defense budget by relying on a solid U.S. nuclear arsenal to deter Soviet aggression, and if needed, defeat Soviet aggression.[17] In essence, the New Look sought to transform the U.S. military into a nuclear fighting force with an emphasis on the strategic deterrent deliverable by airpower.[18]

U.S. reliance on its nuclear arsenal to deter Soviet aggression lead to the declaratory policy of *Massive Retaliation*; the overwhelming use of nuclear forces in the event of Soviet aggression. It is important to note that this declaratory policy was not solely intended for *retaliation* but was intended to *deter* Soviet aggression, in Europe, where the U.S. and NATO forces were at a precarious conventional disadvantage. Conventional parity with the Soviet Union would have been a monumental task.

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17. Elliot Converse, *History of Acquisition in the Department of Defense: Rearming for the Cold War, 1945-1960 Vol. 1*, (Washington, DC: Historical Office; Office of the Secretary of Defense, 2012), 393, http://history.defense.gov/Portals/70/Documents/acquisition_pub/OSDHO-Acquisition-Series-Vol1.pdf?ver=2014-05-28-103257-540.

18. Richard Leighton, *History of the Office of the Secretary of Defense: Strategy, Money, and the New Look, 1953-1956 Vol. 3*, ed. Alfred Goldberg, (Washington, DC: Historical Office; Office of the Secretary of Defense, 2010), v, http://history.defense.gov/Portals/70/Documents/secretaryofdefense/OSDSeries_Vol3.pdf.

Moreover, both the U.S. and NATO were unwilling to spend the resources needed to create conventional parity.

The New Look was heavily influenced by historical events, as well as, the personal beliefs of President Eisenhower and his administration. As with any grand strategy, the implementation occurred and the consequences surfaced, over time. This section will first explore those driving forces such as historical events, developing technologies, and personal beliefs that influenced the administration to pursue sweeping changes to the U.S. force. Secondly, this section will outline the execution, as well as, detail the aftermath of the New Look on land, air, and sea assets of the services. Finally, this section will discuss and examine key takeaways from the New Look that can be applied when analyzing the third offset.

A Strong Economy, Armistice, and New Technology

While few individuals may be familiar with the New Look, many are aware of the policy begotten from the New Look known as *Massive Retaliation*. Certainly, Eisenhower's declaratory policy of Massive Retaliation was a direct result of, and was considered a viable course of action by the Eisenhower administration because of the New Look. Surprisingly, the grand strategy and philosophy that produced Massive Retaliation are often overlooked. However, the New Look was a practical and principled strategy that was tailored to address threats within the limits of the Eisenhower administration's outlook. Interestingly, one of the greatest factors that influenced the New Look was Eisenhower's personal beliefs about defense spending and national

power. Truly, these views steered the administration to develop a strategy like the New Look.

When President Eisenhower took office, he was determined to reduce U.S. defense spending when compared to the Truman Era.[19] President Truman had overseen a period of continued high defense expenditures, even after World War II, as a consequence of the foray on the Korean Peninsula. Eisenhower was determined to reduce defense spending because he held strong views that prodigal defense spending would have detrimental effects on the U.S. economy, which in turn, could ultimately destroy the American way of life.[20] Eisenhower rationalized his leeriness of excessive defense spending with cogent cause and effects on how profligate spending would alter the foundations of American Society.

Eisenhower's arguments followed the reasoning that defense spending would create the establishment of a large defense-industrial complex which would be underwritten by the U.S. government and influenced by special interests. In Eisenhower's view, special interests would lobby for and encourage higher defense spending, creating larger deficits and increased inflation.[21] In turn, larger deficits and increased inflation would have negative impacts on the overall U.S. economy. Further, in Eisenhower's view, an economy where the defense sector made up a large portion of the economy, when compared to other market sectors, was weaker than a more diversified economy.[22] Consequently, Eisenhower believed a weak U.S. economy would alter

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19. Leighton, *New Look*, ii.
20. Garrity, "A New Look".
21. Converse, *Histroy of Acquistion*, 393.
22. Ibid.

American Society with the introduction and implementation of governmental controls to reinforce the economy.[23] Ultimately, the introduction of economic controls and government oversights would not only limit economic freedoms, but would serve as a means to limit other freedoms, and thus threaten the American way of life.

In addition to the aforementioned arguments against excessive defense expenditures based on values, Eisenhower had pragmatic reasons to oppose such spending. He simply believed that high defense spending during peacetime was inefficient and wasteful.[24] He reasoned that defense spending, which prepared for endless contingencies, would spiral out of control and create the problems mentioned above. His views concerning defense spending may seem counterintuitive considering he was a career military general who had commanded the Allies to victory in Europe during World War II. Nonetheless, the quote below demonstrates Eisenhower's personal convictions.

> Every gun that is made, every warship launched, every rocket fired
> signifies, in the final sense, a theft from those who hunger and are not fed,
> those who are cold and are not clothed. This world in arms is not
> spending money alone. It is spending the sweat of its laborers, the genius
> of its scientists, the hopes of its children...[25]

This excerpt demonstrates Eisenhower's awareness of the direct and indirect consequences of excessive defense spending. Although some may question the genuineness of his statement because he used laborers and scientists to make nuclear

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23. Ibid.
24. Ibid., 392.
25. "Quotable Quotes of Dwight D. Eisenhower", Eisenhower National Historic Site, accessed January 21, 2016, https://www.nps.gov/features/eise/jrranger/quotes2.htm, paragraph 6.

weapons, this misses the point. The administration contrived the New Look to address two important issues. On the one hand, the New look was intended to confront the Soviet threat and on the other hand, the New Look was calculated to reign in defense spending. Reigning in defense spending was an important issue to the Eisenhower administration because the administration believed excessive spending could threaten the American way of life. In the end, if the American way of life was transformed by the slow erosion of freedoms it was no better than the ideology it was seeking to contain.

While the above views were the prevailing philosophy of the Eisenhower administration, any solution to reducing defense spending would need to address the high costs associated with manpower spending. The Eisenhower administration believed it could overcome this obstacle by increasing U.S. reliance on the strategic nuclear arsenal for security. By relying on nuclear weapons, costly manpower dollars could be saved and security could be achieved.[26] Therefore, an investment in nuclear forces would achieve "maximum protection at a bearable cost".[27] Nuclear weapons were viewed by the Eisenhower administration as a practical solution to its fiscal constraints.

In addition to fabricating a strategy that fit within Eisenhower's fiscal limits, the New Look was developed to confront Communism and the Soviet threat. Not only did Eisenhower view a weakened economy negatively from the standpoint of altering the American way of life, but he also saw it as inimical to American foreign policy. To Eisenhower, a nation's economic strength was the basis for a strong foreign policy and a

26. Converse, *History of Acquistion*, 393.
27. John Dulles, "The Evolution of Foreign Policy", *The Department of State Bulletin* XXX, no. 761, (January 25, 1954) : 107-110. https://babel.hathitrust.org/cgi/pt?id=msu. 31293008121345;view=1up;seq=110.

nation's military strength was but one instrument of state power.[28] Also, Eisenhower

believed that a strong economy was the driving force that made a well-equipped force

possible.[29]

Resistance to the spread of Communism was a perennial issue during the Cold

War and many are familiar with the aptly named Containment Doctrine that was a

hallmark of U.S. strategy during this period. The Containment Doctrine was introduced

in 1946 by the Truman administration following World War II and the U.S. elevation to

superpower status. A review of the Containment philosophy was ordered at the

beginning of the Eisenhower administration. In what is referred to as *Operation*

Solarium, three working groups were created to assess containment and offer fresh

perspectives to restrain Communism.[30] While the three working groups each presented

separate recommendations, the proposal selected by President Eisenhower was a

continuation of Containment with some changes. A significant change to Containment

was to characterize the ideological and power competition between the U.S. and the

Soviet Union as a long-term struggle.[31] Identifying the ideological struggle between the

U.S. and the Soviet Union as long-term meant the U.S. had to pursue a strategy that

balanced the protracted nature of the struggle against fiscal constraints. Therefore, it was

prudent to invest in cost-effective platforms with a prolonged deterrent value.

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28. Leighton, *New Look*, 1.
29. Converse, *History of Acquistion*, 393.
30. Tyler Nottberg, "Once and Future Policy Planning: Solarium for Today," Eisenhower Institute at Gettysburg College, accessed April 1, 2016, http://www. eisenhowerinstitute.org/about/living_history/solarium_for_today.dot, paragraph 8.
31. Leighton, *New Look*, 150.

Another outcome of Operation Solarium was that the U.S. changed to a slightly more aggressive stance in its approach to undermining Soviet influence. This more aggressive stance included the use of operations short of general war, like covert action, sabotage, and physiological operations to undermine Soviet strength and influence.[32] The objective was to confront the Soviet threat and undermine Soviet influence at lower levels on the conflict spectrum with the hopeful outcome being that these actions would not lead to escalation. Also, it was held that escalation could be avoided with a strong strategic arsenal that had a formidable deterrent value and an equally convincing declaratory message. The struggle to contain communism was important for Eisenhower because he viewed power and influence in zero-sum terms. To Eisenhower, losing influence over one nation, even on the periphery, would erode U.S. influence in other nations.[33]

While Eisenhower's personal beliefs helped shape the New Look, it was historical events and emerging technologies, like advancements in nuclear weapon technology, that allowed the administration to pursue sweeping changes. However, a reduction in defense spending to allow a nuclear build up would have been impossible without the cessation of hostiles on the Korean Peninsula.

Eisenhower came into office in January of 1953 and an armistice was signed that ended hostilities on the Korean Peninsula in July of the same year. While the peace process had begun before he took office, the end of hostilities was not a foregone conclusion during the first six months of his presidency. After his election, the peace

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32. Nottberg, "Solarium for Today", paragraph 14.
33. Garrity, "A New Look".

talks began to falter. Eisenhower authorized an expanded bombing campaign and the National Security Council discussed the tactical and strategic employment of atomic weapons to end the conflict.[34] It is unclear if expanded bombing and the hinted use of atomic weapons weighed heavily on the parties' decision to reenter negotiations and ultimately accept a ceasefire agreement. Moreover, it is difficult to determine the resolve of the U.S. to employ unconventional weapons to end the conflict. Although, the threat to use unconventional weapons may serve as the harbinger for John Foster Dulles's January 1954 speech that introduced the declaratory policy of Massive Retaliation.

With the armistice in place, the administration was afforded the opportunity to offer a cost reduction for its first budget proposal in 1954.[35] Without an ongoing conflict, easy savings would come from manpower cuts. In addition, with Eisenhower's Containment doctrine, that included efforts to undermine the Soviet Union with low intensity operations, there was no need to fund a large conventional strength after hostilities ended. However, reducing the budget by cutting manpower would not automatically mean all manpower dollars could be saved. The development and fielding of a nuclear strategic deterrent would also cost American taxpayers. In the end, while Eisenhower was able to reduce defense expenditures when compared to the Truman Era, he was not able to reduce spending to his desired amount.[36]

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34. James Schnabel and Robert Watson, *History of the Joint Chiefs of Staff: The Joint Chiefs of Staff and National Policy Volume III, 1951-1953, Part Two, The Korean War*, (Washington, DC: Office of Joint History, 1998), 207, http://www.dtic.mil/doctrine/doctrine/history/jcs_nationalp3b.pdf.

35. Leighton, *New Look*, 70.

36. Converse, *History of Acquistion*, ii.

Finally, an often overlooked factor that allowed the Eisenhower administration to pursue the New Look was emerging technologies and scientific advancements. One reason Eisenhower had so much faith in the New Look stemmed from his belief that the U.S. would maintain technological superiority in the nuclear realm.[37] In 1952 the U.S. ushered in the nuclear age with development and corresponding test of a thermonuclear weapon that had a blast yield of 10 megatons of TNT.[38] For perspective, the atomic bombs dropped on Hiroshima and Nagasaki had a blast yield of 15 and 20 kilotons of TNT, respectively.[39] Not only were thermonuclear weapons more powerful than the previous generation of atomic weapons, thermonuclear warheads were smaller and lighter than their atomic counterparts, without compromising destructive power. Additionally, because of miniaturization, nuclear warheads could be attached to missiles; ushering in the nuclear missile age.

Simultaneous to the advent of the thermonuclear weapons and missiles, new technologies like the jet engine introduced new airframe platforms for delivery.[40] A major component of the New Look was that the U.S. arsenal would be deliverable by air assets. Further, transmitters and homing devices were also being miniaturized which greatly improved accuracy. Improved accuracy, coupled with the ability to produce weapons with lower yields, meant that nuclear weapons could be employed in tactical situations.[41] Indeed, there were significant scientific advancements in nuclear weapon

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37. Ibid., 460.
38. "Types of Nuclear Bombs," PBS News Hour, May 2, 2005, http://www.pbs.org/newshour/updates/military-jan-june05-bombs_05-02/, paragraph 3.
39. Ibid., paragraph 7.
40. Converse, *Histroy of Acquistion*, 461 & 463.
41. Ibid., 595.

and associated technology, during the New Look period. These breakthroughs helped to make it possible, as a policy, to rely on the U.S. strategic arsenal as a potent deterrent.

It is important to recognize that not only was the New Look developed as a practical response to events and circumstances, it was also based upon President Eisenhower's tightly held principles. While the Eisenhower administration is often remembered for Massive Retaliation, there was more thought behind this policy, including the New Look, that is rarely acknowledged. The Eisenhower administration followed a salient and transparent process to arrive at the New Look. Additionally, there were other factors, like the cessation of hostilities and new technologies, that allowed the administration to pursue the strategy. Indeed, the New Look oversaw a significant transformation of the U.S. military to a nuclear fighting force. Further, this transformation impacted many facets of the military's traditional structure.

Outcomes, Consequences, and Lessons from the New Look

As with any grand strategy, the implementation occurred over time and the consequences, both positive and negative would take time to surface. Reliance on the nuclear arsenal for security and deterrence was pragmatic for fiscal, personal, and policy reasons and it had impacts on the services. The Air Force was the greatest benefactor of the New Look since the New Look placed importance on a nuclear arsenal deliverable by airpower. From 1954-1960, the U.S. Air Force averaged 46.5% of the total defense budget. While during the same period, the Army and Naval Service accounted for 25.3%

and 28.2%, respectively.[42] In contrast, from 1949 to 1953, the Air Force averaged 27.1%

of the budget, the Army accounted for 44.3% of the budget and the Naval Service

28.6%.[43] In addition, to a larger percentage of the defense budget for the Air Force, the

number of aircraft and missile platforms capable of bearing a nuclear payload increased.

During the Eisenhower presidency, from 1953 to 1960, Strategic Air Command increased

the size of its fleet from 1,830 aircraft to 2,992 aircraft.[44] Additionally, 1959 saw the

largest number of aircraft ever assigned to Strategic Air Command with 3,207 aircraft.[45]

While the U.S. also pursued other capabilities besides aircraft to carry nuclear payloads,

it was not until mid-1959 when the first land- and sea-based missiles began to augment

aircraft as strategic delivery options.

Unsurprisingly, one outcome of the New Look was that overall troop numbers in

the U.S. military declined from 3.3 million in 1954 to 2.5 million in 1960.[46] In addition

to the overall troop levels declining, the U.S. Army reduced the number of its active

divisions from 20 divisions during the Korean War to 12 active divisions by 1956.[47]

Further, the reduction in the number of active duty Army divisions was accompanied by a

reorganization of the Army's divisional structures into a *pentomic* division, that was

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42. Phillip Meilinger, *Bomber: The Formation and Early Years of Strategic Air Command*, (Maxwell Air Force Base, AL: Air University Press, 2012), 299, http:// www.au.af.mil/au/aupress/digital/pdf/book/b_0127_meilinger_bomber.pdf.

43. Ibid.

44. J.C. Hopkins and Sheldon Goldberg, *The Development of Strategic Air Command, 1946-1976*, 1976, 33 & 81, http://www.dtic.mil/dtic/tr/fulltext/u2/a060394.pdf.

