The Rockets' Red Glare: The impact of technology on U.S. nuclear strategy from Eisenhower to Carter

Brent Thomas Gerchicoff

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By: Brent Thomas Gerchicoff

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Signed by the final examining committee:

_____ Chair
Dr. Jean-Francois Mayer

_____ Examiner
Dr. Julian Schofield

_____ Examiner
Dr. Elizabeth Bloodgood

_____ Supervisor
Dr. Julian Schofield

Approved by _____
Chair of Department or Graduate Program Director

_____
Dean of Faculty

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Abstract

The Manhattan Project redefined the landscape of international security. The advent of the nuclear age, in many ways, reshaped the prospect of great power politics and the very nature of war itself. While nuclear weapons have altered the security environment, the literature that revolves around the subject is limited to a few select topics: arms control, deterrence, normative assertions on the (im)morality of nuclear weapons, the routines and potential accidents of organizational behaviour, and the boondoggles of ballistic missile defense. The literature fails to address how the *technical operating requirements* of nuclear weapons affect nuclear strategy.

The research question posed in this thesis is: does technology play an independent role in determining nuclear doctrine? The explanation tested in this thesis is that technology, specifically the technical operating requirements of nuclear weapons drove the American military towards a counterforce-biased doctrine and away from a city-strike strategy. Furthermore, the technical operating requirements were responsible for the move away from Launch on Warning and First Strike doctrines. Technology, as the primary driving factor in the establishment of nuclear doctrine, analysts should be able to make key insights into the highly classified characteristics of a state's nuclear strategy if they are able to find out the procurement policy of that state's military. A technology-driven nuclear doctrine warns us about how other states will develop in the future, as they will be reflective of the technical operating characteristics of their assets.

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Dedication

This work is dedicated to my wife Leah, for being the pivotal source of support and love and sacrifice behind this thesis. To Mom who believed in me when I did not. To Kristin and Leita – who have kept me firmly ground me. To Arthur Priest-Brown who taught me what it means to be a man. To my Father. To Ryan Sen and Julianne Bourdeau who have been a consummate friends. To Marc St. Martin whose discussions helped me make meaning of my own thoughts, and for pushing me out of this airplane (thankfully, the chute opened).

To my sons, Brennan and Aidan – my purpose and inspiration for everything I do.

In Memoriam, Arthur Thomas Priest-Brown

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Introduction

> "The most important points often are the simplest ones. No one can win an all-out nuclear war. While this statement is open to dispute, I maintain that it is correct and that its implications have not been fully appreciated."[1] – Robert Jervis

For all intents and purposes, the Manhattan Project redefined the landscape of the international security environment. The advent of the nuclear age, in many ways, reshaped the prospect of great power politics and the very nature of war itself. The looming prospect of large scale war has become an especially terrifying prospect since the Trinity test at Los Alamos, New Mexico and even more so since the successful tests of the thermonuclear (fusion) bomb in the mid-1950s. Anything beyond a limited conflict between nuclear powers is now a reason to be concerned that a full scale war between states that possess these weapons can only hope for a pyrrhic victory.

While nuclear weapons have altered the landscape of the security environment, the literature that revolves around the subject is limited to a few select topics: arms control, deterrence, normative assertions on the (im)morality of nuclear weapons, the routines and potential accidents of organizational behaviour, the balance of power in the nuclear age, and the billion-dollar boondoggles of ballistic missile defense. There is,

[1] Robert Jervis. *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon* (Ithaca, NY: Cornell University Press, 1989), p. 1.

however, a dearth in the literature that fails to address how the *technical operating requirements* of nuclear weapons affect nuclear strategy.

The research question of this thesis is: does technology play an independent role in determining nuclear doctrine? The primary explanation that will be tested is that technology, specifically the technical operating requirements of nuclear weapons drove the American military towards a counterforce-biased doctrine and away from a city-strike strategy. Furthermore, the technical operating requirements were responsible for the move away from Launch on Warning and First Strike doctrines. The alternative explanation tested in this thesis is that organizational behaviour, specifically the offensive bias model offered by Jack Snyder is responsible for the determination of nuclear doctrine in American Cold War nuclear strategy. [2] This strain of organizational literature has become influential among international security specialists and those who study military strategy, such as Stephen Van Evera, Barry Posen, Scott Sagan, Stuart Kaufman, and Jack Levy.[3]

[2] Jack Snyder, *The Ideology of the Offensive: Military Decision Making and the Disasters of 1914* (Ithaca, N.Y.: Cornell University Press, 1984)

[3] Barry R. Posen. *The Sources of Military Doctrine: France, Britain, and Germany Between the World Wars* (Ithaca, N.Y.: Cornell University Press, 1986); Scott D. Sagan. "1914 Revisited: Allies, Offense, and Instability," *International Security*, vol. 11, no. 2 (Autumn, 1986), pp. 151-175.; Stuart J. Kaufman. "Organizational Politics and Change in Soviet Military Policy," *World Politics*, vol. 46, no. 3 (Apr., 1994), pp. 355-382.; Scott D. Sagan. "1914 Revisited: Allies, Offense, and Instability," *International Security*, vol. 11, no. 2 (Autumn, 1986), pp. 151-175.; Stephen Van Evera. "Cult of the Offensive and the Origins of the First World War," *International Security*, vol. 9, no. 1 (Summer, 1984), pp. 58-107; Jack S. Levy. "Organizational Routines and the Causes of War," *International Studies Quarterly*, vol. 30, no. 2 (Jun., 1986), pp. 193-222.

The state of literature surrounding nuclear weapons is notably focused on the use/non-use of nuclear weapons,[4] deterrence theory, accidental use, nuclear terrorism, etc. Discussions about the impact that technological capabilities have on doctrine, however, are explored less often. David Alan Rosenberg with W.B. Moore[5] and Marc Trachtenberg[6] are examples of fine scholarship relating to this field, however, Trachtenberg and Rosenberg focus on targeting policy as related to bureaucratic bargaining, while Rosenberg and Moore present a study similarly focusing on the inter-service rivalries of the United States. These studies, however, do not test for the possibility that technical operating characteristics present an independent variable on the selection of doctrine. Most of the literature surrounding nuclear strategy approaches the subject matter from a bureaucratic lens (e.g. the organizational behavioural perspective that seeks to simplify the operating environment) or from an arms control perspective (presenting the argument that nuclear weapons are inherently dangerous and prone to accidental launch) or the wealth of literature discussing deterrence. While the geopolitical reality that faces a given state is a necessarily important variable, it only tells part of the story about what drives nuclear doctrine: geopolitics explains the why; technology explains the details of a given doctrine. This thesis will add to the literature by highlighting that technology plays a pervasive role as the primary driving force behind the determination of nuclear doctrine.

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[4] T.V. Paul. *The Tradition of Non-Use of Nuclear Weapons* (Stanford, C.A.: Stanford Security Studies, 2009); T.V. Paul. "Taboo or Tradition? The non-use of nuclear weapons in world politics," *Review of International Studies*, vol. 36, no. 4 (October, 2010), pp. 853-863.

[5] David Alan Rosenberg and W.B. Moore. "Smoking Radiating Ruin at the End of Two Hours": Documents on American Plans for Nuclear War with the Soviet Union, 1954-55," *International Security*, vol. 6, no. 3 (Winter, 1981-1982), pp. 3-38; David Alan Rosenberg, "The Origins of Overkill: Nuclear Weapons and American Strategy, 1945-1960," *International Security*, vol. 7, no. 4 (Spring, 1983), pp. 3-71.

[6] Marc Trachtenberg, "A 'Wasting Asset': American Strategy and the Shifting Nuclear Balance, 1949-1954," *International Security*, vol. 13, no. 3 (Winter, 1988-1989), pp. 5-49.

The two theoretical models that are used to trace the causal story of nuclear doctrine will present very differing implications about how these doctrines come to pass. If technology has an independent effect on doctrine, we should be able to determine the doctrine of a nuclear state given sufficient understanding of the technological characteristics of its arsenal and assets. Furthermore, should technology prove to be the primary driving factor in the establishment and alteration of nuclear doctrine, and then analysts should be able to present key insights into the highly classified characteristics of a state's nuclear strategy if they are able to find out the procurement policy of that state's military. Furthermore, a technology-driven nuclear doctrine warns us about how other states will develop in the future, as they will be reflective of the technical operating characteristics of their assets. Should the organizational politics model, specifically the state's tendency towards a military offensive bias prove to be the primary causal factor driving nuclear doctrine, we should see very different consideration within doctrine and in discussions leading up to implementation. In this case, we should see doctrine reflect a move towards simplified standard operating procedures and doctrines taken without consideration for the alteration in the balance of forces or the development of new technology. While inter-service military rivalry is a reality, the outcome that it predicts is not the desired test; offensive bias is a specified organizational outcome that has an impact on war doctrine, whereas inter-service rivalry is primarily about budgeting competition.

The doctrinal choices examined in this thesis are: countervalue (city-strike), counterforce (targeting enemy military units), Launch on Warning, and First Strike. For

the purposes of simplicity, this thesis will examine these doctrinal options as a "yes/no" choice (did the United States implement a first strike doctrine or not? Why did they abandon plans to implement launch on warning? Etc), with the exception of countervalue versus countervalue, as that will be assessed towards which is the focus of the doctrine (is the doctrine focused on counterforce or countervalue targeting?). These doctrinal choices available to military decision makers may be combined (such as a first strike and countervalue doctrine) but they will be examined as separate units for the purposes of unpacking the option under discussion. These four doctrinal options represent the building blocks of nuclear strategy; other considerations are primarily means of delivery (e.g. bombers versus ICBM versus SSBN versus artillery, etc).