45. Ibid., 75.

46. Roger Trask and Alfred Goldberg, *The Department of Defense 1947-1997, Organization and Leaders*, (Washington, DC: Office of the Secretary of Defense, 1997), 171, http://www.dtic.mil/docs/citations/ADA330985.

47. John Wilson, *Maneuver and Firepower: The Evolution of Divisions and Separate Brigades*, (Washington, DC: Center for Military History, United States Army, 1998), 244-245, http://www.history.army.mil/html/books/060/60-14-1/cmhPub_60-14-1.pdf.

geared toward fighting and sustaining in a nuclear environment, as well as, on the conventional battlefield.[48] Army leaders believed that the employment of tactical nuclear weapons on the battlefield could help the Army achieve increased firepower while both manpower and allocation to conventional ground combat forces were reduced.[49] To meet these demands, the Army shifted to a tactical nuclear force and developed numerous tactical nuclear capabilities, like nuclear-tipped artillery rounds and Honest John rockets.[50] However, the Army was less fortunate when compared to the Air Force because its shift to a tactical nuclear force accompanied a decline in the Army's overall budget from $16 billion in 1953 to $9.3 billion in 1960.[51]

In addition, the Army was proscribed from pursuing a strategic deterrent during the New Look when a 1956 memo, from Secretary of Defense Charles Wilson, discouraged the Army from planning the use of missiles beyond 200 miles was penned.[52] Further, the same memo gave sole control authority to operate ground-based intermediate range ballistic missiles to the Air Force.[53] Interestingly, the Army nearly secured a place of prominence in the New Look strategy with the development of the first ballistic missile. However, the Army was forced to turn its missile over to the Air Force because the Air Force was developing a similar missile and had already secured the preeminent position within the New Look.[54]

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48. Ibid., 263.
49. Ibid., 263.
50. Ibid., 270-281.
51. Ibid., 286.
52. Trask and Goldberg, *Organization and Leaders*, 71.
53. Ibid.
54. Wilson, *Manuver and Firepower*, 596.

On the other hand, the U.S. Navy insulated itself from major cuts with the introduction of the Forrestal-class aircraft carrier in 1954. The Forrestal-class carrier was capable of accommodating new jet aircraft that could bear nuclear payloads, which secured the Navy a strategic nuclear capability.[55] In addition, the Navy sought nuclear cruise missiles for its surface ships and ballistic missiles fired from its submarines. For its part in the development of the nuclear triad, the Navy overcame an immense obstacle in launching a missile from a submerged vessel. The submarine-launched ballistic missile (SLBM), known as the Polaris missile system, came as a requirement in 1956 and was tested at the end of the decade.[56] Further, the Navy was a participant in nuclear power which insulated it from New Look budget cuts. As early as 1955, the Navy had fielded nuclear-powered submarines and its first nuclear-powered aircraft carrier, the *USS Enterprise*, would set sail in 1960.[57]

One consequence of such a focused investment on nuclear weapons deliverable by aircraft was the so-called missile gap. The Soviet Union performed two successful intercontinental ballistic missile (ICBM) launches in the fall of 1957.[58] In addition to successful ICBM tests, the Soviet Union launched the first satellite, Sputnik, into orbit in October of the same year.[59] To make matters worse, during the same time, the U.S. had

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55. "CV-59 Forrestal Class", GlobalSecurity.org, accessed April 3, 2017, http://www.globalsecurity.org/military/systems/ship/cv-59.htm, paragraph 2.

56. Jerry McConnell, "Polaris: A Success Story", *All Hands*, September 1960, 3, http://www.navy.mil/ah_online/archpdf/ah196009.pdf.

57. Daniel Hernandez, "History of the Nuclear Navy", *Stanford University*, February 22, 2015, http://large.stanford.edu/courses/2015/ph241/hernandez1/, paragraph 7.

58. The United States Cryptologic History. *The Soviet Land-Based Ballistic Missile Program, 1945-1972, An Historical Overview*, 33, https://www.archives.gov/files/declassification/iscap/pdf/2010-005-doc2.pdf.

59. Ibid.

two failed ICBM launch attempts.[60] Soviet progress in missile technology shattered

Eisenhower's belief that the U.S. would remain technologically superior. Most

concerning was that ICBMs upset the nexus between the time of attack and response.

Missiles can strike in a matter of minutes and cannot be recalled like aircraft. In addition,

aircraft must be scrambled and travel through enemy air defenses to reach the target. It

was not until almost two years later, in September of 1959, that the U.S. fielded its first

ICBM, the Atlas-D.[61]

The missile gap highlights an important consequence of the New Look and serves

as the first lesson. Technological superiority is difficult, if not impossible, to guarantee.

Confidence in your country's prowess is important for any leader. But with confidence, a

leader should also be prudent to prepare for other scenarios where its prowess is

challenged. Of course, it was not in Eisenhower's nature to prepare for other scenarios

because he eschewed defense spending that accounted for endless contingencies.

Eisenhower may be correct that endless preparation may result in overspending, but the

missile gap shows that it is wise to have a broader strategy with multiple capabilities.

Here, a balanced approach is best.

In addition to the missile gap, there were other consequences of a nuclear and

strategic aircraft centric strategy. At least one consequence of the New Look was inter-

service rivalry as each service vied for a portion of the defense budget and its unique

place in the strategy.[62] Additionally, service roles and missions were complicated and

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60. Converse, *History of Acquistion*, 391.
61. "Atlas (SM-65)", Warren ICBM and Heritage Museum, http://www.warren
museum.com/missiles/atlas-sm-65/, paragraph 1.
62. Trask and Goldberg, *Organization and Leaders*, 70-71.

contested with the introduction of new missiles.[63] The Air Force benefited greatly from the New Look, not only by securing a large portion of the budget, but also by attaining the foremost position within the strategy. On the other hand, the Army had to prepare to fight and sustain in a nuclear environment, which included developing tactical nuclear capabilities, while receiving a smaller portion of the budget when compared to the Air Force and its historical allocations. Here is another lesson to be learned; some inter-service competition is healthy. However, this competition becomes unhealthy when services are vying for funds to grow its importance within a strategy.

Another consequence of stressing the nuclear strategic deterrent was that the U.S. lacked conventional capabilities. This gives rise to a noticeable quandary with the New Look. The main purpose of the strategic nuclear arsenal was to deter Soviet aggression and prevent escalation. Also, Operation Solarium introduced a more aggressive Containment strategy which included subversive operations. However, New Look investments in nuclear capabilities do not seem to be focused on conducting such subversive operations. Admittedly, with a more aggressive check of the Soviet Union, the U.S. was placing a great deal of weight on its strategic arsenal to prevent escalation.

This leaves one with the question, what would have happened if the Soviet Union was not deterred from taking an action to confront the new U.S. Containment strategy? It is difficult to project but the U.S. was preparing to conduct nuclear operations in the event of general and limited conflict with the Soviet Union. Both the reliance on the strategic arsenal and the Army's integration of nuclear battlefield weapons to increase firepower support this claim. U.S. and NATO forces would have only been a tripwire to

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63. Ibid., 71.

a Soviet conventional invasion of Central Europe. The fact of the matter was that the U.S. would have had no other recourse than to use nuclear weapons, strategic or battlefield, in limited conflict or general war. Obviously, this reality helped to bolster the threat of Massive Retaliation, but if the U.S. did not want to utilize nuclear weapons, it may not have had another option. Of course, this quandary led to the Kennedy administration's strategy of *Flexible Response* in the next decade. The lesson from this quandary is that it is beneficial to have multiple options at a leader's disposal if deterrence fails.

The New Look sought to reign in defense spending, and while the U.S. was able to cut manpower spending, the U.S. still needed to fund the build up its strategic, theater and tactical nuclear capabilities. For perspective, according to a Brookings Institution study, the U.S. spent an estimated $5.5 trillion on the development, production, and the systems to deliver, and defend against nuclear weapons from World War II to 1996.[64] Of the $5 trillion, 22%, or $1.1 trillion, was spent on nuclear programs from 1945 to 1960.[65] In addition, it was noted above that even with manpower reductions, Eisenhower was unable to reduce defense spending to his desired levels. This was because it cost more than projected to develop the U.S. nuclear arsenal. This point gives rise to a very evident lesson; Pentagon programs are often more expensive than first estimated.

Truly, the nuclear arsenal has been an expensive investment. Further, it is difficult to determine the actual deterrent value associated with nuclear weapons.

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64. Stephen Schwartz, "The Costs of U.S. Nuclear Weapons", Nuclear Threat Initiative, October 1, 2008, http://www.nti.org/analysis/articles/costs-us-nuclear weapons/, paragraph 2.
65. Converse, *History of Acquistion*, v.

Whether the U.S. strategic arsenal deterred Soviet aggression is difficult to ascertain. The fact that the Soviet Union and the U.S. avoided a nuclear exchange is not proof that the New Look succeeded in deterring the Soviet Union. Then again, if the arsenal served as an avenue for negotiations and meetings between the two nations to resolve issues and thus avoid war, then nuclear weapons may have served an integral secondary purpose.

Most significantly, the first offset resulted in the foundation of the U.S. strategic nuclear arsenal, including the nuclear triad, which continues to be a mainstay of U.S. defense and security. While, strategies, policies, and views for the use of unconventional weapons has evolved over time, the maintenance of a strategic arsenal has endured. The strategic deterrent and nuclear triad continue to be discussed today. Further, the strategic arsenal has paved the way for other policies, like extended deterrence, which is crucial toward demonstrating U.S. commitment to its allies. Moreover, extended deterrence is one way the U.S. contributes to the nonproliferation of nuclear weapons. It is doubtful that the Eisenhower administration anticipated the long-term outcomes of the New Look. The lesson to be taken from this reality is that strategies can have lasting impacts on the U.S. defense culture. In addition, some ramifications cannot be foreseen by the initiators of the strategy.

In conclusion, not only did the New Look fit the fiscal constraints of the Eisenhower administration, it was a feasible strategy because the U.S. enjoyed an advantage over the Soviet Union in nuclear weapon technology, during this period. As a result of the New Look, the U.S. built up its nuclear forces, fielding and deploying B-52s, ICBMs, and SLBMs. Because the strategy focused on the use of nuclear weapons, U.S. conventional forces were intended to support nuclear operations. Unfortunately, the U.S.

reliance on nuclear weapons in its defense strategy had drawbacks that would appear after the Eisenhower administration had left the White House. Foremost, U.S. advantage in nuclear weapon technology was brief and the Soviet Union quickly closed the nuclear weapon technology gap.

THE SECOND OFFSET

Introduction to the Second Offset

As defined by the Pentagon, the second offset was the period of time during the 1970s and 1980s when the U.S. invested heavily in precision guided munitions, long range/stealth aircraft, intelligence, reconnaissance, and surveillance platforms.[66] Unlike the first offset period, that is clearly defined by the New Look, the second offset cannot be attached to one administration or condensed to a sole strategy. On the contrary, the second offset spanned twenty years and included multiple administrations and Pentagon leaders. In addition, while the New Look relied on the U.S. strategic nuclear arsenal for security, the second offset sought to bolster conventional deterrence by outfitting platforms and weapons with over the horizon technologies. Over the horizon or, emerging technologies, would serve to increase battlefield awareness, capability, depth, and scope to make U.S. conventional platforms more accurate, while simultaneously reducing collateral damage and fratricide.

The above definition of the second offset is used by current Pentagon leaders when introducing the third offset. It is important to recognize that this definition is technology centric. An element the Pentagon definition omits, but was nonetheless crucial to the success of the second offset, was the transformation of U.S. military doctrines, warfighting concepts, and training that took place after the Vietnam War and until the Soviet Union collapsed. Indeed, there were a few major military doctrines that were promulgated during this time, the most prominent was the AirLand Battle Doctrine.

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66. Hagel, "Keynote Address".

These military doctrines accompanied a focused shift in U.S. military strategy away from a counterinsurgency type conflict in Vietnam to confronting and deterring the Soviet threat. In addition to military doctrines, the U.S. military transformed into an All-Volunteer Force while at the same time boosting military training.

As with the New Look, the second offset was influenced by external factors. While the U.S. was concentrated on stemming Communist expansion in Southeast Asia, the Soviet Union and its Warsaw Pact allies were undertaking significant modernizations, both quantitatively and qualitatively, to its conventional and nuclear forces. These modernizations were creating a growing imbalance, when compared to Soviet resources, along the Inter-German border during the early 1970s. Further, during the 1970s the Soviet Union achieved nuclear parity with the U.S. and then, quickly surpassed the U.S. arsenal. These two factors placed serious doubts within the minds of U.S. leaders about the balance of power. For example, a 1976 National Intelligence Estimate described the strategic imbalance between the U.S and the Soviet Union as "sizeable" in favor of the Soviet Union.[67] According to the same document, the imbalance provided the Soviets an increasing ability to "coerce at all levels of confrontation".[68]

The efforts of the second offset were put on display in 1991, during the Persian Gulf War, when the U.S. decimated the Soviet capabilities that comprised Saddam Hussein's military. The Persian Gulf War proved that the U.S. military's integration of emerging technologies into its platforms had been worthwhile. Additionally, the U.S.

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67. "NIE -3/8-76: Soviet Forces for Intercontinental Conflict Through the Mid-1980s", December 15, 1976, B-1, https://www.cia.gov/library/readingroom/docs/DOC_0000498605.pdf.
68. Ibid.

military established itself as the preeminent military power in the Post-Cold War security environment. Indeed, the U.S. military underwent a dramatic transformation from the Vietnam War to the Gulf War. This section will begin by describing the increasing Soviet threat that compelled U.S. leaders to pursue changes beginning in the 1970s. Next, this section will discuss the technologies, doctrines and training reforms that were pursued and effectively changed the U.S. military. Finally, as in the first offset portion, this section will detail any valuable lessons that can be garnered from this offset and applied to the third offset.

The Two-Fold Soviet Threat

During much of the 1960s, the slow escalation of U.S. involvement in Vietnam dominated the attention of U.S. leadership and the military enterprise. However, with the U.S. withdrawal from Vietnam in March 1973, the U.S. pivoted its attentions to the increasing Soviet threat and possible conflict in Central Europe. As stated above, there was a growing uneasiness over the U.S. ability to deter Soviet military action due to Soviet conventional and nuclear modernizations. The qualitative and quantitative improvements of the Soviet Union impacted U.S. perceptions concerning the balance of power and the prevailing thought was that with nuclear parity, as well as numerical and qualitative superiority, the Soviets would no longer be deterred from a conventional invasion of Central Europe.[69]

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69. Rebecca Grant, "The Second Offset", *Air Force Magazine*, July 2016, http://www.airforcemag.com/MagazineArchive/Pages/2016/July%202016/The-Second--Offset.aspx.