Argument

In the technological capabilities model, this thesis tests how technology impacts nuclear doctrine in terms of countervalue (city-strike) versus counterforce strategies, Launch on Warning (LoW), and First Strike. Countervalue doctrines are easiest to implement: they require the capability of reliable delivery system to reach the enemy's target and enough nuclear bombs to sufficiently punish a civilian population, industrial infrastructure, and political/governmental networks.[7] The purpose of establishing a countervalue doctrine is to make the cost of war sufficiently prohibitive to deter the enemy or to surrender rather than continue to incur punishment should military action

[7] Jervis (1989), p. 11; Lawrence Freedman. *The Evolution of Nuclear Strategy* (New York, N.Y.: St. Martin's Press, 1981, 1983), pp. 55.

begin.[8] Counterforce doctrines, alternatively, are much more difficult to put into action. Striking an opponent's military units on the battlefield requires highly accurate delivery systems, reduced-yield warheads to minimize blowback to one's own troops,[9] and miniaturized warheads that are able to be launched by individual soldiers or armored units such as tanks or trucks.[10] The use of counterforce weapons is especially useful because: (1) it neutralizes the enemy's ability to strike at its cities, as well as shifts the overall balance of forces in their favour if it successfully destroys a significant portion of the enemy's military assets;[11] (2) counter-force targeting makes use of ground-burst, which achieves the maximum destructive blast possible against enemy targets, which is an efficient utilization of the nuclear warhead being used and does not (necessarily) target civilians.[12]

Due to the decisive nature of nuclear weapons, the suddenness of a nuclear strike, and the capacity of destruction with which thermonuclear weapons are imbued,[13] states are concerned with pre-emptive or surprise attack from a rival state. Because the nature of nuclear weapons precipitates both first mover advantage as well as the use-it or lose-it problem, a state is at the mercy of their potential adversaries in the event of crisis or even

[8] Jervis (1989), p. 11.
[9] Charles L. Glaser and Steve Fetter. "Counterforce Revisited: Assessing the Nuclear Posture Review's New Missions," *International Security*, vol. 30, no. 2 (Autumn, 2005), pp. 86-87, 90-95
[10] Lawrence (1983), pp. 130-132; Colin S. Gray. "Theater Nuclear Weapons: Doctrines and Postures," *World Politics*, vol. 28, no. 2 (Jan., 1976), p. 307; W.S. Bennett, R.P. Gard, and G.C. Reinhardt, *Tactical Nuclear Weapons: Objectives and Constraints*, LA-5712-MS, Informal Report (Los Alamos: Los Alamos Scientific Laboratory, 1974), pp. 4-6.
[11] Herman Kahn. *On Thermonuclear War* (New Brunswick, N.J.: Transaction Publishers, 1960, 2007), p. 16n; Lawrence (1983), pp. 130-132; Daniel Yergin. *Shattered Peace: The Origins of the Cold War and the National Security State* (London: Andre Deutsch, 1976), p. 478; *Bernard Brodie, The Reporter* (11 October 1954).
[12] Glaser and Fetter, p. 97
[13] Thomas C. Schelling, *Arms and Influence* (New Haven, CT: Yale University Press, 1966, 2008), pp. 20-4

the revisionist whims of another state.[14] Given the vulnerability of a pre-emptive strike, countries are more likely to have a First Strike doctrine if their arsenals are neither highly mobile nor difficult to locate.[15] Said simply, this hypothesis says: the more vulnerable a state's nuclear asset is, the more likely they are to consider a First Strike doctrine.

Similarly, states may make use of a LoW doctrine to mitigate the insecurity surrounding the *use-it or lose-it* character of nuclear weapons. In a Launch on Warning doctrine, a country will retaliate against the enemy after they have launched their strike, but before those strikes have reached their Designated Ground Zeros (DGZs).[16] LoW, however, requires two technological necessities: (1) a fully reliable sensor system,[17] and (2) a fully reliable command-and-control infrastructure.[18] While command-and-control capabilities are not choose-able facets since nuclear arsenals must be secure against accidents, the technological advancement of this area of nuclear weapons may ultimately be a determinant of specific launch-on-warning strategies. Because of these technological necessities, the more advanced a state's Command, Control, Communications (C^3I) systems are, the more likely a Launch on Warning doctrine is to exist.

The alternative explanation tested in this study is an organizational model, based on Jack Snyder's *offensive bias* argument. According to this model, (1) military decision-makers will pursue offensive doctrines regardless of the balance of forces or advances in

[14] Fred S. Hoffman, "The SDI in U.S. Nuclear Strategy: Senate Testimony," *International Security*, vol. 10, no. 1 (Summer, 1985) ,p. 21
[15] Jervis (1989), pp. 143-5; Hoffman, p. 21
[16] Jervis (1989), p. 144
[17] Michael D. Wallace, Brian L. Crissey, and Linn I. Sennott, "Accidental Nuclear War: A Risk Assessment," *Journal of Peace Research*, vol. 23, no. 1 (Mar., 1986), pp. 14-15
[18] Wallace (et al), pp. 10-11

technical operating characteristics; (2) military doctrines will produce overly simplified Standard Operating Procedures (SOPs) and war-fighting plans in order to reduce uncertainty and simplify complex environments; and (3) military doctrines will favour holding the initiative.

Military decision-makers, because of their professional training as soldiers will be necessarily preoccupied with armed conflict and view the world in Hobbesian terms. Since this perspective does not offer a great amount of variation, there should be very little change over time. Military planners, therefore, will continually push for and plan for preventive strikes against a potential rival. A better-now-than-later attitude should be at the core of doctrine.

Military decision-makers, because of their dogmatic adherence to doctrine and the desire to simplify complex environments will be reticent to change. For this reason, there should be great hesitation to review SOPs, war-fighting plans, and targeting packages. Large doctrinal changes should be met with a high degree of resistance.

Military decision-makers, due to the overarching desire to hold the initiative and avoid reactionary strategies, will pursue offensive doctrine that will virtually guarantee that they will control the initiation of conflict. As such, surprise attacks should be at the heart of a doctrine that favours holding the initiative. A strategy that is designed to hold the initiative allows for the initiator to select the method, timing, and location of the start

of military combat, therefore allowing flexibility and reducing uncertainty.[19] In terms of an initiative-biased nuclear doctrine, we should expect surprise attack and/or preventive strikes; pre-emptive strikes would not be initiative-biased because the calculus for this type of doctrine would be to minimize how much damage was absorbed by American territory.

Technological determinism has largely fallen through the cracks in the International Relations Theory literature. While Jack Levy's highly influential, seminal work on the Offensive-Defense Balance[20] theory sparked an important strand in Structural Realist theories, this thesis does not offer such a grand explanation on the nature of war, peace, or even security and stability. This thesis does, however, offer an explanation as to how technology has an independent and causal variable in how American nuclear doctrine was driven during the Cold War: as they became more technologically proficient (acquiring smaller-sized warheads), the U.S. moved from countervalue to a counterforce-heavy doctrine; as the American arsenal achieved greater invulnerability (e.g. stealthier technology such as nuclear submarines and greater mobility such as missiles mounted on railroad cars, etc), military decision makers abandoned discussions of first strike doctrine; and lastly, this thesis predicts that as command, control, and control technology becomes more advanced, the United States will become more likely to implement a LoW doctrine. This strand of mid-range level of theory, linking technology and military affairs fits in with Michel Fortmann and Stefanie

[19] Elizabeth Kier. "Culture and Military Doctrine: France between the Wars," *International Security*, vol. 19, no. 4 (Spring, 1995), p. 88; Snyder (1984), pp. 15-17, 26-30.
[20] Jack Levy. "The Offensive/Defensive Balance of Military Technology: A Theoretical and Historical Analysis," *International Studies Quarterly*, vol. 28, no. 2 (Jun., 1984), pp. 219-238

von Hlatky's work on Revolutions in Military Affairs;[21] while that work provides an explanation for the technological implications of international security, this thesis provides a monadic-level explanation (about the state's military policy, as opposed to the strategic interaction between rivals – this thesis does not comment on the stability of the international system) for the state's doctrinal choices.

This thesis will proceed by examining a longitudinal study of U.S. doctrine of the Eisenhower, Kennedy, Nixon, and Carter Administrations. The selection of a longitudinal instead of a cross-national study has been made to control for as many variables as possible. Because the literature does not currently highlight the relationship between technical operating requirements and their relationship with nuclear doctrine, there is a need to carefully examine and develop these variables as much as possible. While this will obviously limit the ability to generalize from the conclusions made by this thesis, it will provide a solid foundation to build upon for future research (should the technological determinist model prove fruitful).

The use of a longitudinal case study, furthermore allows us to hold as much constant, however, as noted above, it will necessarily limit the ability to generalise and predict across the breadth of nuclear cases. While the lack of variation in these cases may cause concern due to the possible confounding effects of path dependency, they allow for a more controlled comparison of the independent variables in accordance with Mill's method of difference. Furthermore, if the presidents are under the aegis of path

[21] Michel Fortmann and Stefanie von Hlatky. "The Revolution in Military Affairs (RMA) and Deterrence Stability," in T.V. Paul, Patrick Morgan and James Wirtz (eds), *Complex Deterrence: Strategy in the Global Age* (Chicago, IL.: University of Chicago Press, 2009).

dependency, then it is a hard case since we are explaining and demonstrating change in the DV (i.e. there is a change, which cannot be explained by path dependency, or at least the technological model offers greater explanatory power, as per Lakatos' Criteria). Since the scope of the inquiry has been limited to years 1953-1981 (President Eisenhower to President Carter), with the Lyndon B. Johnson and Gerald Ford Administrations not included in the case studies, the findings presented within this thesis cannot be appropriately applied to other national doctrinal programmes, nor can they be generalized to post-Cold War cases at this point. However, the post-Carter technological changes are many but small, and do not compare with the major changes between the 1950's and 1960s, or between the 1960s and 1970s. To be able to make these generalizations, further work will be required to make analyses and predictions about (for example), Pakistani or North Korean doctrine. This thesis represents a first step in the direction of a research programme and not the culmination of a new theoretical perspective. Further work is obviously required beyond this study.

The years examined will be from the Dwight D. Eisenhower Presidency to the Jimmy Carter Administration. President Truman's administration has been left out of the analysis because nuclear technology was still in its infancy, and the policy debates surrounding nuclear weapons by-and-large revolved around who would have the authority to command an atomic launch. Additionally, Presidents Lyndon Johnson and Gerald Ford have been left out because they were vice-presidents who took for the elected Commander-in-Chief (Johnson from the Kennedy assassination and Ford from Nixon's resignation). As such, they inherited the policies, directions, and staffs from their

predecessor. Most importantly, the Johnson and Ford years were too short to alter the nation's nuclear policy and develop new doctrine. The last case study considered will be Jimmy Carter's Administration. President Carter's Presidential Directive 59 and much of the debate surrounding the Countervailing Strategy is available in voluntarily declassified primary sources and an additional number of secondary literature.

The United States has been selected as the test case for a number of reasons. Firstly, the American politico-military bureaucracy remains one of the largest, most complex national organizations in the world.[22] The Pentagon and military decision makers in the White House comprise thousands of civil servants, presenting a highly complex bureaucratic machinery. If ever there was a need to simplify organizational behaviour, it should be in the United States case. Secondly, the U.S. research and development industry, as well as RAND strategists have been, historically, very active in the advancement of military technology. American technological development and innovation has not, as far as is discernible, come through espionage (such as the Soviet Union at several points) or the purchasing of technology from abroad (such as the A.Q. Khan network). Again, this holds as much constant as possible: there is very little contamination of the technological input from foreign sources after crossing the nuclear threshold. Thirdly, the United States is among the most transparent and open bureaucracies among nuclear states.

[22] Max Boot. "The Struggle to Transform the Military," *Foreign Affairs*, vol. 84, no. 2 (Mar.-Apr., 2005), pp. 103-118.

This research project is based in evidence gathered from declassified primary sources whenever possible. Presented as evidence, however, memoranda of conversations with various presidents and defense secretaries, notes of National Security Council (NSC) meetings, declassified doctrinal overviews, commission reports to the president and reports to the Arms Services Committee to Congress have been collected and analysed here. Evidence has also been gathered from secondary sources such as academic articles and books, memoires, and newspaper articles.

The thesis is organized and divided into five subsequent chapters that compromise the overall project: *Plan of Research, Argument and Methodology, Literature Review*, *Theoretical Overview and Hypotheses*, *Limitations, Implications and Significance*; the *four Case Studies: Evidence and Analysis*; and *Conclusions*. In the *Plan of Research*, the overall project is explained and justified; the methodology of the project is also explained. The *Literature Review* section builds and justifies the alternative explanation, namely Jack Snyder's offensive bias model. Additionally, key concepts will be explained and it will be demonstrated how they fit into the literature. The *Theoretical Overview and Hypotheses* explains the basis, causal mechanisms, and indicators used throughout the empirical chapters and analyses. The *Limitations* section describes the problems facing this research project, such as the highly classified nature of the material under investigation; the *Implications and Significance* subsection discusses why this project is important and where it fits into the literature.

The *Case Studies* chapters present the empirical evidence and an analysis of the findings. The first two case studies examine the Dwight D. Eisenhower and John F. Kennedy Administrations, chapters two and three respectively. The third and fourth case studies, the Richard M. Nixon and Jimmy Carter Administrations, are examined and analysed in chapter four. Each of the case studies follows a similar format: the presidency is introduced, an analysis of doctrinal developments as related to the technological model is offered (e.g. how the hypotheses under review have been successful or falsified), and lastly a discussion of the evidence relating to the *alternative explanation* and how the predictions of the offensive bias model has been confirmed or disconfirmed.

In the *Final Conclusions* chapter, the findings of the thesis are discussed and a determination is made as to which explanation offers a more compelling causal story as to which theory drove American nuclear doctrine during the Cold War. Furthermore, there will be a discussion as to where to proceed in this research project based on the findings presented through this thesis for future studies.

Chapter I: Theory and Methodology

In this chapter a number of hypotheses about how technological determinism and the military organization's offensive biases caused American nuclear doctrines during the Cold War (specifically deployment and employment doctrines) will be introduced. These hypotheses are grouped into two families of explanations, representing distinct perspectives on state behaviour: that of "organizational theory" and what I will refer to as "technological determinism." The first theoretical perspective has achieved widespread currency in the examination of national security policy. While this perspective seems to be a sensible place to start, this thesis demonstrates that the technological explanation will provide a causal explanation as to the effect of changes in nuclear technology on doctrine in the U.S.

While geopolitics is an important factor in establishing state military interaction in the international system, it does not present a compelling explanation for changes in nuclear doctrine. Firstly, there are an insufficient number of geopolitical changes during the Cold War years that are being examined: the Soviet Union crossing the atomic threshold in 1949, and developing a thermonuclear capability in 1955, and U.S.-U.S.S.R. detente in 1971. Secondly, the geopolitical changes do not coincide with alterations in American nuclear doctrine: Massive Retaliation in 1953 takes place a year before the U.S.S.R. develops its thermonuclear bomb, Flexible Response in 1961 occurs without a corresponding major change in the geopolitical environment, Richard Nixon's Schlesinger Doctrine was implemented in January 1974 and had too great a time lag from

detente to be reflective of this development (additionally, we will later see that the doctrine did not reflect a more pacific approach to nuclear relations), and the Countervailing Strategy was adopted by the Carter Administration in 1980 with no corresponding major alterations in the geopolitical environment.

The organizational theory literature is much larger than the technology scholarship and comprises a far more diverse body of thought than outlined in this section. My goal is only to summarize the fundamentals of the literature from which adherents draw from this perspective. Lastly, there is a dearth in the literature dealing with technology as a causal factor of nuclear doctrine. My hope is that this thesis will begin to fill that intellectual gap.

Argument

This section will outline the argument that will be made in this thesis, followed by a discussion about what key variables will be used. In addition, this section will explain the logical reasoning behind this argument.

The general goal of this thesis is to test whether the technical determinist model or the military organization's tendency towards offensive biases presents a more compelling causal explanation for American nuclear doctrine during the Cold War. The argument is that the technical operating characteristics of nuclear weapons primarily drove doctrine in the United States and not the military-organizational bias towards offensive strategies.

Technical requirements will be taken to mean a state's nuclear capability in terms of yield, diversity of delivery systems, size of warhead, command and control capability, and the vulnerability of nuclear assets – in short, technical requirements are the technical operating characteristics of their nuclear forces.

Nuclear weapons have created a fundamental revolution in military strategy. Atomic and thermonuclear bombs (and missiles) have created a distinctly different environment in international security. According to Robert Jervis, "nuclear weapons have compounded the difficulties facing a state that would seek complete victory. The danger of escalation, combined with the obvious impossibility of winning a total war, means that statesmen realize the serious challenges to the adversary's vital interests can lead to disaster."[23] Thomas Schelling argues that it is the speed with which nuclear weapons produce large-scale destruction that has altered the international environment.[24] Bernard Brodie recognized the qualitative difference that "the thermonuclear bomb made the drastic nature of the change wrought by nuclear weapons completely unequivocal."[25] Clearly, different scholars have noted the distinctive ways that nuclear weapons have changed the international security environment even if they differ as to what are these changes. It follows, unsurprisingly, that doctrine is guided by certain technological realities.

The character of nuclear doctrine is driven by technological factors and the troubleshooting of problems that are technologically-based. These problems and their

[23] Jervis (1989), p. 230.
[24] Schelling (2008), pp. 19-24.
[25] Bernard Brodie, *Strategy in the Missile Age* (Santa Monica, C.A.: RAND Corporation, 1959), pp. v-vi.

solutions form the basis of nuclear doctrine: firstly, the threat of enemy attack is solved by shifting from counter-value targeting to counter-force targeting to pre-empt enemy attack. This works as a solution because the threat of enemy attack is mitigated because, instead of holding their opponent's cities and civilian population as hostages, one can destroy their striking ability by destroying their military assets. Secondly, the threat of pre-emptive strikes and the fear of surprise attack can be mitigated by achieving an invulnerable arsenal that is mobile and able to achieve second-strike survivability. Since the threatening state cannot destroy their opponent's nuclear arsenal with any meaningful certainty, a first strike would invite reprisal that could potentially destroy millions of their people, a significant portion of national infrastructure and economy, political and governmental leadership, and render much of the core state environmental untenable.

When nuclear explosions are detonated at a high altitude (e.g. Airburst) they produce a less destructive blast (and emit less fallout radiation), but maximizes the range of the weapon; contrarily, nuclear weapons that are detonated at as low an altitude as possible (e.g. Ground-burst), achieve a maximum blast and pressure against physical structures (as well as emitting more fallout radiation as debris is superheated and thrown into the atmosphere – e.g. fallout), but minimizes the effective distance of the effects. Additionally, because of the low pressure ability of airburst strikes, they are used primarily for soft targets, while ground-burst strikes are useful for hard targets such as hardened silos, tanks, or fortified enemy units, writ large. Counter-force targeting, because of its mandate of striking enemy forces and structures over a limited area, makes use of ground-burst detonations, which achieves the maximum blast effect and

maximizes destructive damage against the adversary in range. Furthermore, this option becomes attractive because even if deterrence fails and a general or limited war is underway, the utilization of counter-force strikes becomes a *de facto* war-fighting strategy; countervalue, however, works as a programme of exchanging hostages.

The threat of enemy attack constitutes the primary problem of nuclear doctrine. Because of the concern that an adversary may use his nuclear assets against the state (or the state's forces deployed abroad), military policy may take several steps to achieve a capability that may deal with this threat. One such solution to this would be to shift from a counter-value targeting policy to a counter-force capability to pre-empt an enemy attack to neutralize this threat. The use of counterforce weapons is especially useful because: (1) it neutralizes the enemy's ability to strike at its cities, as well as shifts the overall balance of forces in their favour if it successfully destroys a significant portion of the enemy's military assets; (2) counter-force targeting makes use of ground-burst, which achieves the maximum destructive blast possible against enemy targets, which is an efficient utilization of the nuclear warhead being used.

The counter-force option, however, requires a much more advanced technological capability in order to achieve this targeting policy. While counter-value targeting is achieved rather easily, as a bomber force has to break through the opposition's air defences, this is largely a matter of pilot training combined with intelligence-gathering to locate targets and competent military planning. Counter-force targeting, however, is by-and-large a more technological sophisticated proposition. In order to achieve a counter-

force capable nuclear doctrine, yield has to be adjusted to specification (higher yields may be counter-productive as it would be dangerous to one's own forces due to radiation and the initial fireball of the explosion) and warheads need to be miniaturized so that they may sit atop a jeep-mounted launcher or a sea-launched ballistic missile; the early 12,000 pound bombs used by SAC would not suffice, as they could not be loaded onto an Honest John or Davy Crocket artillery piece because they were just too large and heavy.

Another source of insecurity is the threat of pre-emptive strike or surprise attack from an enemy state, especially if the second-strike survivable criterion has not been met. Because the nature of nuclear weapons precipitates both first mover advantage as well as the use-it or lose-it problem, a state is at the mercy of their potential adversaries in the event of crisis or even the revisionist whims of another state. This is due to the decisive nature of nuclear weapons, the suddenness of a nuclear strike, and the capacity of destruction with which thermonuclear weapons are imbued.

A solution to the threat of pre-emption/surprise attack from an enemy state is to reduce the vulnerability of the existing arsenal. This is accomplished through several strategies, mostly technological in nature. For an arsenal to be invulnerable, it needs to be able to survive an enemy's first strike attack: this is referred to as second-strike survivability. Second-strike survivability is achieved by making forces mobile and stealthy. Nuclear submarines (SSBNs) are able to patrol oceans and seas virtually undetected by the opposition's navies and air forces; American Honest John and Davy Crocket artillery units enjoy great mobility traversing the forests of Western Europe;

intermediate-range ballistic missiles (IRBMs) can be put on railway cars to make them mobile in times of tension or during crises.

A second solution to possible pre-emptive and surprise attacks is the Launch-on-Warning (LoW) doctrine. The LoW doctrine is simple enough: when an early warning system (such as BMEWs) detects an enemy first strike, forces are launched against enemy units. While these units obviously cannot *defend* against an enemy strike, they assure that these weapons (that may or may not be targeted in a blunting strike) will be used effectively against the enemy's cities or battlefield assets (assuming that these assets were not utilized in the initial strike). This serves to mitigate the use-it or lose-it issue presented by nuclear weapons, as well as having a deterrent effect preceding the first strike to which they are responding.