The 1973 Annual Defense Department Report, presented by then Secretary of Defense Melvin Laird, stated that strategic realities had come into sharper focus because Soviet buildups had gained greater "momentum" than was projected in the previous year.[70] For example, Secretary Laird pointed to a more rapid development than was expected with regard to the Soviet submarine ballistic missile program.[71] Additional Soviet undertakings, identified in the report, included the identification of 100 new ICBM silos, the continued construction of an Anti-Ballistic Missile (ABM) site surrounding Moscow, Soviet Naval and aircraft modernizations, and finally, two new Soviet battle tanks that the U.S. believed were in production.[72]

Indeed from the end of the 1960's, through the early 1970s, there were noticeable increases in the number of Soviet ICBMs, SLBMs, and overall strategic launch vehicles.[73] In 1966, the Soviet Union had fewer than 400 ICBM launchers and by 1972 had almost 1,600 ICBM launchers at its disposal; whereas the U.S. remained constant with just under 1,200 ICBM launchers from 1967 to 1972.[74] In addition, the Soviet Union increased from under 200 SLBM launchers in 1968 to over 500 by 1972.[75] Similar to its ICBM numbers, the U.S. remained constant with over 600 SLBM launchers from 1967 to 1972.[76] As for strategic bombers, in 1972 the U.S. maintained over 400 strategic

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70. U.S. Department of Defense, *Secretary of Defense Melvin R. Laird's Annual Defense Department Report, FY 1973*, Historical Office, of the Secretary of Defense, February 17, 1972, 30, http://history.defense.gov/Portals/70/Documents/annual_reports/1973_DoD_AR.pdf?ver=2014-06-24-150625-420.
71. Ibid.
72. Ibid., 30-31.
73. Ibid., 38.
74. Ibid., 37.
75. Ibid., 37.
76. Ibid., 37.

aircraft while the Soviet Union maintained fewer than 200.[77] Overall, from 1963 to 1972

the U.S. maintained over 2,000 intercontinental strategic launch vehicles, while during

the same period, the Soviets increased from under 500 strategic launch vehicles to around

2,300.[78]

Not only had the Soviet Union expanded its strategic delivery vehicles during the

1970s, the Soviet Union also qualitatively improved its nuclear forces. Secretary of

Defense Donald Rumsfeld's 1977 Annual Report to Congress outlines the major

qualitative gains in Soviet nuclear capabilities. From 1965 to 1976, the Soviet Union

developed seven new ICBMs compared to zero for the U.S.[79] In addition, three of its

newest ICBM missile silos were hardened and the missiles had been outfitted with

multiple independently targetable re-entry vehicles (MIRV).[80] It was believed that the

Soviet ICBM, the SS-19, was capable of carrying 8-10 MIRVs.[81] Further, the Soviet

Union was developing a MIRV capability for its SLBM fleet, a new land-based mobile

ICBM launcher to augment its current mobile launcher, and had added a new long-range

bomber dubbed the "Backfire" to its suite of strategic capabilities.[82] Finally, in 1978 the

Soviet Union surpassed the U.S. nuclear arsenal with an inventory of 25,393 warheads

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77. Ibid., 37.

78. Ibid., 37.

79. U.S. Department of Defense, *Report of Secretary of Defense Donald H. Rumsfeld to Congress on the FY 1978 Budget, FY 1979 Authorization Request and FY1978-1982 Defense Programs*, Historical Office, of the Secretary of Defense, January 17, 1977, 12, http://history.defense.gov/Portals/70/Documents/annual_reports/1978_DoD_AR.pdf?ver=2014-06-24-150750-460.

80. Ibid., 62.

81. Ibid., 62.

82. Ibid., 62-63.

compared to the U.S. inventory of 24,243 warheads; this was the first time that the Soviet nuclear arsenal was larger than the U.S. arsenal.[83]

Not only was the Soviet Union modernizing and expanding its nuclear arsenal and capabilities, it was also modernizing and increasing its conventional capabilities. In the 1973 Defense annual report mentioned above, the Soviet Union had 160 divisions.[84] Four years later, the number of Soviet divisions had increased to 170 divisions with 31 divisions and supporting aircraft located in East Germany, Poland, Czechoslovakia, and Hungary.[85] According to the 1977 Defense annual report, the Soviet military comprised 4.4 million people compared to 2.1 million in the U.S. Armed Forces.[86] In addition, Soviet conventional qualitative improvements were occurring across the board. The 1973 annual report outlines numerous new and developing aircraft and naval vessels.[87] Further, the Soviet Union developed two new battle tanks, the T-64 and T-72, during the 1970s which were more sophisticated than the U.S. M-60 tank of the same period. The M-60 Patton, which had been fielded in 1959, was little more than an upgraded Sherman tank used in World War II.[88]

Quantitative parity was unfeasible during the Cold War for the U.S. and its allies. Politically and fiscally the West was incapable of such an effort. Therefore, it was imperative the U.S. pursue a different approach to offset its disadvantages. One solution

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83. Grant, "The Second Offset".
84. U.S. Department of Defense, *Secretary Laird's Annual Report*, 47.
85. U.S. Department of Defense, *Report of Secretary Rumsfeld*, 9 & 24.
86. Ibid., 9.
87. U.S. Department of Defense, *Secretary Laird's Annual Report*, 47-50.
88. David Trybula, "'Big Five' Lessons for Today and Tomorrow", Institute for Defense Analyses, May 2012, 8, http://www.benning.army.mil/Library/content/NS%20P-4889.pdf.

to this dilemma was to exploit emerging technologies to increase the U.S. military's

efficiency, effectiveness, and battlefield awareness. The integration of advanced

technologies within military platforms and weapons systems would act as force

multipliers to attenuate Soviet numbers. However, there were additional issues that

needed to be addressed if the U.S. was to rely on technology to offset the Soviet threat.

The U.S. would need to develop a new fighting doctrine that suitably applied the

advancements. Also, personnel changes and training improvements would be paramount

for the U.S. to capitalize on the integration of technology in its platforms and capabilities.

The Plan, the Challenges, and the Lessons

The technologies exploited to rectify the conventional imbalance were derived

from The Long Range Research and Development Planning Program, (LRRDPP). The

LRRDPP began in 1973 and was conducted by the Advanced Research Projects Agency,

the predecessor to today's Defense Advanced Research Projects Agency, or DARPA.[89]

The LRRDPP was instrumental in identifying those capabilities that would yield a more

effective future force and resulted in a set of recommendations "deemed to be of strategic

importance to reshaping the battlefield of the future."[90] The scientific recommendations

included technologies that would enhance precision guided munitions, long range/stealth

aircraft, intelligence, reconnaissance, and surveillance platforms.

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89. U.S. Government, "Long Range Research and Development Plan (LRRDP) Request for Information", *The Wall Street Journal*, December 3, 2014, 3, http://online.wsj.com/public/resources/documents/offsetrfi1203.pdf.
90. Ibid.

The LRRDPP was the Cater administration's contribution to the second offset as it set the strategic vision and the technological foundation for platforms and capabilities that were fielded in later years. An instrumental figure in the Carter cabinet was Secretary of Defense Harold Brown. Brown had a strong scientific and academic background and authorized the development of stealth technologies to defeat enemy air defenses.[91] Additionally, he backed the development of the MX missile, which was fielded in the subsequent administration, to replace the aging Minuteman and Titian ballistic missiles.[92] Also, instrumental in setting the technological foundation was the continuity and support of Pentagon workers in the research and development branches.[93] These members continued the technological pursuit regardless of whom was Secretary of Defense or who was in the White House. The importance of this continuity cannot be underestimated and is the first lesson to be garnered from the second offset. Pentagon programs endure a byzantine process. From research and development, to testing and evaluation. Once those phases are completed, the procurement and ultimately, fielding of platforms and capabilities can occur. With such an intricate process, it is easy to see why programs are contentious and incur budget and schedule overruns as contract requirements are changed or updated throughout the process. Reforms and transformations do not occur overnight and neither can capabilities be fielded as quickly. Therefore, success relies on subsequent leaders' dedication to back reforms throughout

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91. "Harold Brown: James Carter Administration", Historical Office, of the Secretary of Defense, accessed February 1, 2017, http://history.defense.gov/Multimedia/Biographies/Article-View/Article/571287/harold-brown/.
92. Ibid.
93. Grant "The Second Offset".

development to fielding. Also crucial is a permeation of the defense culture to sustain reforms.

The U.S. pursued upgrades to its nuclear arsenal during the second offset, for instance, the MX missile, however, it was relevant that advanced technologies be integrated specifically for conventional capabilities. While nuclear weapons were a staple of the defense culture at the time and were integral to deterrence and security, the U.S. was conducting *conventional* interventions around the globe to thwart the spread of Communism. The Soviet threat was global, not confined to the Inter-German border as so often reminisced. Interventions occurred in Vietnam, the Middle East and as close as Nicaragua in Central America, to name a few. Even Soviet operations, like the invasion of Afghanistan which began in 1979, was a conventional operation. These conflicts show that conflicts occurring around the globe were conventional in nature. Therefore, highly efficient conventional capabilities were a practical response to the security environment of the era. The importance of adopting platforms and capabilities commensurate to the operations and missions being conducted is another lesson to be gleaned from the second offset period. If the third offset is to succeed, it must pursue platforms and technologies useful to the types of operations the U.S. will conduct in the future.

For example, as a result of U.S. emphasis on nuclear weapons for deterrence that permeated the defense culture since the New Look, U.S. forces were trained and equipped to fight a nuclear war; not a slow convention escalation which occurred in Vietnam. The inadequacy of U.S. military platforms to conduct conventional operations is best illustrated by the loss of aircraft the U.S. experienced during the conflict. The Air

Force lost 385 out of a total 833 F-105's.[94] The Air Force F-105 was a fighter-bomber

originally designed as a nuclear attack aircraft during the New Look. Against Soviet

MiGs, over the skies of Vietnam, kill ratios for U.S. aircrews were a mere 2.4 to 1.[95] For

perspective, in World War II kill ratios were 8 to 1 and the Korean War saw kill ratios as

high as 14: 1.[96] These aircraft were designed for nuclear operations, not conventional

bombing, dogfighting, and close air support; the missions these airframes were

conducting over the skies of Southeast Asia. The number of losses can be directly

attributed to the New Look and the U.S. direction to pursue a robust nuclear arsenal to the

detriment of conventional purpose airframes.

As mentioned above, it was both a political and a fiscal impossibility for the U.S.

and its allies to match the Warsaw pact numerically. With the institution of the All-

Volunteer Force in 1973, the U.S. was incapable of conscripting to meet Soviet strength

numerically. In addition, the transition to an All-Volunteer Force created a fiscal

constraint to meeting Warsaw Pact numbers. An interesting attribute of volunteer

militaries is that they are more expensive than conscript militaries. This happens

because, in order to recruit members, benefits such as health, pay, retirement, bonuses,

and schooling are increased to lure recruits.[97] Benefits must also be increased to retain

members after an initial enlistment, in order to grow the senior enlisted and officer corps.

Yet another fiscal constraint was the economic downturn that resulted from the

Energy Crisis during the mid-1970s. This downturn portended the U.S. Department of

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94. Kagan, *Finding the Target*, 25.
95. Ibid.
96. Ibid.
97. U.S. Department of Defense, *Secretary Laird's Annual Report*, 34-35.

Defense did not receive an increased budget during the second offset period.[98]

Additionally, because the U.S. military had to increase pay to its members, without an increased budget, and confront the Soviet threat, advanced technologies offered a solution to this complex fiscal dilemma. On the other hand, technology was not the only solution to this challenge. The U.S. military alleviated some manpower issues when it opened more non-combat military occupations to women and shifted some non-combat duties to the reserve component.[99]

If the conventional and nuclear threat posed by the Soviet Union compelled the U.S. to pursue reforms, it was political and fiscal realities that led the U.S. to select technologically advanced capabilities as the solution to its dilemma. Indeed, there were numerous technological innovations that greatly increased U.S. efficiency, effectiveness, and awareness during the second offset period. These technologies were adapted to platforms beginning in the 1970s and were fielded by the 1980s. The efficiency, effectiveness, and awareness of technologically advanced platforms were compounded with augmented training and doctrinal transformations.

Doctrinal transformations and training improvements began alongside the LRRDPP in the early 1970s. The LRRDPP was not responsible for these transformations and improvements occurred organically as the forces professionalized training and doctrine. In 1973, the U.S. Army Training and Doctrine Command (TRADOC) was

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98. Ibid., 31-32.
99. Richard Stewart, *American Military History: The United States Army in a Global Era, 1917-2008, Volume II*, (Washington, DC: Center of Military History, 2010), 377 & 380, http://www.history.army.mil/html/books/030/30-22/CMH_Pub_30-22.pdf.

instituted.[100] The institution of TRADOC was an important development during this

period because it elevated the status of warfighting concepts and training as an important

feature of the military system. During this period, the first warfighting doctrine to be

announced by TRADOC was called Active Defense. The basic premise of Active

Defense was to quickly concentrate U.S. and NATO forces at Warsaw Pact breakthrough

points and scrap with Soviet forces to prevent a breakthrough.[101] The principal drawback

with this doctrine was that it did not address follow on forces and other facets of the

Soviet military apparatus integral to conventional operations, like command and control

links. It was inconceivable that NATO and U.S. forces would be able to stymie Warsaw

Pact forces indefinitely without addressing second echelon forces and command, control,

and communication assets.

From Active Defense evolved the famous AirLand Battle Doctrine. The 1982

Army manual outlining the doctrine stated the U.S. Army should able to "fight

outnumbered and win".[102] Interestingly, the AirLand Battle Doctrine was based on

Soviet military philosophy, which viewed an enemy holistically and not as a collection of

individual units.[103] This philosophy sought to destroy follow on forces and other

components of an enemy's military system by attacking the enemy throughout its

defense, not solely on the front line. Because the Warsaw Pact had the numerical

advantage when it came to manpower, artillery, and tanks, the U.S. had to counterbalance

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100. Anne Chapman et al., *Prepare the Army for War: A Historical Overview of the Army Training and Doctrine Command, 1973-1998*, (Fort Monroe, VA: Military History Office, 1998), 1, http://www.tradoc.army.mil/Historian/docs/prepArmyForWarChp1_10%20.pdf.
101. Kagan, *Finding the Target*, 55-57.
102. Stewart, *American Military Histroy*, 383.
103. Kagan, *Finding the Target*, 61.

the advantage with a doctrinal focus that took advantage of technological advances and applied them to changes in the conduct of joint and service operational maneuvers. The objective was to inflict enough losses on the enemy to undermine and overcome its strength.

The U.S. AirLand Battle Doctrine exploited the concept of addressing an enemy's capabilities throughout its military structure to engage in close, rear, and deep operations.[104] AirLand Battle sought to reduce the Warsaw Pact second echelon forces and destroy enemy command, control, and communication assets to cause the Soviet and Warsaw Pact forces to be less effective by sending them into disarray. Technology would be utilized, in a combination of platforms, with overlapping capabilities, in an effort to improve NATO firepower.[105] The objective was to see all targets on the battlefield and be capable of destroying each target with one shot. The Airborne Warning and Control System (AWACS) increased battlefield awareness, precision munitions would help to reduce Soviet forces to manageable levels, and stealth aircraft capable of defeating enemy radars would strike second echelon targets to relieve the front line.[106]

In addition to the doctrinal transformations, there were also training reforms. TRADOC emphasized the importance of peacetime training because leaders believed future conflicts would be quick engagements that would not permit the activation of a civilian army in time to reach the conflict.[107] Therefore, the standing All-Volunteer Force had to be a well-trained and tested professional army. Training helped the military

104. Stewart, *American Military Histroy*, 383.
105. Grant, "The Second Offset".
106. Ibid.
107. Stewart, *American Military History*, 384.

increase its performance before battle and it was fiscally advantageous. The Army

conducted a study and found that it was more expensive to replace a trained tank crew

than it was to field a new tank.[108] Therefore, the tank was a battlefield instrument that

needed to ensure the survivability of the crew. TRADOC solved the conundrum of battle

testing its force without putting at risk lives and equipment. The Army introduced

National Training Centers or, NTCs, which were large swaths of land dedicated to force

on force training, simulations, and wargames.[109] With the arrival of training tools, like

the MILES Laser System, force on force training become more realistic and the system

no longer relied on a referee's judgment, but instead was controlled by impartial

computers.[110] These training reforms allowed the force to obtain tactical and technical

proficiency before an actual engagement with the enemy. The result was that leaders saw

how tactics and platforms performed in almost real-life scenarios.