Launch-on-Warning requires two technological necessities: (1) a fully reliable sensor system, and (2) a fully reliable command-and-control infrastructure. While command-and-control capabilities are not choose-able facets since nuclear arsenals must be secure against accidents, the technological advancement of this area of nuclear weapons may ultimately be a determinant of specific launch-on-warning strategies. LoW doctrines can present a very dangerous policy for nuclear weapons decision-makers. Due to the fact that a technical error may register a false positive on an incoming nuclear strike, accidental nuclear war may occur as a result of a response to a phantom pre-emptive strike that was not actually launched by an adversary. Because of this possibility, a state that employs a LoW doctrine must have a great amount of confidence before

committing to launch-on-warning. Furthermore, since even the most reliable systems will encounter errors from time to time, firm command-and-control issues must be available to: (1) recall legitimately authorised strikes before they reach their Designated Ground Zeros (DGZs); and (2) guard against accidental launch, as sub-executive personnel (such as field commanders) must be given the authorization to launch after detection or orders from their superiors.[26]

Technology Hypotheses

The size of the bomb has a consequential effect. Whether or not the warhead is miniaturized will produce a significant effect on outcome. To be successful in any of these strategies, technical operating characteristics must exist so that tactical weapons are a feasible strategy. To be able to employ a counterforce doctrine, state must be significantly advanced in terms of its nuclear delivery system and warhead sizes; big warheads are not realistically useable for tactical purposes; small scale nuclear reactions are necessary for battlefield operability, since weapons in the megaton range will create a situation that is just as harmful to one's army as it will to the target struck (e.g. blowback).

[26] To elaborate briefly on the second point, LoW requires authorization of sub-executive delegation of launch orders to personnel that would not normally be vetted since they are relatively low on the chain of command, mechanisms must be put in place so a stressed twenty year old lieutenant cannot authorise a nuclear launch without provocation.

The vulnerability of a nuclear arsenal has a significant effect on nuclear doctrine. For nuclear assets to achieve invulnerability (as an arsenal), they must be mobile and/or undetectable, or at least difficult to detect.

For the technological model, technical operating characteristics will be taken as the independent variable. The independent variables for this model will be the size of the bomb, diversity of delivery systems, and the size of the yield; the vulnerability of nuclear assets, and the technological advancement of Command, Control, and Communications (C^3I) technology.

Firstly, bomb size and weight has an important effect on how nuclear weapons can be used; if the weapon is very heavy and large, the means of delivery will be inherently limited. When "miniaturization" takes place, the construction of the internal mechanics of a nuclear reaction is altered in such a way that the weight and size of a nuclear "bomb" may be greatly reduced to the size of a warhead.[27][28] While the heavy nuclear bomb, which was up to 12,000 pounds in 1949,[29] could only be delivered by a B-29 bomber. The W31 warhead atop the Honest John MGR-1 artillery piece[30] could facilitate a counterforce capability and, therefore, this doctrine was not feasible until the technical requirement of miniaturization was met.

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[27] http://www.globalsecurity.org/wmd/intro/miniaturization.htm retrieved on 10 August 2012.

[28] The author of this thesis does not have the technical knowledge to explain the scientific and engineering process that is involved in the miniaturization of nuclear warheads. Sufficed to say, it is highly technical and complex. Most importantly for the purposes of this study, the nuclear reaction that is responsible for the detonation of a bomb is produced in a smaller, lighter warhead.

[29] David Alan Rosenberg, "The Origins of Overkill: Nuclear Weapons and American Strategy, 1945-1960," *International Security*, vol. 7, no. 4 (Spring, 1983), p. 30.

[30] Stephen I. Schwartz, *Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons Since 1940* (Washington, D.C.: Brookings Institute Press, 1998), p. 193

The second independent variable in this model will be the extent to which the nuclear arsenal was vulnerable. This will be measured in terms of the asset's stealthiness and mobility; if the weapon can remain undetected and mobile, then it is invulnerable.[31] Vulnerability, unfortunately, cannot be quantified in directly measurable terms since it requires assessing the technical characteristics of the assets: is the asset movable or is it left in the open for the enemy to attack it (such as bomber airfields)?; is the asset hidden (such as SSBNs on patrol or missiles that can be deployed on railway cars) or are they easily located by the enemy (such as many silos that could be picked up via aerial reconnaissance). This thesis posits that, when the invulnerability criterion is met, the state need not adapt a first-strike doctrine, as second-strike survivability has been achieved; the state need not hold the adversary's cities hostage with counter-value doctrine (or threats), but can make use of assets in a tactical counter-force and war-fighting plan should military or political decision-makers deem armed conflict is necessary in crises or hostilities.

The third variable used for the technological determinist model is C^3I technology. Innovations in early warning sensors, as well as in nuclear surety and positive control will be considered advancements in C^3I technology. These advancements and innovations should contribute to the launch on warning doctrine.

The dependent variables that will be tested are American employment and deployment doctrine. Employment and deployment doctrine indicates the when and how

[31] Schelling (1966, 2008), pp. 232-4.

nuclear weapons are used. Deployment doctrine, how nuclear forces will be used in combat, offers the actual force posture and war-fighting strategy of doctrine. This will provide insight as to the actual war-fighting plans and trace the effects of the theories under analysis on nuclear doctrine by using strategic debates and war-fighting plans.

In measuring employment and deployment doctrine, the DV will measure the significant changes in doctrine during the years investigated. These doctrinal changes, namely: Massive Retaliation under President Eisenhower was established in 1954,[32] Flexible Response under President Kennedy in 1961,[33] Selective Options implemented by President Nixon in 1974,[34] and President Carter's Countervailing Options in 1981.[35] Enlisted as the dependent variables to operationalize doctrine, four major doctrinal choices will be examined: countervalue/counterforce, first strike, and launch on warning (LoW).

T1: As nuclear bombs and warheads become more effectively miniaturized, low-yield bombs are produced, and delivery systems are diversified, states will move from a countervalue to a counterforce doctrine

T2: As a state's nuclear arsenal becomes more invulnerable to enemy attack, a first strike doctrine will become less adopted.

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[32] John Lewis Gaddis, *Strategies of Containment: A Critical Appraisal of American National Security Policy During the Cold War,* second edition (Oxford, UK: Oxford University Press, 2008), pp. 145-48
[33] Gaddis, p. 213.
[34] Freedman, pp. 375-82.
[35] Walter Slocombe, "The Countervailing Strategy," *International Security*, vol. 5, no. 4 (Spring, 1981), pp. 18-27.

T3: As command and control technology becomes more advanced, Launch on Warning (LoW) doctrines become more likely.

Organizational Theory

The alternative explanation tested as the primary driving force behind nuclear doctrine is organizational theory, specifically Jack Snyder's *Offensive Bias* model. This section will offer a brief literature review of organizational theory, where the offensive bias model fits into that literature, and why this specific model will be used as the alternative explanation.

Literature Review

The organizational behaviour framework takes very different starting points from classical international relations theory. Organizations are the result of fulfilling a specific role and purpose.[36] Whereas international theorists take the state as the unit of analysis within the international system (for structural realists), organizational theorists do not take the state as a 'monolithic' entity, but a 'constellation of loosely allied organizations on top of which government leaders sit.'[37] These constellations of organizations then

[36] Barry R. Posen, *The Sources of Military Doctrine: France, Britain, and Germany Between the World Wars* (Ithaca, NY: Cornell University Press, 1984), p. 43.
[37] Graham Allison and Philip Zelikow, *Essence of Decision: Explaining the Cuban Missile Crisis*, second edition (Reading, MA: Addison-Wesley, 1999), p. 166.

divide problems and parcel them out to various organizations, depending on the competency of the issue at hand.[38] Graham Allison, in what he refers to as factored problems and fractionated power, notes that the drawback 'about large organizations is that their size prevents any single authority from making all important decisions or directing all important activities', but this comes out of a necessity that is borne from dealing with a wide range of assorted and complex problems (which vary with respect to importance and priority).[39] It is in this manner that the organization interprets, processes facts and information, and addresses the problem. Allison further comments that this occurs with 'considerable autonomy.'[40]

Jack Snyder argues that military policies reflect an organizational tendency towards an *offensive bias*. According to Snyder, "the choice of offensive strategies by the continental powers was primarily the result of organizational biases and doctrinal oversimplifications of professional military planners."[41] The offensive strategies employed by Germany, France, and Russia were based neither in terms of a rational strategic calculus nor the offensive-defensive balance nor geopolitical circumstances.[42] *Ideology of the Offensive* presents a compelling framework for the primary driving mechanism behind military doctrine: a bias towards offensive strategies. This strain of organizational literature has become influential among international security specialists

[38] Allison and Zelikow, p. 166.
[39] Allison and Zelikow, pp. 166-7.
[40] Allison and Zelikow, p. 166.
[41] Snyder, p. 16.
[42] Snyder, pp. 15-18.

and those who study military strategy, such as Stephen Van Evera, Barry Posen, Scott Sagan, Stuart Kaufman, and Jack Levy. [43]

More recent scholarship discusses the relationship between the defense industry and transformation. Dombrowski, Gholz, and Ross argue that "the posited transformation of the defense industry depends largely on the weapons, weapons systems, and defense industrial sector under consideration."[44] By and large, however, Dombrowski et al focus on the acquisition programs related to the Revolution in Military Affairs (RMA) literature.[45] How these programs lead to doctrinal changes and whether technological innovations or the behaviour of the defense industry as a whole, is a question that is largely left unanswered.

Alternatively, Horowitz presents *adoption-capacity theory* which argues, "for any given innovation, the financial resources and organizational changes required for adoption govern the system-level distribution of responses and influence the choices of individual states."[46] In attempting to explain why some states pursue military innovations

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[43] Barry R. Posen. *The Sources of Military Doctrine: France, Britain, and Germany Between the World Wars* (Ithaca, N.Y.: Cornell University Press, 1986); Scott D. Sagan. "1914 Revisited: Allies, Offense, and Instability," *International Security*, vol. 11, no. 2 (Autumn, 1986), pp. 151-175.; Stuart J. Kaufman. "Organizational Politics and Change in Soviet Military Policy," *World Politics*, vol. 46, no. 3 (Apr., 1994), pp. 355-382.; Scott D. Sagan. "1914 Revisited: Allies, Offense, and Instability," *International Security*, vol. 11, no. 2 (Autumn, 1986), pp. 151-175.; Stephen Van Evera. "Cult of the Offensive and the Origins of the First World War," *International Security*, vol. 9, no. 1 (Summer, 1984), pp. 58-107; Jack S. Levy. "Organizational Routines and the Causes of War," *International Studies Quarterly*, vol. 30, no. 2 (Jun., 1986), pp. 193-222.
[44] Peter J. Dombrowski and Andrew L. Ross, "The Revolution in Military Affairs, Transformation and the Defense Industry," *Security Challenges*, vol. 4, no. 4 (Summer, 2008), pp. 29-30; Peter J. Dombrowski, Euguene Gholz, and Andrew L. Ross, *Military Transformation and the Defense Industry After Next: The Defense Industrial Implications of Network-Centric Warfare* (Newport, RI: Naval War College Press, 2003)
[45] Dombrowski and Ross (2008), pp. 31-2.
[46] Michael C. Horowitz, *The Diffusion of Military Power: Causes and Consequences for International Politics* (Princeton, NJ: Princeton University Press, 2010), p. ix.

while others do not, two factors are identified: "the ability to afford the improvements and the organizational capacity to adopt them."[47] While the book discusses the ability of states to adopt military innovations but, as Lawrence Freedman critiques, "to become a nuclear power requires a considerable financial outlay but not much organizational change."[48]

In another stream of the military diffusion literature, Goldman argues that the willingness of state elites to adopt new technologies, ideas, and practices is due to cultural foundations.[49] Whether these new technologies are adopted or not is explained by "presence or absence of a cultural and ideological orthodoxy shapes the scope, pace and extent of diffusion."[50] However, it is difficult to explain variation in doctrine if external shocks are not present. The argument touches on the *willingness* to accept military diffusion, but does not offer causal explanations as to what specific types of doctrinal decisions are implemented.

Additionally, recent work on military doctrine effects interstate relations such as Twomey argues that "an underestimation of an adversary's capabilities can lead to failure of deterrence and efforts at coercion, escalation, and to conflict, because it complicates

[47] Review by Lawrence D. Freedman, *Foreign Affairs*, vol. 90, no. 1 (Jan.-Feb., 2011) retrieved http://www.foreignaffairs.com/articles/67158/michael-c-horowitz/the-diffusion-of-military-power-causes-and-consequences-for-inte on 11 August 2012.
[48] Ibid.
[49] Emily O. Goldman, "Cultural Foundations of Military Diffusion," *Review of International Studies*, vol. 32, no. 1 (Jan., 2006), p. 69.
[50] Goldman (2006), p. 70.

both assessments of the balance of power and interpretation of the adversary's signals."[51] While this work presents an important contribution to the work on military doctrine and deterrence, it does not offer an explanation as to how doctrinal choices are made.

Risa Brooks adds to the organizational literature in her study of strategic assessments and civil-military relations. This work argues that institutional processes (information sharing, strategic coordination, structural competence, and the authorization process) determine strategic assessment.[52] While this work presents important insights as to how civilian and military organizations assess the strategic environment, its focus is not on doctrinal choices and military strategy.

While recent scholarship (e.g. since the year 2000) in military doctrine, revolutions in military affairs, and the military diffusion literature provides a rich source of material to draw from, they do not offer a causal explanation for how organizations determine the specifics of doctrine. This strain of literature, of course, presents a body of scholarship that offers explanations for several issues relating to military organizations, but Jack Snyder's classic work on *military organizations and offensive biases* present a more direct causal story for how the specifics of military doctrine are selected.

Alternative Argument: Military Organizations and Offensive Biases

[51] Christopher P. Twomey, *The Military Lense: Doctrinal Difference and Deterrence Failure in Sino-American Relations* (Ithaca, NY: Cornell University Press, 2010), p. 35.
[52] Risa Brooks, Shaping Strategy: *The Civil-Military Politics of Strategic Assessment* (Princeton, NJ: Princeton University Press, 2008).

The first stricture of military organizations is what Jack Snyder terms *focus of attention*.[53] Military decision-makers, because of their training as professional soldiers (and their duties thereof), the focus is on threats to the state's security and on the conflict-oriented side of international relations.[54] This *Hobbesian* ontological perspective of military decision makers is such that the international system reinforces the prospect of militarized interstate disputes, and they are necessarily preoccupied in preparations of this nature.

In a *Hobbesian* world view where hostility is taken for granted, it is prudent for military decision-makers to not only prepare for war, but to make plans for preventive wars and pre-emptive strikes against potential adversary. This is true because military dictum states that there is a favourable advantage for the force that has the initiative.[55] According to this ontological perspective, Snyder argues that "a preventive grand strategy requires an offensive operation doctrine. Defensive plans and doctrines will be considered only after all conceivable offensive schemes have been decisively discredited."[56]

O1: Military decision-makers will pursue offensive doctrines, namely preventive strikes and surprise attacks, regardless of the balance of forces or advances in technological advancements or innovations.

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[53] Snyder, p. 28.
[54] Ibid.
[55] Stephen Van Evera. "The Cult of the Offensive and the Origins of the First World War," *International Security*, (Summer, 1984) vol. 9, no. 1, pp. 71-72.
[56] Snyder, 28.

Military decision-makers, because of their professional training as soldiers will be necessarily preoccupied with armed conflict and view the world in Hobbesian terms. Since this ontological perspective does not offer a great amount of variation, there should be very little change over time. Military planners, therefore, will continually push for and plan for preventive strikes against a potential rival and surprise attack. A better-now-than-later attitude should be at the core of doctrine in either a preventive or a surprise attack. The purpose of a preventive strategy is the (1) establish combat on the enemy's territory,[57] *and* (2) to redefine the strategic balance, making the adversary weaker than the attacking state. Pre-emptive strikes are not a valid indication of an offensive doctrine because they are primarily defensive; pre-emption action, especially blunting missions that target the adversary's ability to destroy homeland territory,[58] is considered defensive only when there is an imminent threat of attack. Under this definition, "the existence of an immediate threat and a very short time frame for decision making characterizes a pre-emptive attack; a preventive attack, by contrast, is motivated by long-term forecasting."[59]

This should be relatively easy to see reflected within the empirical record. Did doctrine reflect the prevailing balance of forces: do military and political decision makers base their doctrinal decisions upon the comparison of military might between themselves and the adversary targeted? The prevailing balance of forces (e.g. does the adversary have stronger military might in terms of manpower, technological superiority, more

[57] Wilhelm Agrell, "Offensive Versus Defensive: Military Strategy and Alternative Defence," *Journal of Peace Research*, vol. 24, no. 1(Mar., 1987), p. 78; Desmond Ball, "U.S. Strategic Forces: How Would They Be Used?" *International Security*, vol. 7, no. 3 (Winter, 1982-1983), pp. 42-3.
[58] Freedman (1983), pp. 130-2.
[59] Randall L. Schweller. "Domestic Structure and Preventive War: Are Democracies More Pacific?" *World Politics*, vol. 44, no. 2 (Jan., 1992), pp. 247, 261-2.

military assets, is the adversary weaker in terms of military strength, or is there a general equilibrium between the two militaries)[60] should not be a factor if the offensive bias model holds true. Did military decision makers pursue offensive strategies that were not justified by the balance of forces; was the balance of forces discussed, to what extent and emphasis was placed upon this discussion? We should not expect doctrine to change due to an alteration of the balance of force or advancements in technological capabilities; if technological advancements or alteration in the balance of forces occurs, there should be no change in doctrine according to this model.

O2: Military doctrines will produce overly simplified SOPs and war-fighting plans in order to reduce uncertainty and simplify complex environments.

Military decision-makers, because of their dogmatic adherence to doctrine and the desire to simplify complex environments will be reticent to change. Again, this should be relatively easy to see within doctrine, memoranda, and meeting minutes with decision makers. For this reason, there should be great hesitation to review SOPs, war-fighting plans, and targeting packages. Large doctrinal changes should be met with a high degree of resistance. Furthermore, the SOPs and war-fighting plans should reflect a desire to reduce complexity and to simplify the environment within which the military would operate.

[60] Robert J. Art, "To What Ends Military Power?" *International Security*, vol. 4, no. 4 (Spring, 1980), pp. 6-7, 28, 33-4.

Standard Operating Procedures constitute an organization's plans for specific actions, the coordination and codification of 'clusters' of SOPs forms the program for dealing with a situation or crisis.[61] The sets of rehearsed SOPs guide the organization to select the appropriate developed program. Since a program is a set of SOPs that are called upon, which are already resistant to change, programs are even more difficult to change to particular situation. Often programs consist of a large number of SOPs. Because creating a new program which combines a number of workable SOPs is not easy, there are few programs at the organization's disposal. An organization, furthermore, will have a list of programs at the disposal to call upon when a specific type of activity is chosen (war-fighting would be an example) which is a repertoire.[62] According to Allison, the number of repertoires an organization possesses is limited. As Posen points out, the package of organizational programs possessed to form a repertoire 'is roughly analogous to a military doctrine.'[63]

O3: Military decision makers should be reticent to change doctrine.

This leads to the second stricture is the *dogmatization of doctrine*.[64] Military doctrinal strategists and decision-makers create the standard operating procedures (SOPs), college training, institutional structures, field manuals, and war plans to inculcate a simple, standard doctrine as well as to reduce uncertainty at the planning levels. As Snyder points out, this "process of disseminating a doctrine throughout the organization

[61] Allison and Zelikow, p. 170.
[62] Allison and Zelikow, p. 170.
[63] Posen, p. 44.
[64] Snyder, 29.

tends to make a simple doctrine even simpler, because it must be made easily communicable. As a result, dogmatization and standardization make existing biases more extreme, whether they are offensive or defensive."[65] Biases, in other words, become more entrenched and reticent to change.

The third stricture of military decision-making is the *reduction of uncertainty*.[66] As Posen illustrates, "taking the offensive, exercising the initiative, is a way of structuring the battle."[67] Defense, in contrast, is a reactionary and less structured proposition, and necessarily more difficult to plan as it depends upon the strategies and tactics of the opposition. According to Stephen Van Evera, military decision-makers have an organizational bias towards offensive doctrines because they are easier to plan, even if they are more difficult (and risky) to execute successfully on the battlefield. Therefore, we could predict that this bias towards offensive doctrines would manifest itself in planning surprise attacks as well as aggressively planning first strike doctrines in order to eliminate the possibility of being caught off guard.

Case Selection

This section will introduce the cases selected for empirical testing, namely the Eisenhower, Kennedy, Nixon, and Carter Administrations. Furthermore, this section will offer a justification for the use of the United States as a longitudinal study, single-nation study.

[65] Snyder, 29.
[66] Snyder, 29-30.
[67] Snyder, 29; Posen, chapter 2.

For the purposes of this thesis, I will make use of a longitudinal case study of the United States against which to test the two competing theories. By controlling for as many variables as possible outside of those discussed in the hypotheses, we can have greater confidence in the findings and outcomes. While the lack of variation in these cases may cause concern due to the possible confounding effects of path dependency, they allow for a more controlled comparison of the independent variables in accordance with Mill's method of difference. Additionally, since the nuclear technological determinist model has not been sufficiently explored in the literature, there is a need to carefully examine and develop these variables as much as possible. By keeping as much constant as possible, a longitudinal case study of a single country will be able to flesh out the technological variables for further research.

The years examined will be from the Dwight D. Eisenhower Presidency to the Jimmy Carter Administration. President Truman's administration has been left out of the analysis because nuclear technology was still in its infancy, and the policy debates surrounding nuclear weapons by-and-large revolved around who would have the authority to command an atomic launch. Additionally, Presidents Lyndon Johnson and Gerald Ford have been left out because they were vice-presidents who took for the elected Commander-in-Chief (Johnson from the Kennedy assassination and Ford from Nixon's resignation). As such, they inherited the policies, directions, and staffs from their predecessor. Most importantly, the Johnson and Ford years were too short to alter the nation's nuclear policy and develop new doctrine. Lastly, the last case study considered will be Jimmy Carter's Administration. President Carter's Presidential Directive 59 and

much of the debate surrounding the Countervailing Strategy is available in voluntarily declassified primary sources and an additional number of secondary literature.

The U.S. used different employment and deployment doctrines during the Cold War. In the early 1950s, before the possibility of miniaturization of warheads (for tactical delivery) and relied heavily on Strategic Air Command (SAC) bombers, Secretary of State Dulles operated the Massive Retaliation doctrine, implemented in 1954. When McNamara took over as Secretary of Defense, the Kennedy administration instituted a Flexible Response doctrine, as of 1961. The Richard Nixon presidency in 1974 implemented the Selective Options doctrine, while the Carter Administration established the Countervailing Strategy in 1981.