The air services were also rethinking training. Similar to the Army and its tank

crew study, the air services conducted its own study and found that most aircrews were

lost in the first 8-10 missions.[111] The air service reckoned it could complete those first 8-

10 missions under simulation, with realistic training, and increase the survivability of

aircrews and aircraft. The best reflection of this change was in 1972 when an elite pilot

training program was founded known as Topgun. Alongside training, aircraft platforms

were being rethought. The Air Force learned from its inadequate kill ratio over the skies

of Southeast Asia and broke up its airframe designs into smaller programs for specific

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108. Kagan, *Finding the Target*, 38.
109. Chapman et al., *Prepare Army for War*, 38.
110. Kagan, *Finding the Target*, 52.
111. Ibid*.,* 44.

purposes. Hence the development of the F-15 Eagle for air to air combat and the B-1 Lancer for bombing. Each airframe was designed for different missions and thus were better prepared for those specific missions.[112]

The discussion about airframes offers an important insight for today concerning the F-35 Lightning Joint Strike Fighter. In the 1970s and 1980s, the air services chose to pursue different airframes for different missions. Today, the U.S. is pursuing platforms designed for multi-roles. While in theory, a multi-role aircraft, that is co-developed by the services, with minor changes to fit specific needs of the service, seems like an effective way to save money, the program has been plagued with cost and schedule overruns. These overruns can be attributed to the defense enterprise changing the contract requirements and chasing the newest technology. Therefore, even today, a platform with a multi-role mission may not be the best option to pursue due to the bureaucratic process of development through fielding. In addition, a detractor of the F-35 could argue that if the fighter is intended to fulfill multiple roles, then it calls into question the aircraft's ability to adequately fulfill *one* of those roles.

An excellent case study that illustrates the crux of the second offset, the technology, concepts, and overlapping capabilities, is the Army's *Big Five*; the M1 Abrams tank, the M2 Bradley Infantry Vehicle, the Apache and Black Hawk helicopters and the Patriot missile system.[113] A significant historical event, that stimulated U.S. thought during the second offset and generated the Big Five, was the Yom Kippur War of 1973.[114] Interestingly, many U.S. officials believed that tank warfare had become

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112. Ibid., 40.
113. Chapman et al., *Prepare Army for War*, 40.
114. Ibid., 39.

superannuated after this conflict. Combined, the Arabs and Israelis lost more tanks than the U.S. possessed in Europe.[115] The reason for the high loss of tanks in this conflict is attributable to the use of anti-tank missiles which granted both belligerents standoff distance to engage armor outside the range of the tank's main gun. In addition, anti-tank missiles were a potent firepower weapon because an armor resilient enough to protect tanks did not exist.

However, the assumption that tank warfare was obsolete would prove to be incorrect with the arrival of ceramic composite armor. The M1 Abrams took advantage of ceramic armor which is lighter and stronger than steel allowing the Abrams a high level of mobility and speed without sacrificing protection. In addition to the new armor, the cannon was stabilized by a computer that accounted for speed, wind, elevation, and other physical factors.[116] Also, the tank round was greatly improved with the arrival of stabilizers and penetration rods.[117] Not only was the Abrams more resilient and more potent than its predecessors, but the introduction of a suite of platforms would help the U.S. military outclass adversarial forces.

The second platform in the Army's Big Five is the infantry combat vehicle named the M2 Bradley. The Bradley was designed with a smaller cannon and machine guns for close-in fighting, as well as, the ability to transport infantry.[118] Further, the M2 is equipped with a TOW missile, granting the Bradley the capability to engage tank armor at distance to protect the Abrams from anti-tank missiles, thus allowing the Abrams to

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115. Stewart, *American Military History*, 381.
116. Ibid., 384-385.
117. Ibid., 384-385.
118. Stewart, *American Military Histroy*, 386.

close distance. The third platform of the Big Five is the AH-64 A Apache helicopter

built as an anti-tank capability to fly close to the ground in a high-intensity battle. The

Apache was delivered to units in 1983 and was later equipped with night vision and

sensing devices enabling the helicopter to fly in different types of environments.[119] The

UH-60 A Blackhawk helicopter is a transport platform and is the fourth in the Big Five.

The Blackhawk is utilized to transport troops and equipment to and from the battlefield.

The last platform is the Patriot air defense missile which originally began as an anti-air

capability guided by computer and radar. The Patriot system was later developed into an

anti-missile capability to protect against tactical missiles like the Soviet SCUD missile.

The Big Five utilized unique technological advancements and were developed to work in

tandem and augment one another. These capabilities were ideal for AirLand Battle and

continue to be an impressive suite of capabilities that continue to be modified as needed.

The principal lesson to be learned from the second offset is that technology is not

a panacea. It enhances capabilities, but by itself, it does not have transformative powers.

It is in the hands of well-trained troops and utilized in well-thought operational concepts

that technologies flourish and the entire military enterprise benefits and advances. It is

difficult to assign greater or lesser value to any single pursuit in this transformation.

Without technology, the AirLand Battle Doctrine would not have been a feasible strategy.

Likewise, without doctrine and training, technology would not have been applied

systematically to the military enterprise. The nexus between technology, doctrine, and

training was an ecosystem of symbiotic relationships; each performed a necessary

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119. Trybula, "Big Five", 47.

function and coalesced to produce a major transformation. Importantly, the second offset period capitalized on new technologies and other reforms.

Secretary of Defense Brown would later reflect on the second offset period and say "The Carter Administration initiated and developed these programs, the Reagan Administration paid for their acquisition in many cases and the…Bush Administration employed them."[120] Indeed, the second offset platforms and the accompanying warfighting concepts were not employed against the Warsaw Pact in Central Europe. While many leaders, strategists, and academics, on both sides, speculated the results of a conflict between NATO and the Warsaw Pact, it impossible to state with certainty the outcome. On the other hand, the Persian Gulf War gives some insight into the return value of second offset investments. The decimation of Saddam Hussein's Soviet military capabilities validated U.S. efforts.

While the Pentagon definition of the second offset period seems to end with the collapse of the Soviet Union, it would be remiss not to mention advancements that occurred following this period. Truly, second offset capabilities enabled the U.S. to step into the role of the sole superpower after the dissolution of the Soviet Union. The second offset's advanced technologies were used in conflicts and interventions in the early 1990s in Iraq and the Balkans. Smart munitions are heralded in these campaigns because of improved accuracy, collateral damage was mitigated. Original smart munitions were optically guided, then laser guided, and now GPS guided.[121] However, these controlled operations would not have been possible without the integration of information

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120. Grant, "The Second Offset".
121. Ibid.

technology in the battle space that allowed U.S. forces to view the entire battlefield. A main effort undertaken by the Army in the 1990s, was to multiply its information sharing and communication ability by digitizing its force; viewing the battlefield in real time.[122]

The importance of advanced technologies did not end with the turn of the century. Within its first year, the Bush administration launched a "new triad" which placed emphasis on conventional strike capabilities alongside unconventional capabilities, a missile defense system, and a robust defense infrastructure. Further, the U.S. has relied on technologies developed during the second offset for operations in Iraq and Afghanistan over the past 15 years, including smart munitions and ISR platforms. Although investments in the second offset began in the 1970s and 1980s, the U.S. has continued to evolve, both the technologies and strategies.

The U.S. continues to possess an operational advantage with the technologies and platforms that were developed during the second offset. However, the U.S. advantage in these technologies is eroding, therefore, the third offset is designed to address this dwindling lead. It is not inconsequential that the U.S. has enjoyed an advantage in second offset technologies for almost 40 years. In reality, after the fall of the Soviet Union, there was no country, opposed to the U.S., that had the knowledge base and infrastructure to challenge the U.S. advantage. As seen from the New Look, the U.S. advantage in nuclear weapon technology was fleeting because there was a competitor with the technological and intellectual base to challenge U.S. nuclear superiority. In addition, the security environment of the New Look and second offset are starkly

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122. Christopher Toomey, "Army Digitization: Making it Ready for Prime Time", *Parameters*, 2003, 41, http://strategicstudiesinstitute.army.mil/pubs/parameters/Articles/03winter/toomey.pdf.

different from today's. Further, the current offset is expected to compete in the future

security environment. Therefore, before introducing and analyzing the third offset, it is

important to describe elements U.S. planners predict will comprise the future security

environment.

THE FUTURE SECURITY ENVIRONMENT

If previous offsets have been pursued in response to specific threats, coupled with the prevailing security challenges and environment of their respective eras, then it is advantageous to detail the future security environment that the third offset is intended to compete in. In addition, this is valuable because the success of the third offset hinges on whether the major thrusts of this strategy are well aimed to confront future challenges. Indeed, it is difficult to predict the future security environment and any threat projection should be met with a certain amount of skepticism. Although threat forecasting is an inexactable task, it is nonetheless useful to provide guidance and ensure U.S. forces do not languish. Acknowledging the uncertainness of this task reinforces the need for adaptable forces capable of confronting a myriad of emerging and unknown threats. With the guidance of U.S. strategic documents, like the National Military Strategy, National Security Strategy, and the Quadrennial Defense Review, future threats and challenges the U.S. is envisaging can be gleaned.

In the 2015 National Military Strategy, the Chairman of the Joint Chiefs of Staff characterized the global security environment as the most unpredictable he has seen in his 40 years of service.[123] According to the same document, the U.S. currently faces multiple and simultaneous security challenges from many threat actors with a wide array of capabilities. This has created a security environment that is complex and prone to rapid changes. These rapid changes are fueled by a number of factors including demographic shifts, globalization, altering power dynamics, and the diffusion of technology. These

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123. Joint Chiefs of Staff, *National Military Strategy*, i.

characteristics, indicative of the current environment, are expected to continue. Other

strategic documents echo the National Military Strategy in this view.

At first glance, it seems outside the scope of normal military preparation to

account for shifting demographics. However, this assumption is misplaced. According

to a Center for Strategic and International Studies assessment, which compiled

demographic data, the world population is expected to grow from the current 7.3 billion

people to 9.4 billion people by 2045.[124] Most of this growth is expected to occur in

developing countries. Also, the population surge in developing countries will occur as

the populations of industrialized nations grow older. Further, the number of megacities,

defined as dense urban areas with a population more than 10 million people, will increase

from 29 to 40 by 2030.[125]

The impacts of demographic shifts on the future security environment are

numerous. One could imagine a future replete with food and water shortages, as well as,

energy crises. Resource shortages, coupled with a lack of economic opportunities caused

by population growth and the replacement of human jobs with technology, could foment

a large disaffected population that could easily destabilize a nation. The current refugee

crisis, triggered by the Syrian Civil War, offers an observation into impacts on the

security environment caused by demographic shifts. In the short term, the mass

migration of peoples to more stable, safe, and secure places in the West has raised

security concerns about vetting. In addition, if the millions of displaced people do not

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124. David Miller, *Defense 2045: Assessing the Future Security Environment and Implications for Defense Policymakers*. (Lanham, MD: Rowman & Littlefield, 2015), 4, https://csis-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/publication/151106 _Miller_Defense2045_Web.pdf.

125. Ibid.

return to their homeland after the region stabilizes, the population could have a lasting impact on the countries where refugees settle. The above scenarios are bleak results of changing demographics. On the other hand, population growth, that is well managed, could engender a new partner for the U.S. or the birth of a regional hegemon that is a security provider for its region.

Of particular concern for military operations is the urbanization of the world's population. According to a United Nations study, 54% of people live in urban areas and this percentage is expected to rise to 66% of the population by 2050.[126] As mentioned above, the number of megacities is expected to increase as well. As previous conflicts in this, and past centuries have demonstrated, it is extremely difficult to conduct military operations in urban environments. An organized, effective, and balanced military operation in such an environment takes unique training and conditioning. Differentiating between civilians, hostile actors that may not fall within traditional parameters as combatants, and actual adversarial military forces, will become increasing difficult in the future. Also, ingress and egress from these zones will require a collection of platforms and capabilities that are suited to the urban environment.

Not only will the population increase, but the future population will also be more connected. Globalization and the diffusion of technology have revolutionized interactions amongst people, organizations, and governments, at all levels. Using digital communication and social media, events and ideas spread quickly throughout the world,

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126. "World's Population Increasingly Urban with More Than Half Living in Urban Areas", United Nations Department of Economic and Social Affairs, July 10, 2014, paragraph 1, http://www.un.org/en/development/desa/news/population/world-urbanization-prospects-2014.html, paragraph 1.

seemingly unencumbered by national boundaries. One can imagine a future security

environment ripe with the use of digital information. While globalization and the

diffusion of technology have positively impacted humankind, both have created unique

challenges for the U.S. military. For example, the diffusion of technology is challenging

the U.S. competitive advantage in military systems, like early warning and precision

strike capabilities. Three of the U.S. strategy documents acknowledge that the U.S. will

be operating in a future environment replete with sophisticated technologies like ballistic

missiles, unmanned systems, space, and cyber capabilities.[127,128,129]

Indeed, U.S. adversaries are developing the above capabilities to counter the U.S.

technological advantage to challenge U.S. power. Currently, China and Russia are

modernizing their respective forces to neutralize the suite of U.S. second offset

technologies. Moreover, the demonstrated use of second offset technologies and

platforms in conflict serve as both a model to emulate and a guide to overcome. Whether

from large states or small power brokers, there is no doubt that the U.S. will face

increasingly technologically capable adversaries in the future.

Although the National Military Strategy and other documents are cognizant of a

future where technology is more widespread to a range of actors, these documents do not

mention efforts to curtail the diffusion technology. While the U.S. continues to support

counterproliferation and nonproliferation sentiments efforts with respect to ballistic

missiles and weapons of mass destruction, the strategy documents do not mention

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127. Joint Chiefs of Staff, *National Military Strategy*, 1 & 3-4.
128. U.S.Department of Defense, *Quadrennial Defense Review*, iii & 3-9.
129. White House, National Security Strategy, February 2015, 14, http://nssarchive.us/wp-content/uploads/2015/02/2015.pdf.

sentiments to stem the diffusion of technology. To the contrary, an element of building

stronger relationships with allies consists of assisting allies and partners with developing

their own technologically adept forces.[130] The goal of this effort is to increase the

deterrent and fighting capability of allies and partners resulting in increased security

overall. While increased security and strengthened relationships are positive, at least one

drawback is the creation of an additional avenue to diffuse technology. This could mean

that adversaries may be able to access proprietary U.S. technology sooner.

Not mentioned in the overarching strategy documents, but important to mention,

are emerging technology sectors that are believed to offer an opportunity for any actor

that can harness the scientific powers of these sectors to fabricate revolutionary

capabilities. The most notable are the biotechnology and nanotechnology sectors. A

variety of states, large and small, wealthy and less wealthy, have set in motion

government-backed initiatives aimed at developing these sectors to upset the traditional

balance of power.[131] What makes these sectors appealing is that the threshold; cash,

knowledge, and infrastructure, for these type of technology centers is less when

compared with other types of technologies, like nuclear. Essentially, it is easier for less

advanced states to compete with more advanced nations to research, develop, and

ultimately breakthrough, in these sectors. This shows that not only is the diffusion of

technology an element of the future security environment, but also research and

development will be more competitive and will not be solely reserved for states with

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130. U.S. Department of Defense, *Quadrennial Defense Review*, 17.
131. Anne Clunan and Kirsten Rodine-Hardy, "Nanotechnology in a Globalized
World: Strategic Assessments of an Emerging Technology", *Naval Postgraduate School*,
June 2014, 25, https://core.ac.uk/download/pdf/36735318.pdf.

large defense-industrial enterprises. This could signify that smaller countries may become more empowered in the future.

An added element of these technologies that has ramifications for the future security environment is the dual-use nature of these programs. Both nanotechnology and biotechnology have applications in the civilian and military worlds.[132] For example, a biotechnology center studying a cure for a disease could also covertly be enhancing the lethality of biological warfare agents. Or a nanotechnology center could quickly convert research from civilian applications to military uses in a time of national emergency. The dual-use characteristic of these technologies creates the need for better intelligence to discover any furtive motives of these programs. However, the ability to adequately review each program may be an insurmountable task based on the number of such centers increasing around the world.

While things may appear differently in the future, U.S. strategy documents assert that nation-states will remain the international system's dominant actors in the future security environment.[133] This prediction seems to be based parochially in that it is difficult for the current generation to imagine the Westphalian power structure ending. Although, this prediction has been strengthened by recent events; namely the Brexit vote. There seems to be growing push back against international organizations and their ability to regulate member nations' powers. However, it is difficult to extrapolate this sentiment as enduring or ephemeral.

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132. Ibid., 6.
133. Joint Chiefs of Staff, *National Military Strategy*, 2.

Indeed, there are some revisionist states attempting to create new international norms and behaviors, as well as, new centers of power using unique methods to undermine the traditional system. For instance, the Russian sponsored invasion of Crimea has utilized overlapping state and non-state violence where the actors have blended techniques, capabilities, and resources.[134] This type of overlapping techniques is referred to as *hybrid* conflict and has become common to the vernacular of the security and defense communities. A feature of hybrid conflict is that it creates ambiguity as to the threat actor's actual and perceived involvement and thus complicates decision making for any actor wishing to combat hybrid conflict. In addition, hybrid warfare offers the aggressor a way to circumvent international organizations by allowing the aggressor to deny the breadth and depth of involvement and support.[135]

On the other hand, China is employing what some refer to as *lawfare*; using or misusing law as a substitute for traditional military means to achieve an operational objective.[136] By using existing international law, China is attempting to redraw its territorial boundaries by reclaiming disputed islands, reefs, and atolls in the South China Sea. This territory is highly contested due to its numerous resources and strategic value. Not only is the Sea believed to contain an abundant oil and gas reserve, a significant amount of the world's shipping traffic passes through the South China Sea. By claiming and occupying these islands, China could use international norms to extend its territorial

134. Ibid., 4.
135. Ibid., 4.
136. Charles Dunlap, "Lawfare Today: A Perspective", *Yale Journal of International Affairs*, Winter 2008: 146, http://yalejournal.org/wp-content/uploads/2011/01/083111 dunlap.pdf.

waters to encompass the South China Sea in its entirety.[137] Whether through hybrid warfare or lawfare, what can be projected is that these types of strategies will continue to be employed in the future security environment if states can achieve goals and objectives through these methods.

While states will most likely remain dominant actors in the international system, non-state actors like violent terrorist organizations will continue to be prevalent. Military incursions and operations, led by the West and its allies, to combat extremism in the Middle East, North Africa, and Southeast Asia have remained steady. These operations have remained steady despite a more than decade-long battle with terrorist affiliates in Iraq and Afghanistan, by the U.S. and its partners. Terrorism has been utilized as a tactic for centuries; therefore, it is unlikely to be eliminated. Two mistakes are often made when appraising terrorism in today's security environment that must be rectified for the future security environment. First, that terrorism is a phenomenon associated solely with Islam and initiated by the 9/11 attacks. In reality, the U.S. and allies have been dealing with Islamic extremism for decades before September 11, 2001. Therefore, it is important to widen our historical perspective when examining the threat posed by terrorism. Second, it is wrong to assume that any ideology can be eradicated in a few years with military operations. Kinetic operations are not the only way extremism should be stemmed.

While shifting global demographics, the diffusion of technology, new power brokers, and unique methods of conflict are expected in the future security environment,

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137. Marina Tsirbas, "What Does the Nine-Dash Line Actually Mean?", *The Diplomat*, June 2, 2016, http://thediplomat.com/2016/06/what-does-the-nine-dash-line-actually-mean/.

the third offset must also fulfill mainstays of U.S. strategy. Indeed, there are certain predominant objectives that have endured as pillars of U.S. defense strategy since World War II. These enduring objectives have weathered numerous administrations, leaders, budgets, and many other changes. Most likely, regardless of external and internal pressures, the U.S. will remain a global power with global interests. Therefore, the third offset must fulfill these enduring pillars.

The key strategic mainstay of U.S. strategy is to *deter* aggression, and if deterrence fails to *deny* the adversarial objectives and ultimately *defeat* the enemy. While the terms, "deter", "deny" and "defeat" go through minor iterations depending on leadership, the principle is the same; confront aggression and secure American interests. The second foundational principle of U.S. strategy is to strengthen relationships with allies and partners. A considerable piece of building and maintaining strong relationships comes from the U.S. forward deployed presence. Forward deployed assets demonstrate U.S. commitment to allies and establishes the U.S. in a more advantageous position to achieve the first objective. It is unrealistic to believe that these hallmarks will undergo drastic changes in the future. Thus, the third offset must be geared toward ensuring these essential objectives.

Less essential, but still foundational hallmarks of U.S. strategy, are to support the spread of democracy and maintain the All-Volunteer Force. The U.S. has long supported emerging democracies and the desire to export democratic processes and ideology. At least one unintended consequence of supporting democracies is that democracies can change orbits with the election of new leaders. The U.S. is experiencing this in the Philippines. As the U.S. supports the export of democracy, it must appreciate that the

strength of alliances can ebb and flow, but it must support the direction that the partner country has chosen. It is an exercise in statecraft to demonstrate that even democratic nations can have differences but those differences are not drastic enough to engender violent conflict.

In order to meet these hallmark objectives, the military outlines priority missions. These missions are to maintain a safe and secure nuclear deterrent, provide military defense for the homeland, defeat an adversary, provide a global stabilizing presence, combat terrorism, counter weapons of mass destruction, deny adversary objectives, respond to crisis, conduct military engagement and security cooperation, conduct stability and counterinsurgency operations, provide support to civilian authorities and finally, conduct humanitarian and disaster relief.[138] Indeed, this is a litany of "priority" missions. In short, the U.S. military must be capable of conducting a multitude of missions, across the spectrum of threats.

With a litany of diverse missions, the U.S. must be adaptable to changing situations and be prepared to conduct any mission around the globe. To this end, the strategy documents state the U.S. should be capable of swift and decisive force projection.[139] Many strategy documents delineate what the Joint Force should stress to accomplish swift and decisive force projection, to address priority missions, and to achieve essential objectives. First, the Joint Force seeks the best and the brightest Americans for its ranks.[140] Second, the U.S. seeks investments to counter anti-access and

138. Joint Chiefs of Staff, *National Military Strategy*, 10-13.
139. U.S. Department of Defense, *Quadrennial Defense Review*, 19 & 36.
140. Joint Chiefs of Staff, *National Military Strategy*, 8.

area denial (A2AD) capabilities, space, cyber, and hybrid threats.[141] These investments include, space and earth-based indications and warning systems, integrated and resilient intelligence, surveillance and reconnaissance assets, strategic lift platforms, long-range precision weapons, missile defense technology, undersea systems, remotely operated vehicles, special forces, and a Cyber Mission Force, among others.[142]

One may notice that the two elements the Joint Force seeks closely align with the three thrusts of the third offset strategy. The only thrust missing is the development of operational concepts. These strategy documents, which were released after the unveiling of the third offset, show that the third offset is currently underway. Indeed, the services are pursuing some incredible technologies geared toward alleviating impacts of the future security environment. Many technologies and concepts are beginning to be tested and are close to fielding. While similar to previous offsets in many ways, the third offset also has many unique attributes. In addition, there are other endeavors that are being pursued in conjunction with the third offset to facilitate the implementation of the bold strategy.

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141. Ibid., 16.
142. Ibid., 16.

THE THIRD OFFSET

Introduction to the Third Offset

To face the challenges of an uncertain and unpredictable future security environment, as well as, to address the dwindling U.S. technological advantage, the U.S. is pursuing a new strategy. The third offset strategy is aimed with advancing cutting-edge technologies for use in military applications, developing operational concepts to maximize the utility of cutting-edge technologies, and finally with retaining the best and brightest Americans for service in the U.S. military. There is not one preeminent document that outlines and delineates the strategy in its entirety. To the contrary, much of the information concerning the third offset comes from speeches and interviews with top Pentagon officials. In addition, major tenets of the third offset strategy can be found in many key U.S. strategy documents. Further, the services are actively pursuing new operational concepts while, researching, developing, and testing cutting-edge technologies. The direction to move forward has been given and the strategy has permeated the U.S. military enterprise.

Indeed, the three major thrusts of the strategy offer innovative ways to improve the military enterprise and enhance warfighting capabilities. From the Navy's electromagnetic railgun, with offensive and defensive applications, and advanced manufacturing like, 3-D printing, that has the potential to simplify the complexities of supply chains and logistics. Both capabilities, and many others are cost effective breakthroughs that offer pioneering ways to ensure U.S. military dominance. Operational concepts are utilizing Artificial Intelligence (AI) and autonomous systems to augment the

human decision-making process. Machine power augmenting human performance is

believed to offer the greatest impact for the third offset period.[143] In today's

interconnected world, the young men and women growing up with technology are

tomorrow's warfighters. Therefore, efforts are in motion to recruit the next generation of

technologically adroit warfighters.

With a myriad of threats and a diverse range of operations, the third offset is not

intended for one adversary but is intended to blunt multiple military competitors. While

still in its emergent stages, new technologies, warfighting concepts, and highly trained

warriors are geared toward modernizing and *leaning* out the military.[144] In addition, the

strategy is not intended to fight future wars but to deter future conflict. The Pentagon

views the diminishing U.S. technological lead as a threat to U.S. deterrence. Therefore,

the purpose of the third offset is to develop these thrusts to maintain U.S. military

superiority and ensure peace through a strong conventional deterrence.

Moreover, this strategy is expected to be a continuous assessment and

development. The U.S. no longer expects to have a monopoly on a technological

advantage for 40 years, thus, the third offset is focused on sustaining the technological

lead in short-term increments of three to five years.[145] This may seem like an

unattainable development regimen for a bureaucratic morass like the Department of

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143. U.S. Department of Defense, "The Third Offset Strategy", YouTube video, 27:59, Deputy Defense Secretary Robert Work speaks to the Air Command and Staff College about The Third Offset, posted by the Department of Defense, May 27, 2016, https://www.youtube.com/watch?v=wA0epN0L1fc.
144. U.S. Department of Defense, *Secretary of Defense Ash Carter Submitted Statement to the Senate Armed Services Committee on the FY 2016 Budget Request for the Department of Defense*, March 3, 2015, 4, http://www.defenseinnovationmarketplace. mil/resources/20150303SenateArmedServicesCommitteeSECDEFBudgetTestimony.pdf
145. U.S. Department of Defense, "Third Offset Strategy".

Defense. However, the organization has acknowledged its shortcomings, with regards to business practices, and the third offset strategy is part of a larger Department wide initiative. Other initiatives and reforms in areas like, audits and procurement, are intended to support the third offset to reduce barriers and impediments.

Truly, the third offset is an ambitious strategy and this section will begin by introducing the third offset and its three major aims. In addition, this section will discuss some of the accompanying initiatives that are intended to strengthen the third offset. This strategy has been liberated from the philosophical debate and has produced tangible results. Therefore, this section will provide a brief overview of various undertakings for each aim.

The Third Offset Strategy

As mentioned above, much of the information that has been released concerning the third offset strategy has come from speeches, testimonies, and press releases from Pentagon leaders. In addition, since the strategy is still in its early stages, it can be difficult to locate information outside Pentagon sources. This offers benefits including, obtaining information directly from the source. Of course, with only one avenue to glean information, at least one drawback is biasness. Also, because the strategy is incipient, it is fluid and continues to take form. Fluidity offers the Department of Defense the ability to adapt the strategy to pressures from the changing security environment and emerging security challenges.

The third offset strategy was introduced in 2014 as part of a larger U.S. Department of Defense initiative. Laid out in the keynote address before the Reagan

National Defense Forum, former Secretary of Defense Hagel announced the Defense

Innovation Initiative. The foremost goal of this initiative is to terminate the loss of the

U.S. technological advantage to ensure the U.S. maintains a robust and effective

conventional deterrence. This extensive initiative is aimed with;

1) Developing cutting-edge technologies by focusing on fields such as robotics, autonomous systems, miniaturization, analyzing big data, and advanced manufacturing, like 3-D printing.
2) Exploring new operational concepts and approaches to warfighting by utilizing the cutting-edge technologies developed.
3) Acquiring and retaining the best and brightest minds to pursue the previous objectives.[146]

In short, technical innovation, coupled with the development of operational concepts and

doctrine, will produce the third offset strategy. According to the figurehead behind the

third offset strategy, Deputy Secretary of Defense Robert Work, the offset strategy

utilizes U.S. advantages to offset, or undermine, adversarial advantages.[147]

The third offset strategy is intended to address the long-term security of the U.S.

by addressing current instabilities while simultaneously, planning and preparing for

future threats and the future security environment. In addition, the U.S. views adversarial

advancements and modernizations as efforts to blunt the U.S. technological edge. Both

Russia and China are modernizing their military capabilities on a trajectory to become

U.S. peers. In addition, these modernizations can be thought of as an adversarial offset

strategy aimed at undermining U.S. strengths, mainly U.S. technological superiority and

expeditionary force projection. The third offset is intended to respond to the "adversarial

offset".

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146. Hagel, "Keynote Address".
147. U.S. Department of Defense, "Third Offset Strategy".

The U.S. technological lead is dwindling and is best illustrated by outlining

technologies, modernization regimes, and platforms that growing powers are seeking

which include; advanced aircraft, submarines, longer range and more accurate cruise and

ballistic missiles, anti-ship missiles and counter space, cyber, and electronic warfare

capabilities.[148] Advanced aircraft, like the new Chinese fifth-generation fighter and the

Russian fifth-generation fighter under development, are intended to weaken U.S. air

supremacy. In addition, China has christened five new *Luyang-III* class guided missile

destroyers that carry its "carrier killer" missiles.[149] Russia has recently deployed a new

cruise missile, dubbed the SSC-X-8, that the U.S. contends violates the Intermediate-

Range Nuclear Forces Treaty.[150] Longer range and more sophisticated ballistic and

cruise missiles, like the Chinese "carrier killer" and the new Russian cruise missile,

threaten the U.S. homeland and the U.S. forward presence to limit U.S. involvement

during tense situations or a conflict.

Another way U.S. adversaries are seeking to offset U.S. strengths is by targeting

information and other electronic networks the U.S. utilizes in every operation. In

addition, the electronic and computer infrastructure are vulnerable to exploitation and a

successful attack can undermine U.S. military effectiveness.[151] Therefore, adversaries are

developing and, in some instances, have already utilized, informationalized warfare

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148. U.S. Department of Defense, *Quadrennial Defense Review*, 3.

149. Franz-Stefan Gady, "China Commissions New 'Carrier Killer' Warship", *The Diplomat*, January 24, 2017, http://thediplomat.com/2017/01/china-commissions-new-carrier-killer-warship/.

150. Michael Gordon, "Russia Deploys Missile, Violating Treaty and Challenging Trump", *The New York Times*, February 14, 2017, https://www.nytimes.com/2017/02/14/world/europe/russia-cruise-missile-arms-control-treaty.html?_r=0, paragraph 3.

151. P.W. Singer and Allan Friedman, *Cybersecurity and Cyberwar: What Everyone Needs to Know*, (New York, NY: Oxford University Press, 2014), 69.

capabilities, like cyber-attacks. Numerous examples abound from North Korea's hack of Sony Pictures, to China's theft of information from the U.S. Office of Personnel Management, to Russia's Distributed Denial of Service (DDoS) attack against Estonia in 2007. Cyberattacks and network intrusions are difficult to defend against because they materialize at the speed of light along fiber optic cables and are not confined by geographic or other physical boundaries.[152] In addition, attribution of intrusions and attacks in cyberspace are complicated in that, the actor can easily obfuscate its location and conceal its motives.[153]

Because U.S. adversaries are developing asymmetric capabilities in every domain, the U.S. must be prepared to conduct and combat operations across all domains; land, sea, air, space, and cyberspace. Further, while the examples above pertained to states, today's technologies are evolving rapidly, are no longer reserved for actors with defense infrastructures, and are easily accessible to a range of actors.[154]

For the past forty years, the U.S. has held a monopoly on technologies that were developed during the second offset. Many competitors have observed how the U.S. has utilized those technologies in operations and are seeking to emulate and implement those capabilities in their own military enterprise. Further, because the use of such technologies has been optimized, adversaries have recognized advantages and weaknesses. The well-established nature of the current suite of U.S. platforms, in military operations, gives adversaries insight to undermine the U.S. advantages. Although the use of U.S. platforms and capabilities is well-known, the third offset is not

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152. Ibid.
153. Ibid., 74.
154. U.S. Department of Defense, *Quadrennial Defense Review*, 3.

solely about introducing new and expensive platforms. A large element of the offset is to upgrade and integrate cutting-edge technologies into existing platforms, thus, creating new or enhanced capabilities.[155]

The core issue with adversarial modernizations and development of asymmetric capabilities is the U.S. ability to conventionally deter adversaries and growing power states may be called into question. Therefore, the Department of Defense views the dwindling U.S. technological edge as an erosion of the value associated with the U.S. conventional deterrent.[156] Thus, it is an imperative that the U.S. respond with investments in innovation and reforms at present to maintain a lead ahead of any potential gains from an adversary. The third offset is intended to give U.S. warfighters every advantage over potential enemies.