My first goal is to test whether the argument that states develop their nuclear doctrine based on technical operating characteristics is true. This will be done by a temporal study of the United States. The U.S. is the most obvious case in which to start, as there is a large organizational approach to civil service, as well as a history of technological research and development in the defense industry. While the U.S. has the most technically advanced nuclear capability, the focus was on miniaturizing warheads for tactical/counterforce use. The U.S. placed a major focus on tactical nuclear weapons, for example, a 0.1KT warhead fired from a howitzer a distance of up to 14,000m[68] and the 'neutron bomb' with its 'enhanced radiation effects' designed primarily to disable Russian tank crews[69] as well as tactical aircraft delivery systems;[70] but strategic (large-

[68] David Miller. *Battlefield* (London: Brian Todd, 1990), p. 137.
[69] Freedman, p. 385.

scale weapons) were available, the largest-yield thermonuclear warhead produced was the 25 Mt B-41 gravity bomb deliverable from either the B-47 or B-52 bomber. [71] By 1959, Strategic Air Command (SAC) had obtained 3,000 B-52s and B-47s. The US had a fleet of ballistic-missile submarines and ICBMs capable of striking Russia and China; Medium-Range Ballistic Missiles (MRBMs) were available for striking Russian territory from Western Europe.

Implications and Significance

If my technological determinist hypothesis is correct, we will be able to add a theoretical layer to the nuclear literature that is able to offer a causal explanation for doctrines related to war fighting. As yet, there has been no systematic analysis of nuclear doctrine, while arguing that the technological requirements as having an independent effect on nuclear doctrine. It should be noted that I am not arguing that technological determinism explains everything, but that in most instances it explains most of the variance in nuclear doctrinal outcomes. However, if the technological model is correct in providing the most compelling explanation for nuclear doctrine in the United States during the Cold War, this will provide the basis for a future research programme to test this theory against post-Cold War America and other nuclear states.

Beyond the scholarly contribution, very different implications result from both sets of hypotheses. (1) Should the technological determinist model be confirmed, we

[70] Norman Polmar and Robert S. Norris. *The U.S. Nuclear Arsenal: A History of Weapons and Delivery Systems Since 1945* (Annapolis, MD: Naval Institute Press, 2009), pp. 113-163.
[71] *Ibid*, p. 53.

should be then be able to determine the doctrine of nuclear states, given a sufficient understanding of the technological characteristics of its arsenal and assets. Furthermore, a technology-driven doctrine warns us about how other states will develop in the future, as they will be reflective of the technical operating characteristics of their assets. (2) Should the offensive bias model prove to be the primary causal factor driving nuclear doctrine, we should see doctrine reflect a move towards simplified standard operating procedures and, doctrines taken without consideration for redresses and alterations of the balance of power or the development of new technology or technological innovations.

"The technological realities of this competition are constantly changing from month to month and year to year. Are we to flee like haunted creatures from one defensive device to another, each more costly and humiliating than the one before, cowering underground one day, breaking up our cities the next, attempting to surround ourselves with elaborate shields on the third, concerned only to prolong the length of our lives while sacrificing all the values for which it might be worth while to live at all?"[72] – George F. Kennan

Chapter II – The President Eisenhower

While there were many discussion dedicated to who ultimately had the prerogative to authorize the launch of a nuclear strike, discussions during the Truman Presidency did not implement a nuclear doctrine of its own. The planning of a nuclear war was nominal, at best; in fact the Truman Administration went out of its way to avoid "deliberately and publicly threaten" to use their atomic monopoly.[73] It is only when Dwight Eisenhower was elected in 1953 was the planning of how nuclear weapons would be used, including specific targeting, actual came to the forefront of American military planning and strategy.[74]

While the 1950s saw the last time the United States would hold an unchallenged nuclear superiority over the Soviet Union, the fact of the matter is that the Eisenhower administration would only be able to claim a primitive nuclear capability. Although the U.S. was in the process of adding a significant number of hydrogen bombs (they had

[72] George F. Kennan. *Russia, the Atom, and the West* (Oxford: Oxford University Press, 1958), p. 54
[73] Gaddis (2005), pp. 145-6.
[74] Ibid.

successfully tested the thermonuclear Mike Shot in 1952) to their already large fission (atomic) stockpile,[75] engineers were only beginning to produce the Mark-12 bomb, which weighed one tenth of the 10,000 pound blockbusters; the Americans were able to equip nearly all existing and planned bombers and attack planes with these new bombs. [76] Additionally, vulnerability to enemy attack was still a major problem and being able to actually deliver the bomb towards the Soviet Union required major redundancy as a high amount of attrition was to be expected. Since the United States could not miniaturize the atomic bomb and develop a warhead, a counterforce doctrine could not be realistically implemented. The Eisenhower Administration, therefore, would have to rely on a doctrine of Massive Retaliation, which targeted Soviet cities.

The first thermonuclear test by the United States, the Mike Shot, was detonated on 1 November 1952 at Enewetak in the Pacific Ocean. The 10.4 Megaton (MT) explosion was enormous: "once the explosion broke through the casing, it expanded in seconds to a blinding white fireball more than three miles across [the Hiroshima fireball had measured little more than one-tenth of a mile] and rose over the horizon like a dark sun."[77] With the ability to produce a much greater explosion than Fat Man and Little Boy dropped on Japan eight years earlier, came new military applications. By 1954, the United States began to stockpile 15 MT hydrogen bombs; Strategic Air Command (SAC)

[75] Lawrence Freedman. *The Evolution of Nuclear Strategy* (New York, N.Y.: St. Martin's Press, 1983), p. 77.
[76] Peter Pringle and William Arkin. *SIOP: The Secret U.S. Plan for Nuclear War* (New York, N.Y.: W.W. Norton & Company, 1983), pp. 110-11.
[77] Richard Rhodes. *Dark Sun: The Making of the Hydrogen Bomb* (New York, N.Y.: Simon & Schuster Paperbacks, 1995), p. 508.

could now "destroy a city, a hardened command center, or an airfield. Possibilities for bonus damage and destruction of multiple targets were also greatly enhanced."[78]

Although strategists at the RAND corporation, such as "James Digby, a number of Air Staff planners including the future head of ballistic missile development, Brigadier General Bernard A. Schriever, and the Evaluation Staff at the Air War College,"[79] were advocating a "no-cities" strategy as early as 1954,[80] the reality of the technological developments in thermonuclear design were such that the potential for Countervalue (e.g. city strikes) could not be ignored – especially considering the fact that the U.S. lacked a means to deliver Counterforce strikes at this time. A counterforce strategy (e.g. tactical warfare) requires the miniaturization of nuclear weapons so that they may be used as artillery piece. The problem of fitting a 155-inch, 1,200 pound implosion bomb on an artillery unit or a shoulder-mounted rocket launcher that has the same yield as the one dropped on Hiroshima[81] is readily appreciable. Additionally, however, by 1953 the United States was able to determine that when warheads were made smaller and lighter they would become significantly more accurate (as well as an increased range); more highly accurate weapons systems were needed for counterforce targets than countervalue Designated Ground Zeros (DGZs), because precision would be needed smaller and less concentrated, mobile targets.[82]

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[78] David Alan Rosenberg. "The Origins of Overkill: Nuclear Weapons and American Strategy, 1945-1960," *International Security*, vol. 7, no. 4 (Spring, 1983), p. 36
[79] Ibid.
[80] Rosenberg (1983), p. 36.
[81] http://nuclearweaponarchive.org/Usa/Weapons/Allbombs.html Retrieved 11 August 2012
[82] Schwartz, p. 128.

The development of the MB-1 "Genie" project came out of a report that was commissioned in 1951, culminating in 1953. In this report, code-named the HEAVENBOUND study, the concept of "free-fall nuclear weapons" being dropped onto enemy bomber formations was being explored. While the idea held little technical merit, it did give rise to the development of Genie, a nuclear-tipped air-to-air missile that could be launched from air-defense interceptor aircrafts.[83] It was not until the beginning of 1957 that the small two kiloton (KT) Douglas MB-1 "Genie" was available for atomic air-to-air missiles designed for anti-bomber purposes[84] and, within a year, Nike Hercules and Ajax supersonic point defense surface-to-air missiles with a 25-mile range were available to be deployed.[85] Not until the successful miniaturization of the 2 KT atomic weapons into a sufficiently small design was technological capability was it conceivable that a counterforce doctrine a realistic possibility. In March of 1956, with the final live fire test months away (Operation Plumbbob), the National Security Council, as this capability became feasible, authorized NSC-5602/1 which declared:

that it is the policy of the United States to integrate atomic weapons with other weapons in the arsenal of the United States; that atomic weapons will be used in general war and in military operations short of general war as authorized by the President; and that such authorization as may be given in advance will be determined by the President.[86]

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[83] Schwartz, 277; Directorate of Historical Services, "Nuclear Weapons in the Air Defense System," Air Defense Command, Special Historical Study 2, p. 9.
[84] Sean M. Maloney, *Learning to Love the Bomb: Canada's Nuclear Weapons During the Cold War* (Potomac Books, Inc.: Washington, D.C., 2007), p. 24.
[85] Rosenberg (1983), p. 43; Maloney (2007), p. 24.
[86] This statement is from a declassified version of NSC 5602/1, March 15, 1956, in NSC Papers File, MMB and JCS 2143/56, *ibid*; David Alan Rosenberg and W.B. Moore, "Smoking Radiating Ruin at the End of Two

While the statement outlining the policy of atomic weapons integration occurred sixteen months before Genie's live test fire, it was the technological innovations outlined in HEAVENBOUND that recommended the MB-1.[87] While, strictly speaking, policy was enacted before the final Plumbbob live fire test, it was actually made based on the technical recommendations three years earlier. The pre-authorization for launching Genie in the case of a Soviet surprise attack was paving the way to make use of the asset that was nearly in production.

This presents an interesting moment in the creation of new technology and its effect on doctrinal policy. While it must be acknowledged that it is problematic that the NSC was enacting policy for an asset that had not completed its test run, the Administration's decision to pre-authorize the use of the MB-1 missile with their aircraft interceptors was, in effect, preparing doctrine for the new weapons system. NSC 5602/1's pre-authorization of command authority in a surprise attack is difficult to construe as policy leading technology, as they were setting policy for technology that had been already developing for three years.

The Killian and Gaither Reports

The Killian and Gaither Reports, convened in 1955 and 1957 respectively, advised the National Security Council, President Eisenhower, and high level staff,

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Hours": Documents on American Plans for Nuclear War with the Soviet Union, 1954-55," *International Security*, vol. 6, no. 3 (Winter, 1981-1982), p. 14.