Moreover, this strategy is expected to be a continuous assessment and development. Again, the U.S. no longer expects to have a monopoly on a technological advantage for 40 years. Thus, the third offset is focused on sustaining the technological lead in short-term increments.[157] In explanation, the U.S. is seeking to implement the three aims to gain the operational advantage in the next three to five years. Once that has been completed, the U.S. will begin anew to develop and implement innovations to ensure the advantage for the next period of years, and so on. In the end, the U.S. is attempting to restrict its adversaries' ability to compete by continually remaining at the forefront. These short-term cycles are intended to have long-term ramifications.

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155. Ibid.
156. Ibid.
157. Ibid.

To maintain a rapid cycle and lower obstacles to innovation, the third offset is accompanied by other Department of Defense programs directed to streamline Pentagon business practices. In addition, the Pentagon has acknowledged that many of today's cutting-edge technologies are developed outside the traditional defense apparatuses. Technological advances are occurring in the private sector for commercial uses. To acquire these technologies, the Pentagon has increased investments outside the familiar defense companies. Furthermore, to foster a greater collaborative relationship between the government and the technology industry, the Pentagon has opened outreach offices in Silicon Valley and in other burgeoning technology cities.

Accompanying Initiatives

The Defense Innovation Initiative is a department wide effort to identify and invest in ways to sustain and advance U.S. military dominance in the 21st Century.[158] To this end, other reforms and innovations, outside technologies and operational concepts, are integral if the third offset is to succeed. U.S. Secretary of Defense Ash Cater explained, in his statement to the Senate Armed Services Committee on the FY 2016 Department of Defense Budget, the chief area where the military enterprise needs reforms are in its business practices.[159]

To remain competitive Secretary Carter stated the Department of Defense needs to curb wasteful spending and be accountable for expenditures, as cost overruns hurt public trust.[160] It may be difficult to believe but the Department of Defense has never

158. U.S. Department of Defense, *Ash Carter Submitted Statement*, 9.
159. Ibid., 3.
160. Ibid., 4-6.

undergone a Department wide audit. However, the National Defense Authorization Act of 2010 requires the Department to have its full financial statements audit-ready by September 30, 2017.[161] According to a Department of Defense audit readiness document, the organization is continuing its efforts to meet this goal and audits have been instrumental in assisting the enterprise to review its business practices and management systems.[162]

In addition to audits, programs like Better Buying Power are other initiatives the organization is pursuing to streamline and review and its business practices. Better Buying Power, now in its third iteration since 2010, is a Department of Defense mandate "to do more without more."[163] It is intended to strengthen the Department of Defense's buying power by implementing a series of reforms to control the costs of programs through competition, incentives, and curtailing the bureaucratic process. Better Buying Power focuses on affordable programs, controlling costs throughout capability life-cycle, incentivizing productivity in government and industry, eliminating unnecessary and unproductive processes in the bureaucracy, promoting competition, and improving the professional and knowledge of the acquisition workforce.[164] By controlling costs and reducing fraud, the Department of Defense can reallocate defense dollars to pressing challenges. In addition, a mandate like Better Buying Power will ensure third offset

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161. U.S. Department of Defense, *Financial Improvement and Audit Readiness (FIAR) Plan Status Report*, Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, May 2016, ES-1, http://comptroller.defense.gov/Portals/45/documents/fiar/FIAR_Plan_May_2016.pdf.

162. Ibid., ES-1.

163. "What is Better Buying Power?", U.S. Department of Defense, accessed February 12, 2017, http://bbp.dau.mil/.

164. Ibid.

technologies and innovations reach the warfighter rapidly by reducing obstacles to acquisition. Smooth acquisition cycles will be key if the third offset is to achieve short-term development cycles and sustain with the quick pace of technological development.

Technological developments are no longer occurring solely at the government level; many advances are occurring in the private sector for commercial use. To remain competitive in the current development environment, the Department of Defense instituted its own start-up called the Defense Unit Innovation Experimental or, DUIx. According to its mission statement, the Unit is a bridge between those in the U.S. military, conducting national security missions, and companies operating on the cutting-edge of technology.[165] This Unit has locations in technology hubs like Silicon Valley, Boston, and Austin to be near private sector developers to accelerate technology into the hands of military warfighters.[166] This outreach reinforces the third offset by enabling the organization to have access to developers producing cutting-edge technologies.

In addition to outreach and business practice initiatives, the Department of Defense also wants more freedom in its fund allocation. Congressional oversight is an important function, however, there are ways the Pentagon feels this relationship can be improved. Most importantly, the Pentagon believes the Budget Control Act of 2011 should be repealed.[167] According to the Pentagon, unpredictable budgets and continuing resolution spending bills are detrimental to the enterprise overall and deleteriously impact the research and development portion of the budget on a greater scale.[168] Also, the

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165. "Accelerating Innovation for National Defense", Defense Innovation Unit Experimental, accessed February 12, 2017, https://www.diux.mil/.
166. Ibid.
167. U.S. Department of Defense, *Ash Carter Submitted Statement*, 4-6.
168. Ibid.

Pentagon seeks another round of Base Realignment and Closures (BRAC) because the organization is operating at 25% higher capacity than it needs.[169] Another contentious issue is the retirement of aging platforms and capabilities. For a number of years, the organization has been attempting to retire the A-10, however, Congress continues to fund the platform. At the crux of this issue is the organization wants Congress to trust the Department of Defense that it is making the correct decision with respect to its base closures and retirement schedules. Indeed, cutting overhead spending and retiring aging platforms would facilitate the third offset by funding the strategy's aims and accompanying initiatives.

Examining the Three Aims: Cutting-Edge Tech, Operational Concepts, and Retention

As outlined above, the third offset consists of three major aims. The first aim is to develop cutting-edge technologies by focusing on fields such as robotics, autonomous systems, miniaturization, analyzing big data, and advanced manufacturing, like 3-D printing. Certainly, many advancements in these fields have taken place in recent years. Although, the notable advancements in autonomous systems have been in the arena of operational concepts and will be discussed in more detail subsequently.

Miniaturization is an interesting technology to examine because it entails more than producing smaller and more powerful computer chips. A prime example of how miniaturization is being utilized can be found in the electromagnetic railgun system. The electromagnetic railgun can hurl a 24-lb projectile, named the hypervelocity projectile

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169. Ibid.

(HVP), at Mach 7 over 100 nautical miles, using solely electricity.[170] In comparison to the Navy's current deck gun, the HVP has over seven times the range and is three times faster and lighter.[171] The railgun's smaller and lighter rounds permit more projectiles to be stored on a ship when compared to conventional rounds. Therefore, the HVP has the potential to increase space, a precious commodity aboard a vessel, for other capabilities and platforms. In addition, the HVP is not a combustion round and relies solely on the speed of the projectile to destroy the target.[172] This characteristic of the HVP minimizes the risk associated with storing the projectile. Further, the electromagnetic railgun may upset the current missile defense quandary because of the inexpensiveness of each fire sequence when compared to the cost of current missile interceptors. The prototypes are said to be capable of firing 10 rounds a minute at a meager cost of $25,000 per shot.[173] By comparison, the SM-3 Block IA and IB interceptors cost between $12 million to $15 million and the new interceptor, being developed between the U.S. and Japan, costs between $20 million and $24 million.[174] Fast reloads and a deep magazine on the railgun grants increased shot opportunities on target at an affordable cost. The railgun's sustained firing may help to reduce the effectiveness of new sophistication techniques on

170. "Electromagnetic Railgun", Office of Naval Research, accessed December 20, 2017, http://www.onr.navy.mil/media-center/fact-sheets/electromagnetic-railgun.aspx.

171. "*MK 45 Naval Gun System*", BAE Systems, 2012, http://www.baesystems. com/product/BAES_020039/mk-45-mod-4-naval-gun-system?_afrLoop=492700336 7985000&_afrWindowMode=0&_afrWindowId=null#!%40%40%3F_afrWindowId%3D null%26_afrLoop%3D4927003367985000%26_afrWindowMode%3D0%26_adf.ctrl-state%3D17onrbbnyf_222.

172. Office of Naval Research, "Electromagnetic Railgun".

173. Ronald O'Rourke, *Navy Lasers, Railgun, and Hypervelocity Projectile: Background and Issues for Congress*, Congressional Research Service, March 17, 2017, 4, https://fas.org/sgp/crs/weapons/R44175.pdf.

174. Laura DeSimone, *Aegis BMD; The Way Ahead*, Defense Technical Information Center, December 6, 2011, 8-10, http://www.dtic.mil/ndia/2011PEO/DeSimone.pdf.

adversary's ballistic missiles, like multiple independently targetable reentry vehicles (MIRV) and salvo launches.

The utility of 3-D printing, sometimes referred to as additive manufacturing, in future operations is straightforward. Advanced manufacturing would simplify replacing lost, missing, or broken parts for equipment. Ostensibly, it would greatly reduce the need for large inventories of spare parts. In addition, additive manufacturing could reduce costs in a variety of ways. With less need for physical warehouse and storage space, overhead dollars could be reallocated. Additionally, the military could save on procurement by not spending large sums on storing parts that may never be used. Having the ability to replace parts on a one-to-one and as needed basis would be a great benefit.

In addition, additive manufacturing would simplify the supply chain and logistics, as well as, the costs of shipping parts. An almost non-existent supply chain would assist units conducting missions in underdeveloped locales that lack an infrastructure. Further, as a unit deploys it can leave non-essential replacement parts behind making the unit lighter for a more rapid force projection. This innovative technology could transform military supply chain and logistics and the bureaucratic procurement process. This technology is beginning to enter the military enterprise. For example, an MV-22B Osprey flew a trial mission with a flight essential part fabricated by additive manufacturing.[175] On a lower scale, an Air Force unit manufactured brackets to hang signs, using a 3-D printer, which lowered the cost of the bracket by 88%.[176]

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175. U.S. Department of Defense, "3-D Printing: Manufacturing Made Easy", Department of Defense Video, 1:11, accessed February 20, 2017, https://www.defense. gov/Video?videoid=498885.

176. Ibid.

At first sight, analyzing big data evokes notions about government spying programs. In truth, major advances in analyzing large amounts of data could greatly increase U.S. intelligence and information gathering. There is a wealth of information online and with the rapid sifting of data, the U.S. could glean valuable information about adversarial troop movements, training, and equipment. This ability is predicated on the ubiquitous use of social media platforms by service members around the globe. Further, there has been a demonstrated use of an algorithm that specifically followed social media profiles and created a timeline of flight MH17; the Malaysian passenger plane that was shot down over Ukraine in July 2014.[177] This timeline sifted through open source social media platforms and found pictures of the plane taking off and a Russian SA-11 missile battery in the vicinity where MH17 was shot down, with all its missiles. The next picture in the timeline revealed a contrail emanating from near the location of the Russian missile battery. Another picture showed the same missile battery, confirmed by serial number, leaving the area and lastly, a picture of the SA11 battery entering Russian.[178] While this does not prove beyond a shadow of a doubt Russian military involvement, it does demonstrate the value of intelligence gathering through social media platforms, and the utility of tracking adversarial movements through cyberspace.

In addition, this type of sifting requires learning machines that can be taught to identify patterns and objects. Until 2015, a human analyst was more effective at

177. Robert Work, "Remarks by Deputy Secretary of Defense Work on the Third Offset Strategy: As Delivered by Deputy Secretary of Defense Work, Brussels Belgium", United States Department of Defense, April 28, 2016, https://www.defense. gov/News/Speeches/Speech-View/Article/753482/remarks-by-deputy-secretary-work-on-third-offset-strategy.

178. Ibid.

identifying objects than a machine.[179] Now machines can identify objects more

accurately and more quickly than humans. While big data analytics could be used to

acquire, analyze, and distribute intelligence and information about an adversary, there are

other practical applications. Salvo ballistic missile launches are of concern for the U.S.

With hundreds of enemy missiles incoming, big data would be able to track the trajectory

of many missiles and use interceptors sparingly to destroy only the missiles that will

harm friendly assets; not the missiles that may fall harmlessly into the ocean.[180]

Learning machines that analyze large amounts of data takes advantage of

Artificial Intelligence (AI) and autonomous systems. These developments are also

producing the primary operational concepts to result from the third offset thus far, like

human-machine collaboration and teaming. It is helpful to provide a quick overview of

terms that are often applied to today's emerging technology. Autonomy is the delegation

of a decision authority to an entity to act within specific parameters.[181] An entity in the

battlespace with autonomy can be a human or a computer. However, no machine or

human has full autonomy, considering orders are prescribed through the chain of

command. An autonomous capability means the entity (human or machine) can

independently select an action, to accomplish goals, based on the entity's knowledge and

understanding of the world, itself, and the situation.[182]

So-called "autonomous systems" utilize Artificial Intelligence, which is the

capability of a computer to perform a task that is usually reserved for human

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179. U.S. Department of Defense, "Third Offset Strategy".
180. Defense Science Board, *Summer Study on Autonomy*, June 2016, 51, http://www.acq.osd.mil/dsb/reports/2010s/DSBSS15.pdf.
181. Ibid., 4.
182. Ibid., 4.

intelligence.[183] In essence, by expanding the use of AI within machines, humans are ceding more tasks to machines. Interestingly, learning machines and AI differ from robots because a robot is simply a machine that completes a determined and defined task, function, or duty. It is not capable of autonomy or decision-making within its purview.

Human-machine cooperation is guided by the idea that a human and computer team is more effective at solving problems than either a human or computer team alone. For example, in 2005, two amateur chess players, utilizing three computers, beat a cadre of Grand Champion human chess players and another cadre of supercomputers.[184] In human-machine collaboration, the human is the strategic thinker and the computer processes information quickly and presents tactical options to the human for a decision. This hinges on allowing the humans and machines to individually do what they do best. The F-35 is a great example of human-machine collaboration. The F-35 is best described as a flying computer; a network of sensors that analyzes and relays information and data to the pilot through the helmet.[185]

Human-machine collaboration and teaming, or using autonomous systems not in isolation of humans but in tandem, are truly innovative concepts. Previously, unmanned systems were remotely operated by humans and were slated to replace humans on the battlefield. Now machines are designed to augment humans. The position that machines or computers are not meant to supplant humans, but instead are designated to allow humans to make informed decisions quickly, is supported by Pentagon leadership.[186] In

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183. Ibid., 5.
184. U.S. Department of Defense, "Third Offset Strategy".
185. Ibid.
186. Ibid.

addition, one can begin to see the far-reaching effects of autonomy on almost every facet of the military enterprise. From automated cyber response to autonomous underwater mine sweeping and a litany of other applications are described in the Defense Science Board's study on autonomy.[187] Delegating command authority to learning machines will greatly enhance the military enterprise. Not only are the machines capable of rapid decision making if given autonomy, relying on autonomous systems will keep more service members out of harm's way.

A core belief of U.S. strategy, since World War II, has been that the U.S. military is technological savvy and has better-trained men and women in uniform.[188] The Department of Defense realizes that in today's competitive environment, U.S. technologies are subject to theft, intrusion, and duplication. However, the U.S. warfighter is stressed by U.S. leaders as an asset that cannot be replicated by U.S. adversaries. For these reasons, the third aim of the third offset strategy is to recruit and retain the best and brightest minds to pursue cutting-edge technologies and develop operational concepts. To this end, Secretary of Defense Carter released his Force of the Future initiatives. One of these initiatives is intended to foster new ideas and attract new people to the Department. The corporate fellows program allows service members the opportunity to gain experience in the private sector, where the breakthroughs are occurring, to bring the ideas back to the organization.[189] The idea is to increase the

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187. Defense Science Board, *Autonomy*, 61.
188. Cheryl Pellerin, "Work Details the Future of War at Army Defense College", *DoD News, Defense Media Activity*, April 8, 2015, http://www.defense.gov/News-Article-View/Article/604420.
189. Ash Carter, "The Next Two Links to the Force of the Future", *United States* Department of Defense Memorandum, June 9, 2016, http://www.defense.gov/Portals/

Department's exposure to the wealth of burgeoning technology. A second effort of the Force of the Future is geared toward retention. To this end, Secretary Carter implemented a standard 12-week maternity leave policy and increased access to child care and insurance. Other efforts include flexibility to offer career incentives and allowing some experts to enter military service in mid-career capacities.[190]

Another Force of the Future initiative involves ensuring there are an adequate knowledge base and workforce to support a more technologically focused military enterprise.[191] For example, to strengthen the workforce, the U.S. is fostering a skilled base by increasing access and the allure of science, technology, engineering, and mathematics (STEM) educations. This means investments and scholarships in STEM programs, at all levels of the U.S. education system, which the U.S. has been pursuing diligently within the last decade. Once the Pentagon has fostered and acquired the best and brightest minds, it seeks to retain its personnel, in both its civilian and military ranks. Competitive benefits and career development are key to retaining a talented workforce.

The Defense Innovation Initiative is department wide and seemingly encompasses every aspect of the military enterprise. However, its full implementation is not a foregone conclusion. The third offset faces many obstacles. Some impediments like, funding and the bureaucratic process, are perennial issues that have plagued the enterprise for generations. Other barriers like buy-in are as institutional as other obstacles. However, the organization is attempting to address those issues. Often

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1/features/2015/0315_force-of-the-future/Memorandum-The-Next-Two-Links-to-the-Force-of-the-Future.pdf.
190. Ibid.
191. Ibid.

neglected is the implications and consequences the third offset may produce. This should not be ignored because as the two previous offsets show, today's efforts can have lasting ramifications on the enterprise for generations. In addition, there are lingering questions that need to be resolved or examined. Is now the correct time to pursue an offset strategy? How much autonomy will the U.S. or an adversary give machines? These and other questions, implications, and ramifications will be discussed in the next section.

ANALYZING THE THIRD OFFSET

Introduction

The self-awareness and zeal with which the Department of Defense is pursuing the third offset strategy are commendable. Indeed, there have been numerous accomplishments and the enterprise has benefited from new technologies, emerging operational concepts, and the pursuit of other initiatives. The Department of Defense is not ready to rest its laurels on these accomplishments and is continuing its efforts to maintain the U.S. technological advantage. While many obstacles exist to the implementation of the strategy, the organization is undertaking significant efforts to overcome these major internal and external hindrances. Three internal obstacles the Department of Defense can mitigate are funding, its business practices, and buy-in. On the other hand, external factors, like rising near peers and the proliferation of advanced technologies, may be beyond U.S. control.

Fundamentally it is important to answer whether this is the correct time to pursue such a strategy. Is the U.S. advantage so undermined that it must resort to an offset at present? The Department of Defense believes so and makes a compelling argument for its position. On the other hand, naysayers will counter that the organization continually hypes threats to secure funding. In addition, an argument can be made that threat forecasting is imperfect. A counter argument to this point is that the U.S. has a duty to prepare for the future or witness its power and influence deteriorate. This back and forth discourse is necessary for a democracy to ensure there is a balance between security and other aspects of American life.

Further, if one accepts the Pentagon position that it is prudent to pursue an offset at present, is the vision focused enough to be successful? Indeed, it encompasses more than technology and builds upon lessons from previous offset strategies. Most notable is this offset seems to be leaving nothing to chance. During the second offset, training and doctrinal reforms burgeoned alongside advanced technology. Although these developments occurred organically and independently of the LRRDPP, the reforms and technologies coalesced to form what is considered the second offset. The third offset differs by rendering technology, concepts, and people as pillars of the same strategy and other dimensions, like business practices, are being overhauled to ensure the strategy transitions smoothly.

It is important to note possible impacts, implications, and ramifications the third offset may have on the force, force structure, and other facets of the enterprise. The historical look at the previous offsets shows there can be lasting ramifications and impacts. Technologies like autonomy and Artificial Intelligence (AI) are viewed as offering the greatest benefit to the military enterprise at present. In addition, the integration of technology within the military enterprise has far-reaching ramifications for the enterprise, U.S. allies, and society. From interconnectedness to machines increasingly fulfilling human tasks. But how far and how much autonomy is the U.S. willing to give machines? Ultimately the answer to this question lies in the future security environment the third offset is intended to compete in and the enduring pillars of U.S strategy.

Obstacles the Third Offset Must Overcome

Admittedly, the success of the third offset is not a guarantee and will depend on numerous factors. Three major internal obstacles the third offset strategy must overcome are funding, business practices, and acceptance. Funding is an uncertain and limiting factor to the success of any strategy and the previous administration's Secretary of Defense acknowledged that the fiscal environment is a major hurdle for implementation of the third offset.[192] However, the new Trump administration has taken a strong stance in support of funding and building the U.S. military enterprise and released a proposal to increase Defense spending by $54 billion next year.[193]

In addition, the total Federal research and development (R&D) budget requested for FY 2017 was $152 billion.[194] Of the total R&D budget requested, the Department of Defense was allocated 47.8%, or $71.44 billion.[195] In addition, the FY 2016 budget authorized close to $70 billion for total Department of Defense R&D spending. To further break down the FY 2016 budget, the more research oriented portion of the Department's budget, which includes basic and applied research, as well as, advanced technology development, accounted for $2.3 billion, $5 billion and $5.7 billion, respectively.[196] Further, two budget activities that authorize funds for new weapons and platforms, where an operational need has been determined and there is an acquisition

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192. U.S. Department of Defense, *Ash Carter Submitted Statement*, 7.
193. Michael Shear and Jennifer Steinhauer, "Trump to Seek $54 Billion Increase in Military Spending", *The New York Times*, February 27, 2017, https://www.nytimes.com /2017/02/27/us/politics/trump-budget-military.html?_r=0.
194. John Sargent et al., *Federal Research and Development Funding: FY2017*, Congressional Research Service, January 27, 2017, Summary Section, https://fas.org/ sgp/crs/misc/R44516.pdf.
195. Ibid., Summary Section.
196. Ibid., 16 & 18.

regime in place, like the Joint Strike Fighter, accounted for $14.3 billion and $12.8 billion.[197] Finally, the budget activity that allocates funds for the development of improvements to existing systems totaled $25.4 billion.[198] These numbers show that the Department of Defense R&D budget and ostensibly, the third offset, is receiving significant funding.

The second key obstacle to the implementation of the third offset is its business practices. Return on investments, as well as, controls that ensure the funds are spent properly and efficiently are integral to show the organization is a trustworthy fiduciary. In addition, slashing wasteful spending produces the obvious benefit of more defense dollars for where funds are truly needed. Defense program cost and schedule overruns have become the normal, however, if the short-term cycles outlined by the third offset is to succeed, a new standard must be instituted.

Another area where the Department could improve its business practices is in procurement and acquisition. Currently a bureaucratic labyrinth, procurement needs to be optimized to accomplish rapid fielding and integration of technologies, if the U.S. is to operate in short-term cycles. Moreover, this obstacle must be addressed without delay to meet this requirement. The Pentagon has acknowledged procurement as a limiting factor and is working to improve procurement with its Better Buying Power 3.0 program. However, this is the third iteration of this program and hopefully, the organization has addressed the shortcomings of its previous iterations.

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197. Ibid., 16 & 18.
198. Ibid., 16 & 18.

The third obstacle that must be addressed is buy-in or acceptance of the third offset strategy. Buy-in of the third offset must occur at all levels; from the U.S. President, to Congress, to military brass, to battlefield commanders. With the administration, which introduced the third offset departed from the White House, the new administration will need to approve of the third offset strategy if the strategy is to survive. President Trump has affirmed his desire to build up the military, but it is unclear if he will continue with the third offset strategy. In addition, the Trump administration has nominated a replacement for the brainchild of the strategy, Deputy Secretary of Defense Robert Work, with a top Boeing executive, Patrick Shanahan.[199] During his tenure, Deputy Work did a great deal to support the strategy by constantly preaching its tenets at every opportunity to engrain the third offset in military leaders at all levels.

Congress has a role in funding and accepting the strategy. For example, if Congress does not approve phase-outs of older capabilities, new third offset technologies may not be fielded. In addition, continued funding for obsolete capabilities may diminish the returns expected from the third offset investments. Retiring aging capabilities and closing or shrinking bases can hurt a Congressman's constituents. However, the Department of Defense may offer to replace aging capabilities with third offset platforms to assuage a Congressman's concerns. In the end, Congress and the Department of Defense must work together to overcome their differences.

Importantly, warfighters within the military will need to embrace the strategy. Not only must the warfighters embrace the game-changing capabilities, they will also

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199. Alex Lockie, "Trump Just Nominated a Top Boeing Executive to be Mattis' Second-In-Command", *Business Insider*, March 16, 2017, http://www.businessinsider. com/trump-nominate-patrick-shanahan-boeing-defense-2017-3.

need to be trained, knowledgeable, and confident in third offset capabilities for the innovations to be fully exploited. The fast pace of technological innovation creates a unique predicament for service members. There may come a time when the tempo of technological advancement has outpaced a human's ability to remain abreast of emerging technologies.

Two glaring external obstacles the U.S. will face is the proliferation of technology and competition. It would be a wasted effort for the U.S. to attempt to stem the spread or restrict access to emerging technologies. First, the private sector is taking point on innovation, therefore, any attempts to check the proliferation of technology may stymie advancement. Or with a restrictive stance, companies may decide not to work with the Pentagon. Secondly, it does not seem likely that the U.S. could create an effective control regime. There are countless outlets for the spread of technology and it would be difficult to stem a fraction of the avenues.

Other actors are no longer sitting idle as the U.S. advances. Currently, other power actors are attempting to undermine U.S. military superiority. Because adversaries are undergoing extensive military modernizations and the U.S. no longer expects to have an advantage for 40 years, short-term innovation cycles are being pursued to stay ahead of adversarial gains. However, commanding the technological advantage may be difficult to accomplish indefinitely. The U.S. may want to begin to plan for a short period where it does not have the advantage. Admittedly, addressing external factors are extremely difficult, but it was in response to external actors that the U.S. chose to pursue an offset strategy at present.

The Pentagon's Case for a Third Offset

The Pentagon deems it is relevant to pursue an offset at present and Deputy Secretary Work explained the reason in understandable terms. As he relates the story, when Ash Carter took the helm at the Department of Defense, he asked Deputy Work and the Joint Chiefs how the next 25 years will differ from the previous 25 years.[200] As they interpreted it, the security environment had undergone a momentous change at the end of 2013. The 25 years before December 2013, at no time in history, since the Peace of Westphalia created the modern nation state, had there been a period where one nation had accumulated so much national power without a worthy competitor.[201] The nation that had accumulated preeminence was the U.S. and the event that led to its ascendancy as the sole superpower was the fall of the Soviet Union.

For close to 25 years the U.S. had maintained a status far above adversaries and competitors. However, in December 2013, China began the largest land reclamation effort ever undertaken, in the South China Sea. In addition, a few months later, in February and March of 2014, Russia began its invasion and subsequent annexation of Crimea. From these two events, Deputy Work and the Joint Chiefs determined that the next 25 years would see the rise of great power states.[202] Further, an offset strategy was chosen because the U.S. had confronted a great power state during the Cold War and the U.S. had employed an offset strategy to confront the Soviet Union.[203]

200. U.S. Department of Defense, "Third Offset Strategy".
201. Ibid.
202. Ibid.
203. Ibid.

The Pentagon's case begs the question, are these life-changing events that require a new strategy? This is a difficult question to discern. Of course, Deputy Work and the Joint Chiefs could be incorrect in their prediction. In addition, if the U.S. believes it will be facing growing power states should it forego naming humanitarian assistance and disaster relief as priority military missions? This way the U.S. is concentrated on confronting growing powers. Further, President Eisenhower had an enlightening view concerning spending on endless contingencies. However, this view may be less relevant as the U.S. seeks to contain growing powers. Soft power operations can be vital to winning influence as the other states grow. For these reasons, it seems unlikely that the Pentagon will change these designations now, but it may need to in the future. While threat forecasting is difficult, it seems the U.S. can expect the growing power states of Russia and China to continue their individual quest for ascendancy. Indeed, there has been a growing number of incidents since 2013 with Russian nuclear bombers entering NATO airspace and Russian pilots buzzing U.S. ships. Further, Russia seems to have inserted itself into the Syrian Civil War to ensure that any peace that is mediated includes Moscow's influence.

There were many ways the U.S. could address growing power states. However, it chose an offset strategy because it had been successful in the past. The third iteration of the offset strategy is similar to its forerunners, although, the third offset has many unique aspects. Importantly the third offset has built upon its predecessors. Both the second and third offset learned from the New Look that it was imprudent for the U.S. to pursue a sole capability and emphasize a singular platform to deliver the capability. During the second offset, training and doctrinal reforms burgeoned alongside advanced technology.

Although these developments occurred organically and independently of the LRRDPP, the reforms and technologies coalesced to form what is considered the second offset. The third offset differs by rendering technology, concepts, and people as pillars of the same strategy. In addition, other dimensions of the enterprise are being overhauled to ensure the strategy is implemented smoothly.

To characterize the third offset as a technology-centric strategy is both correct and misinformed. Technology is the guiding principle, but it is people, concepts and other reforms that will bolster the use and introduction of new technologies. Similarly, it is people, concepts, and reforms that will be transformed by technology. Truly, it is impossible to differentiate one as more important. The brilliance of the third offset is that it is taking a comprehensive view of the entire enterprise to make itself ready for the 21st Century power competition. While the third offset in is the inchoate stages, what is clear is if the strategy is implemented and the intended outcome is produced, the third offset will have many implications and impacts on policy, strategy, and force structure.

Predictions, Impacts, and Implications

The third offset will have many implications and impacts on policy, strategy, and force structure. For example, as the U.S. transfers more responsibilities to machines, troops numbers will most likely decrease and the composition of units will change as the units acquire new technologies. In addition, with the growing use of autonomous systems, there is a new dimension to the ethics and conduct of war. It is important to take note of possible impacts, implications, and ramifications the third offset may produce because, as the historical record demonstrates, offset strategies have the potential for

enduring ramifications. Couple the short cycles with the astounding rate of technological

growth and the U.S. will have less time to adapt to changes and mitigate difficulties. For

this reason, the U.S. must begin a thorough review of outcomes to prevent surprise.

Even though new technologies and concepts are meant to augment humans, the

introduction of more advanced technologies has implications for troop levels and force

structure. Even though humans are not being replaced, there will be less need for humans

as autonomous platforms are fielded. Therefore, it can be predicted that as autonomous

systems proliferate, the overall number of humans in the military enterprise will decrease.

This will hold true for combat, non-combat, and civilian roles and numbers.

Evidence for this claim is supported by platforms like DARPA's unmanned

vessels and the Army's Grey Eagle program. DARPA recently released an unmanned

vessel designed to track submarines. In addition, a primary of objective of this unmanned

surface vessel is that a human is never intended to board this vessel at any point during its

operating cycle. Moreover, the autonomous operating system is intended to operate

independently for months with little remote supervisory control.[204]

The prediction that fewer troops will be needed in noncombat roles can be

concluded because platforms are currently being designed to operate without humans,

during its operating cycle, and operate independently for long periods without human

control. Therefore, fewer humans will be needed to operate non-combat capabilities as

those responsibilities are turned over to machines. This point is further supported by

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204. Scott Littlefield, "Anti-Submarine Warfare (ASW) Continuous Trail Unmanned Vessel", Defense Advanced Research Projects Agency, accessed January 8, 2017, http://www.darpa.mil/program/anti-submarine-warfare-continuous-trail-unmanned-vessel.