[87] Schwartz, p. 277; Directorate of Historical Services, "Nuclear Weapons in the Air Defense System," Air Defense Command, Special Historical Study 2 (n.d.), p. 9.

including the Joint Chiefs of Staff. In these scientific committees, they discussed the vulnerability of Strategic Air Command, the importance of the race to develop the ICBM, and the importance of a functional early warning system.

In the mid-1950s James Killian, president of the Massachusetts Institute of Technology (MIT), was responsible for the creation of the President's Science Advisory Council (PSAC). While the Special Assistant for Science and Technology to President Eisenhower advised the Executive on a range of topics, the technological implications of nuclear weapons was part of PSAC's portfolio.[88] PSAC, along with the Technological Capabilities Panel (TCP) produced a report to the NSC on "Meeting the Threat of Surprise Attack," known colloquially as "The Killian Report," the document noted that although the United States and the Soviet Union might make improvements to defenses (especially civil defenses), both superpowers would remain vulnerable to surprise attacks. Tacitly recognizing the fact that while the United States enjoyed a monopoly of nuclear power over their rival, this was a temporary state and the U.S.S.R. would soon catch up to American capabilities and predicted Sputnik in the near future: "By the time the Russians had acquired their own 'multi-megaton' weapons, the American should have improved their defences and reduced the vulnerabilities of SAC. There was a warning that, if the U.S. was laggard in this regard, it could be placed 'in danger of surprise attack and possible defeat.'[89]

[88] William T. Golden, ed. *Science Advice to the President* second edition (New Brunswick, NJ: Transaction Publishers, 2009) pp. 85-91, 101-104
[89] Lawrence (1983), pp. 158-60.

The first to win this race towards the Intercontinental Ballistic Missile would gain a crucial strategic advantage. The possessor of the ICBM would be give its state the possibility of launching a surprise attack far more quickly and with greater potential of success – missiles were (and are) far more difficult to shoot down than strategic bombers. It was the opinion of the scientists in the committee that, while "the United States enjoyed an air-atomic advantage but was vulnerable to surprise attack because of an incomplete early-warning system, inadequate air defenses, and a growing Soviet bomber force."[90]

While the American technological failure to have successfully developed air defenses and early warning systems by 1955 contributed to the increasingly vulnerable position of the United States, the Killian Report recommended that the Administration strengthen the existing commitment to the development of their own ICBM and strengthening SAC bomber bases.[91] Although the Soviet Union was about to surpass the U.S. on the race to the first ICBM, the same threat remained: the U.S.S.R. was the only superpower rival to challenge American supremacy since the Berlin Blockade in 1948. Since the Soviets successfully test detonated their first atomic bomb in 1949 and given their capacity for strategic bombing, they remained a threat to surprise attack. While the coming of *Sputnik* made this more acute, it did not constitute a brand new geopolitical development. We should also note that while the U.S. continued to develop the ICBM and SAC protective measures, a new doctrine was not actually suggested; this served more as a reminder that existing plans were important.

[90] Richard V. Damms, "James Killian, the Technological Capabilities Panel, and the Emergence of President Eisenhower's 'Scientific-Technological Elite'," *Diplomatic History* vol. 24, no. 1 (Winter, 2000), p. 68.
[91] Freedman, 159.

The Killian Report illustrated that the Soviet Union had enough mid-range strategic bombers and atomic bombs (with yields up to one megaton); the threat would dramatically increase once they acquired long range aircraft and the thermonuclear fusion weapons which were only a few years away. The outcome of the report "gave the highest priority to improving intelligence and tactical warning capabilities, and preparing for instantaneous response, including the use of nuclear armed air defense missiles. It urged the President to proceed with the dispersion of nuclear weapons to offensive and defensive forces, and to grant 'advance authority for the instant use of the atomic warheads wherever needed over the land areas of the United States and Canada."[92] In fact, the Distant Early Warning (DEW) Line came on line during the mid-1950s for the latter, and in late 1960 for the former. These projects could be directly linked to the Launch on Warning doctrine[93] which would require this technical operating capability to be fully functional before this would be possible.

In the spring of 1957, President Eisenhower, along with Special Assistant for National Security Affairs, Robert Cutler asked H. Rowan Gaither Jr. to head a Committee to evaluate a proposal about American active and passive capabilities for defense. Gaither was a lawyer and chairman of the boards of the Ford Foundation and The RAND Corporation, as well as Robert C. Sprague (an industrialist and expert on continental defense) who would serve as co-directors of the study and set about recruiting an eleven-

[92] David Alan Rosenberg. "The Origins of Overkill: Nuclear Weapons and American Strategy, 1945-1960," *International Security*, vol. 7, no. 4 (Spring, 1983), 38; "Meeting the Threat of Surprise Attack," *The Report to the President by the Technological Capabilities Panel of the Science Advisory Committee, Office of Defense Mobilization*, February 14, 1955, Technological Capabilities Panel of the S.A.C., Report to the President, February 14, 1955 Folder, Subject Series, Alphabetical Subseries, Box 11, WHO-SS, DDEL, Vol. I, pp. 10-22, 31-46, Vol. II, pp. 50-71, 73-111.

[93] Launch on Warning will be discussed in a subsequent section of this chapter.

person panel of experts on military policy.[94] The Gaither Committee panel "set in motion a series of technical studies by the large scientific staff which it had brought together."[95]

Similar to the Killian Report, commissioned two years earlier, the Gaither Report "was to stress the danger to the United States of a Soviet surprise attack and to advocate measures to make America's retaliatory power invulnerable to attack."[96] Although both documents predated the USSR's successful launch of *Sputnik*, they shared an anxiety to race to deploy the ICBM and the invulnerability that went with this development. On November 7, 1957, the Gaither Committee presented its report to over forty White House officials, including President Eisenhower, the civilian secretaries of the Joint Chiefs of Staff, and other top governmental officials. According to the panel, the major danger facing the United States "was the vulnerability of the American strategic force."[97] The Committee, furthermore, "pointed out that what must deter the Russians was not the force which the United States had, but the force which was capable of surviving an all-out Russian attack. The vulnerability of SAC was stressed. The planes of America's strategic force were exposed and concentrated in a way that made it extremely unlikely that they could survive a nuclear attack. The Committee, during the November 7 meeting, warned that by the early 1960's, when Russia had an operational ICBM, she would be capable of destroying the American retaliatory force."[98]

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[94] Morton Halperin. "The Gaither Committee and the Policy Process," *World Politics*, vol. 13, no. 3 (Apr., 1961), p. 362.
[95] *Ibid*, p. 362.
[96] Robert Gilpin. *American Scientists and Nuclear Weapons Policy* (Princeton, NJ: Princeton University Press, 1962), p. 172.
[97] Halperin (1961), p. 366.
[98] Halperin (1961), p. 366; Joseph Kraft, "RAND: Arsenal for Ideas," *Harper's* (July 1960), pp. 71-73; Joseph Alsop, *New York Herald Tribune*, November 25, 1957, p. 18; Alsop, *New York Herald Tribune*, November

The vulnerability of American nuclear forces was the central danger facing strategic planners, according to the briefing. Central to the Gaither Report was that the United States "must give overriding priority to the development of an invulnerable second-strike force. It urged that for the short run everything possible must be done to enable SAC to survive an attack. It also called for an acceleration of the IRBM program. For the longer run, the Report urged that the missile production program be greatly accelerated."[99] Additionally, the Report concluded that SAC strategic bombers and missiles should be dispersed and placed in hardened bunkers to limit vulnerability. The Gaither Report did not call for much in the way of specific policy recommendations to render American strategic forces invulnerable, besides relying on the expedient solution of maintaining the alert status of SAC bombers so they would not be caught unawares on the airstrip or hangar bays, but this solution was suboptimal as it is not hard to imagine pilot error due to a constant state of ready alert.[100] An expedient and low-tech recommendation had to be made, as the technological capabilities did not exist in the late 1950s to deploy invulnerable assets such as the Polaris SSBN submarine or mobile launched rockets.

23, 1957, p. 1; Claude Witze, `Classified Report Says Soviets Can Neutralize SAC by 1960, *Aviation Week*, 67 (December 2, 1957), p. 28.

[99] Halperin (1961), p. 366; Drew Pearson, "Gaither Report Release Sought," *Washington Post* and *Times Herald*, December 18, 1957, p. 11.

[100] Morton Halperin, "The Gaither Committee and the Policy Process," *World Politics*, vol. 13, no. 3 (Apr., 1961), p. 366; 23n.

Command and Control – the "Launch on Warning" Doctrine

The Launch on Warning (LoW) doctrine is a form of first strike incentive – a *use-it* or *lose-it* condition of nuclear warfare. As described by Robert Jervis, the LoW doctrine would "respond to sensor indications that the state was attacking."[101] In National Security Council memorandum 5602/2, the pre-authorization for the use of nuclear-tipped missiles from interceptors:

that atomic weapons will be used in general war and in military operations short of general war as authorized by the President; and that such authorization as may be given in advance will be determined by the President.[102]

Called "Launch on Confirmation of Attack" was the first step towards a LoW doctrine. That those in high level meetings such as Robert Sprague, NSC Consultant on Continental Defense, assumed in the 1956 meeting that "the USSR would be in a position not merely to launch a *crippling* attack, but actually a *decisive* attack not later than mid-1958 and possibly sooner."[103] It was with this concern that Sprague "commented on the

[101] Robert Jervis. *The Meaning of the Nuclear Revolution* (Ithaca, N.Y.: Cornell University Press, 1989), p. 144.
[102] This statement is from a declassified version of NSC 5602/1, March 15, 1956, in NSC Papers File, MMB and JCS 2143/56, *ibid*; David Alan Rosenberg and W.B. Moore, "Smoking Radiating Ruin at the End of Two Hours": Documents on American Plans for Nuclear War with the Soviet Union, 1954-55," *International Security*, vol. 6, no. 3 (Winter, 1981-1982), p. 14.
[103] Memorandum of Discussion at the 288th Meeting of the National Security Council, 15 June 1956, *Foreign Relations of the United States*, 1956 (Washington, D.C.: U.S. Government Printing Office, 1975), XIX: 82.

vital importance that SAC be in a position to get the required percentage of SAC planes off bases and in the air within the estimated warning time of Russian attack."[104]

While the SAC ready-alert force was a low-tech way for policymakers to deal with mitigating an enemy surprise attack or first strike, there were technological methods that were discussed to take the place of either the alert force or LoW. One such technological potential option was the anti-ballistic missile (ABM). The debate surrounding ABM systems was not, as has been argued, about the effect it would have upon the stability of nuclear deterrence but was driven by the technological feasibility of the project becoming operational. From the inception of the missile age in the late 1950's, the President's Science Advisory Committee (PSAC) had been discussing the technological feasibility of ABM defense as early as June 1959 – two years after Sputnik. According to PSAC, an ABM system could not "be made effective enough against a determined attack to provide significant protection for the civilian population."[105]

The limit here was not that a missile shield was undesirable, but that it was not technologically feasible to be put into operational deployment. The fact of the matter was that although political (and military) decision-makers would prefer to institute a fully functional ABM system and area defense to provide a countermeasure against potential Soviet first strike surprise attacks (or attack of any kind), this was precluded because the technology did not exist to strike down any incoming missiles with any probability of

[104] Ibid.
[105] Memorandum, Robert A. Feary, U.S. Department of State Office of European Regional Affairs (RA), to Lane Timmons, Office Chief, RA, "Macmillan Letter." National Archives, Department of State Records, Record Group 59 (hereinafter RG 59), Decimal Files, 1955-59, 611.61/5-1958.

success. In actuality, the United States was in the process of developing a rocket they hoped would be able to shoot down an incoming Soviet ICBM: the Nike-Zeus.[106] Furthermore, a 1964 study conducted by General Glenn Kent determined that an effective ABM system would limit damage to half of American industry and 60 percent of the population – while ultimately retaining only an 80 percent success rate against incoming Soviet warheads.[107] While the Administration would have liked a functional ABM system, this iteration presented an unacceptable risk in which an 80 percent success rate would result in industrial losses of 50 percent and the death of 60 percent of American citizens.