DARPA's admission that its vessel is to be fabricated to do without human maintenance during its life operating cycle. Subsequently, fewer service members will be needed to perform maintenance on autonomous technologies. In addition, with the majority of technological advancements occurring outside the military, there is less need for the enterprise to employ civilians to perform this function.

In addition to requiring fewer members in non-combat specialties, the U.S. military will also require fewer members in combat roles. Evidence for this claim can be found in the U.S. Army's Grey Eagle program. The Army's machine teaming operational concept utilizes its Apache helicopters to fly missions with autonomous aircraft, called the Grey Eagle. The autonomous vehicles will act as external extensions of the helicopter.[205] Therefore, fewer helicopters and subsequently, fewer pilots, will be needed to achieve missions. Further, the force structure of those units will change. The number of aircraft in each unit will decrease, while the number of autonomous vehicles attached to each unit will increase. If the same numbers of aircraft remain operational through these changes, there may be an increase in the total number of helicopter units throughout the Army's force structure. The possible increase in helicopter units without the need to increase the number of helicopters would be a positive development. This could mean the U.S. may be able to increase its forward presence abroad, in places like Europe, to confront Russia's increasing aggression.

While the above example centered on the Grey Eagle project, it is not hard to extrapolate this example to the integration of autonomous platforms alongside other

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205. "MQ-1C Gray Eagle Unmanned Aircraft System", ASC.Army.Mil, accessed January 8, 2017, http://asc.army.mil/web/portfolio-item/aviation_gray-eagle-uas/.

capabilities and expect similar results. Whether alongside U.S. Navy ships, or Marines, autonomous entities will enhance human and platform performance with reduced troop numbers, with the intention, that the overall military effectiveness increases.

So far the human discussion has concentrated on troop numbers and force structure. However, there is another piece to the human element that is worth mentioning. The members of the future force will need to be highly capable and adaptable. The platforms that the men and women will be operating will take extensive training and intelligence to operate. Further, technologies will be constantly changing and progressing. Even though machines will assist the human in decision making, the human ultimately decides the course of action. Therefore, the services will require people with good judgment and decisiveness. Because the future force will require people of the highest caliber and ability, one can expect the Department of Defense to increase pay, bonuses, and benefits for the future generation of warfighters. Additionally, because familiarization with third offset technologies, platforms, and concepts will require extensive study, the Department of Defense may look to extend the time of military occupation schools. Moreover, because initial training time may be increased, the military should examine the feasibility of increasing initial enlistment contracts. Training time will most likely increase unless the enterprise can rely on STEM investments to train its workforce before they arrive at initial training. It may be best for the enterprise to recruit trained men and women before they are hired.

There are ramifications of a smaller U.S. military and a more technologically educated warfighter on American society. First, it is important to recognize that with fewer positions in the military, some Americans willing to serve their country may be

excluded. In addition, the available positions may become extremely competitive. While STEM investments are important to train a workforce, they are also important so Americans of all backgrounds and educations have the option to serve. Second, it may seem futuristic and implausible, but it is important that the military enterprise does not become an exclusive cadre of elite troops. As fewer Americans become involved in the military, due to openings, this means fewer Americans will have a personal connection to a service member. This could create an environment where the troops who serve are removed from American society. In addition, it is important that a diverse range of Americans serve so every sector of the American population is represented. This will ensure leaders are held accountable for future military operations. In the end, while machines will increasingly assist humans in military operations, humans will continue to be present in combat environments. Technology may limit and reduce human exposure to warfare, but the human element will continue to experience the realities of warfare.

In addition to the changes at the human level, the third offset has implications for U.S. policy and strategy. U.S. adversaries, especially China, are developing asymmetric capabilities aimed at denying the U.S. the freedom to intervene and navigate Pacific waters in the event of a dispute with the U.S. At the crux of the Chinese A2AD strategy is the modernization and sophistication of its ballistic missile arsenal. Chinese ballistic missiles are intended to threaten U.S. aircraft carriers and coerce a limited response. Moreover, multiple countries, including numerous U.S. allies, dispute Chinese land reclamation efforts in the South China Sea. One could see how an autonomous vessel, capable of continuously operating, could conduct freedom of navigation missions to refute Chinese claims in the South China Sea and bolster America's presence and

commitment. Although a caveat to utilizing autonomous vehicles to refute Chinese claims is that autonomous vehicles may not have standing to refute claims within international law.

Technologies like the electromagnetic railgun will allow the U.S. Navy the freedom to navigate and operate in the Pacific. If fielded the railgun's fast and inexpensive rounds will ensure the U.S. cannot be coerced by Chinese ballistic missiles. Not only could the railgun protect against Chinese missiles, the railgun's inexpensive rounds and directed energy weapons could liberate the U.S. from the ballistic missile interceptor quandary. Both the railgun and directed energy weapons offer the U.S. an opportunity to change the asymmetric nature of missiles and interceptors by putting the cost burden on actors who would choose to employ ballistic missiles. Furthermore, when coupled with the human-machine collaboration, the railgun and directed energy weapons could effectively defeat salvo missile launches. The machine could quickly relay the coordinates and trajectories of salvo launch missiles and inform the human of which missiles have the potential to cause the most damage or harm, and which may fall harmlessly into the ocean.

The previous examples illustrate the third offset's possible effect on weighty defense issues like the U.S. rebalance to Asia and countering ballistic missiles. However, the third offset has implications for soft operations like drones capable of delivering humanitarian assistance to regions that are otherwise inaccessible due to a disease outbreak or a natural disaster. Supplies could include water, food, and medicine or even a portal advanced manufacturing station so an affected population can rebuild. Not only would this prevent the U.S. from putting its troops at risk, it also ensures the U.S. military

fulfills its responsibilities and demonstrates U.S. resolve to confront instabilities at all levels. Other soft power operations may include sharing technology with allies and partners to establish goodwill and bolster security. Also, by embracing a technologically advanced economy, the U.S. can maintain its economic strength to encourage partnerships and hedge against growing powers.

Importantly, these examples indicate that the third offset will impact U.S. relationships. The U.S. may look to allies to fulfill niche roles or support smaller and agiler militaries that can absorb innovation more rapidly, to make modernizations the U.S. cannot. Possible changes in force structures may allow the U.S. to continue and possibly increase its forward presence. This would demonstrate the enduring U.S. commitment to its allies and partners. Further, to U.S. adversaries, the third offset will indicate the U.S. will not resign itself to accept a dwindling U.S. technological lead. Instead, the U.S. will rise to challenge and adapt to changing circumstances to guarantee the U.S. remains a global power.

It is beyond the best prognosticator's ability to predict the effect that the third offset will have on the Department of Defense budget. However, it will be interesting to witness the effect the third offset will have on large, expensive traditional platforms like the Air Force's Long Range Strike Bomber and the U.S. Navy's Ohio Class Replacement submarine. These large platforms may become obsolete and the U.S. may transition to smaller platforms that interact with autonomous vehicles. Or these large platforms may become a type of *queen bee* to a vast swarm of autonomous vehicles.[206]

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206. Defense Science Board, *Autonomy*, 83.

On a final note, the third offset has the potential to introduce a new element to the ethics and conduct of war. Currently, the U.S. maintains that a human will always be the final decision maker in any situation where a human life can be taken.[207] Vehicles like DARPA's vessel and the Grey Eagle project are intended to augment the human and do not have the authority to take a human life. However, it is not difficult to believe that one day these autonomous extensions may have the capability to protect U.S. lives by taking enemy lives. At what point will the U.S. allow independent vehicles a license to kill? While the U.S. remains adamant that the human should be the final decision maker when it comes to taking lives, this does not mean that U.S. adversaries will have the same beliefs. How will the U.S. respond? Currently, this dimension has more questions than answers.

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207. U.S. Department of Defense, "Third Offset Strategy".

CONCLUSION

The first offset strategy was the Eisenhower administration's New Look strategy that strove to offset Soviet conventional strength with U.S. nuclear and atomic technological superiority. The New Look placed importance on the U.S. strategic arsenal deliverable by airpower to deter Soviet aggression and prevent escalation. In addition to the strategic arsenal, the U.S. Army developed and devised doctrine, as well as, battlefield nuclear and atomic weapons to fight and sustain in a nuclear environment. U.S. reliance on nuclear weapons, both strategic and tactical, was viewed by the Eisenhower administration as a way to achieve deterrence at a bearable cost. The idea of cost effective deterrence was predicated on President Eisenhower's personal beliefs that a robust economy was the foundation of a strong foreign policy and profligate defense spending would undermine American freedom and liberties.

The New Look was a practical and principled strategy that was tailored to address threats within the limits of the Eisenhower administration's outlook. In addition, the New Look resulted in the development of the U.S nuclear arsenal, including the nuclear triad, that continues to be a mainstay of U.S. strategy today. Not only does the nuclear arsenal serve in defense of the U.S., but in the case of extended deterrence, the U.S. nuclear arsenal has built relationships with allies and partners around the globe, while simultaneously stemming the proliferation of nuclear weapons. The development of the nuclear arsenal during the New Look period offers an important insight concerning the far-reaching and enduring ramifications that such strategies can impart. While the U.S.

relied on its nuclear arsenal to offset Soviet conventional strength in the 1950s, the U.S. advantage in nuclear weapon technology was fleeting.

After the U.S. withdrawal from Vietnam in March 1973, the U.S. pivoted its attentions to the increasing Soviet threat and possible conflict in Central Europe. There was a growing uneasiness over the U.S. ability to deter Soviet military action due to Soviet conventional and nuclear modernizations, both quantitively and quantality. The prevailing thought was that with nuclear parity, which was achieved in the early 1970s, as well as conventional numerical and qualitative superiority, the Soviets would no longer be deterred from a conventional invasion of Central Europe.

The second offset strategy is considered the period, from the early 1970s through the 1980s, when the U.S. pursued investments in precision guided munitions, long range/stealth aircraft, intelligence, reconnaissance, and surveillance platforms which would serve as force multipliers to upset the Soviet-U.S. imbalance. Unlike the first offset period, that is clearly defined by the New Look, the second offset cannot be attached to one administration or condensed to a sole strategy. On the contrary, the second offset spanned twenty years and included multiple administrations and Pentagon leaders. In addition, while the New Look relied on the U.S. strategic nuclear arsenal for security, the second offset sought to bolster conventional deterrence by outfitting platforms and weapons with over the horizon technologies. Over the horizon technologies served to increase battlefield awareness, capability, depth, and scope to make U.S. conventional platforms more accurate while simultaneously reducing collateral damage and fratricide.

Crucial to the success of the second offset was the transformation of U.S. military doctrines, warfighting concepts, and training that took place after the Vietnam War. These military doctrines accompanied a focused shift in U.S. military strategy away from a counterinsurgency type conflict in Vietnam War to confronting and deterring the Soviet threat. The development of the AirLand Battle doctrine by TRADOC in 1982 exploited the overlapping suite of technologically advanced capabilities and platforms that were beginning to come to fruition; most notably the Army's Big Five. In addition to military doctrines, the U.S. military transformed into an All-Volunteer Force while at the same time boosting military training. National Training Centers and training programs like Topgun granted the U.S. the opportunity to obtain tactical and technical proficiency before actual engagement with the enemy. In the end, the efficiency, effectiveness, and awareness of technologically advanced platforms were compounded with augmented training and doctrinal transformations.

The U.S. is currently pursuing its third iteration of the offset strategy in response to a strategic inflection point characterized as growing great powers capable of challenging U.S. power, the unpredictable security environment where the U.S. seeks to address a host of contingencies from general war to humanitarian assistance and finally, as a response to an erosion of the U.S. technological lead. Per the Pentagon, an offset strategy was chosen based on its historical utility to offset Soviet military strength during the Cold War. The third offset strategy is aimed with advancing cutting-edge technologies for use in military applications, developing operational concepts to maximize the utility of cutting-edge technologies, and finally with retaining the best and brightest Americans for service in the U.S. military. In addition, the third offset strategy

is a Department wide effort and includes other programs to reduce internal barriers the third offset faces.

In the third offset, technology is the guiding principle, but it is people, concepts and other reforms that will bolster the use and introduction of new technologies. Similarly, it is people, concepts, and reforms that will be transformed by technology. Truly, it is impossible to differentiate one as more important. The brilliance of the third offset is that it is taking a comprehensive view of the entire enterprise to make itself ready for the 21st Century power competition.

According to the U.S. 2015 National Military Strategy, the U.S. currently faces multiple and simultaneous security challenges from many threat actors with a wide array of capabilities.[208] This has created a security environment that is complex and prone to rapid changes. These rapid changes are fueling the future security environment and factors such as demographic shifts, globalization, altering power dynamics, and the diffusion of technology are indeed shaping a security environment not seen in 25 years. Demographic shifts mean the future security environment will consist of a growing and more urbanized global population. Military interventions and operations will increasingly occur near urban centers as the populations and thus, power centers, shift to sprawling urban areas. Conducting military operations in urban environments creates unique challenges. For example, discerning between combatants and noncombatants in large urban areas will become more difficult. In addition, collateral damage must not only be minimized but may become a liability as the interconnectedness through globalization and technology means that military actions will be broadcast throughout the

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208. Joint Chiefs of Staff, *National Military Strategy*, i.

world in a matter of seconds. Here, the development of A.I. and autonomous systems that can sift through large quantities of data and sufficiently identify combatants and legitimate targets is needed for future operations. The third offset development of such capabilities seems promising to address this element of the future security environment.

The spread of technology and the rapid pace at which technological innovation is occurring is blinding. What is created today is obsolete tomorrow and in some cases, sooner. There will come a time when the U.S. must decide when to field a capability that may not have the most current technology. Because the rate of innovation is rapid, continually waiting for the next iteration of technology could jeopardize readiness and produce costly contract budget overruns. Therefore, the U.S. must execute upgrades when funds and time are available. Additionally, the U.S. government no longer has the monopoly on technological innovation. Technological advancements today are occurring in the private sector for commercial use. Therefore, the U.S. defense enterprise must solicit the private sector for new technologies and tailor those technologies to meet its requirements. For this reason, the Department of Defense launched the DUIx unit in various technology hubs throughout the U.S. Not only is this a promising avenue for the acquisition of new technologies, but it may serve as a method to recruit bright individuals from the private sector to the defense enterprise.

Further, U.S. adversaries are developing unique ways to undermine U.S. power by introducing methods of warfare like A2AD capabilities, lawfare, and hybrid conflict. Again, third offset technologies and operational concepts are geared toward addressing these challenges; from the Navy's railgun that may upset the ballistic missile defense cost dilemma to continuously operating unmanned systems that may help to overturn China's

claims in the South China Sea. In addition, with the advent of advanced manufacturing, the logistic barriers to confronting threats around the globe will be reduced.

If the defense enterprise implements the third offset the force of the future will look starkly different from today. While planning and preparing for the future is crucial, it is also imperative the U.S. not neglect the present security challenges. In contrast, foregoing the future for present challenges and operations can jeopardize the U.S. readiness and ability to address future challenges and threats. The best way forward is to balance present requirements and future needs to maximize both the present and future force. Balancing these constraints will be difficult and risks will need to be minimized to short-term and long-term capabilities, but it is important that neither the long- nor short-term readiness is lacking.

On a final note, it is important the defense enterprise not morph into an exclusive body comprised of an elite cadre of tech warfighters that are removed from American society. As machines are expected to replace humans in the private and commercial sector, one can assume this will also hold true for military jobs. STEM investments are important not only to train capable individuals to fill the ranks but to offer the opportunity for every American citizen the chance to serve his or her country.

Indeed, the third offset is underway and is geared toward operating in the future security environment. As Secretary of Defense Brown would later reflect on the second offset period and say "The Carter Administration initiated and developed these programs, the Reagan Administration paid for their acquisition in many cases and the…Bush Administration employed them."[209] If the past is any indication of the future, the Obama

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209. Grant, "The Second Offset".

administration set the strategic guidance for the third offset and it seems that the Trump administration will increase military spending to pay for the development of the third offset. In the end, if implemented, the third offset strategy will produce technologies and operational concepts the next President can utilize if deterrence fails.

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