Alternative Explanation

The organizational politics model does not offer a compelling explanation for U.S. nuclear doctrine during the Eisenhower Administration. We should find, as outlined in the theoretical overview, military decision-makers will pursue offensive doctrines regardless of the balance of forces or advances in technical operating characteristics. Military and political officials were acutely aware of the balance of military forces vis-a-vis the USSR; in fact, military policy makers and analysts were highly concerned with U.S. strategic vulnerability and the erosion of American nuclear monopoly during the later years of the Eisenhower Administration. It is notable that, as Schweller demonstrates, "despite the knowledge that its nuclear monopoly was a wasting asset...the

[106] Jerome Wiesner (President's Advisory Committee), Report: Warning and Defense in the Missile Age, 11 June 1959 retrieved from http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB43/doc2.pdf 12 August 2012
[107] Stephen I. Schwartz, *Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons Since 1940* (Washington, D.C.: Brookings Institution Press, 1998), footnote on p. 286; Fred Kaplan, *The Wizards of Armageddon* (Stanford, C.A.: Stanford University Press, 1991).

U.S. did not launch a preventive nuclear war when it could have done so with impunity against the rising Soviet challenger."[108]

Discussions surrounding the establishment of a Launch on Warning (LoW) doctrine and First Strike came out of two committees, Killian and Gaither, which coalesced around technological considerations: the Reports were urged and overseen by the President's Scientific Advisory Council (PSAC) and the Technological Capabilities Panel (TCP). The Committees were overseen by the same President of MIT who was responsible for the creation of PSAC itself (James Killian) and the chairman of the boards of the Ford Foundation and The RAND Corporation (H. Rowan Gaither, Jr.). The Killian Committee, of course, did not directly advocate LoW or First Strike, but the recommendations of continuing to develop early warning systems such as the DEW Line and BMEWS were the technological operating capabilities that drove LoW discussions as of 1959. Additionally, PSAC itself recommended Anti-ballistic Missile (ABM) systems and early warning systems declared that current technology was insufficient to make these military systems feasible at the present time.

In a similar capacity, the Gaither Committee did not directly recommend First Strike out of its discussion of American strategic vulnerabilities. However, it was the Committee's findings of the imminent vulnerabilities, especially in SAC assets, that called for the dispersal and hardening of bombers and silos, respectively, that were

[108] Schweller, p. 261.

immediately put into place. Furthermore, the recommendations to speed up the U.S. ICBM programme and augment current IRBM capabilities were also put into practice.

The second hypotheses of the offensive bias model is that military doctrines will produce overly simplified standard operating procedures (SOPs) and war-fighting plans in order to reduce uncertainty and simplify complex environments. This was simply not the case. Nuclear targeting put forward an enormous number of potential Designated Ground Zeroes (DGZs) and the formula introduced by the National Strategic Targeting and Attack Policy (NSTAP) and the Joint Strategic Target Planning Staff (JSTPS) produced a complex formula, composed of attrition, assurance of delivery, probability of level of damage, etc.[109] In fact, the Single-Integrated Operations Plan (SIOP) produced by the Eisenhower Administration "aimed for an assurance of delivery factor of 97 percent for the first 200 DGZs, and 93 percent for the next 400, well above the goals established by the NSTAP."[110] This is, of course, far from the overly simplified SOPs and war-fighting plans that we should expect to find. Furthermore, by 1957 the Army was developing strategies for fighting land warfare on "a fluid or 'non-linear' battlefield"; this "transformation from a linear to a porous battlefield was extremely complex."[111] An uncertain operating environment was not something the U.S. military was actively attempting to distance themselves from; in planning a war-fighting doctrine, an uncertain environment was unavoidable given that a nuclear war in which both sides had atomic

[109] Rosenberg (1983), p. 6.
[110] Rosenberg (1983), p. 7; Memo, Burke to Lemnitzer, 22 November 1960; Message, CINCLANT to CNO, Subject: JSTPS Progress, 203IZ/22 October 1960.
[111] Michael Evans, "The Primacy of Doctrine: The United States Army and Military Innovation and Reform, 1945-1995," *Army Occasional Paper*, no. 1 (August, 1996), p. 5. Retrieved from http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA336095 on 13 August 2012.

weapons had never been fought before. In fact, according to Major Robert A. Doughty, the "Army probably has never experienced a more radical change during peacetime in its thought, doctrine and organizations."[112]

While the above indicates that nuclear planners did not pursue "oversimplification" or a reduction in uncertainty as a qualification for their SOPs, they did create standard operating procedures and routines to create a coordinated and efficient war-fighting plan. Learning from experience drawn from World War II, the experience was one of lack of a coherent structure both between and within theaters of operation: "with regard to close air support, no single system of coordination or control had been common in all theaters" and "the actual procedures employed by the ground forces, however, were often ad hoc and varied widely from unit to unit."[113] The post-war period would seek to avoid making similar mistakes, the result was codified SOPs and coherent war-fighting doctrines published in a new Field Manuals, such as the one created for *Air Ground Operations* (FM 31-35) in August 1946.[114]

Ultimately, SOPs were established within the Administration not as a way to reduce uncertainty or *over*simplify the complexities of a fighting a nuclear war, as the hypothesis suggests; NSC policy formation, NSTAP, and JSTPS codified doctrine and targeting lists that were incredibly complex, redundant, and exhaustive. However, SOPs did contribute a role to doctrine in that it added a layer of efficiency to strategic planning.

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[112] Robert A. Doughty, *The Evolution of US Army Tactical Doctrine, 1946-76* (Fort Leavenworth, KS: Combat Studies Institute, US Army Command and General Staff College, 1979) retrieved from http://usacac.army.mil/cac2/cgsc/carl/resources/csi/Doughty/doughty.asp on 13 August 2012.
[113] Ibid.
[114] Ibid; FM 31-35, *Air-Ground Operations* (Washington, D.C.: War Department, 1946).

While decision makers have ultimate authority on whether or not to launch a nuclear strike, from the point that decision is made there are a lot of moving parts in the military that must work together. This is where SOPs come in; ready to carry out strategic planning when the order was given: the SAC target list totalled in the thousands and were planned in advance to reduce the effect of nuclear fratricide (e.g. inadvertently destroying their own bombs because they were too close together).[115]

Large doctrinal reviews should, additionally, be met with a high degree of resistance. Reviews of U.S. doctrine, such as the Killian and Gaither Report should be met with much reticence. In fact, both these review committees were sought out by the Eisenhower Administration. While Killian and Gaither underlined the importance for the American development of early warning systems and for taking measures to reduce the vulnerability of SAC bombers, the report was welcomed by Administration officials, generals, and the President himself.

Additionally, neither technological innovations nor changes in the balance of forces were ignored by military or political decision makers. As we have seen in this chapter, the imminent launch of *Sputnik* and the subsequent Soviet ICBM threat spurred high-level National Security Council discussions and produced doctrinal recommendations (e.g. SAC ready-alert status). According to this hypothesis, the expected result should have been to ignore changes in Soviet force capabilities, but this was not the case. Furthermore, and this was apparent in the Killian and Gaither Reports,

[115] Rosenberg (1983).

that new technology was welcomed rather than ignored. The importance of completing the DEW Line and getting BMEWs online were welcomed by decision makers. The imminent arrival of the "Genie" air-to-air missile was not ignored by national security policy makers, but was suggested in NSC-5602, when Eisenhower pre-authorized the use of this weapon's nuclear-tipped missile to intercept a Soviet nuclear surprise attack.

Lastly, the perception of geopolitics did matter to decision makers. As the imminent arrival of a Soviet ICBM reduced the amount of warning before a surprise attack landed on American soil, the NSC recommended that SAC bombers be placed in a constant state of ready alert, to mitigate the possibility that they may be destroyed in a first blow. While we could argue that the geopolitical environment did not change and the U.S.S.R. was still the primary superpower rival to the U.S. (and given that Soviet large bomber fleet was capable of catastrophic destructive capability against the U.S. homeland long before *Sputnik*), the perception of greater vulnerability did have a consequential effect and was considered a factor of concern for policy makers.[116]

[116] While perception of geopolitical perception was an important factor in this episode, it is something that will warrant further research to investigate whether or not this was an eccentricity of this particular issue and, thus, an outlier or a more pervasive mechanism. Further testing and research will be required.

"Technology is volatile. The advantage of surprise can be overwhelming. The forces-in-being are almost surely decisive – at least in all-out war. A major cause of instability is the very rate of technological change. Every country lives with the nightmare that even if it puts forth is best efforts its survival may be jeopardized by a technological breakthrough on the part of its opponent."[117] – Henry Kissinger

Chapter III - President Kennedy

The Kennedy years began with a review of the Eisenhower-Dulles Massive Retaliation doctrine, even before the administration was sworn-in as of January 1961. Secretary of Defense Robert McNamara and President Kennedy were both philosophically opposed to a doctrine in which cities were targeted and massive strikes would be launched against the Soviet Union (and absorbed by the American homeland).[118] While there was a shift away from Dulles' Massive Retaliation doctrine towards a Flexible Response, McNamara and Kennedy did not completely escape the countervalue targeting outlined in their doctrine of Mutually Assured Destruction.

This section will demonstrate that as the technological capability of the United States moved towards a greater potential for a counterforce option, American nuclear policy makers began to move towards a strategy of Flexible Response, a doctrine that relied more heavily on tactical nuclear war. American technical operating characteristics,

[117] Henry Kissinger. "Arms Control, Inspection, and Surprise Attack," *Foreign Affairs*, vol. 38, no. 4 (Jul., 1960), p. 557.
[118] Gaddis,p. 200-04; Freedman (1983), pp. 227-8, 230-32

however, were not so advanced that President Kennedy and Secretary McNamara would be able to abandon countervalue targeting as a strategy.

Within months of inauguration, President Kennedy moved away from the Eisenhower-Dulles doctrine of Massive Retaliation and had announced the strategy of "Flexible Response." Among the broad strategic goals laid out during his first defense message to Congress in March 1961 laid out the character of the doctrine: a series of controlled options without resorting to the total destruction of the U.S.S.R., no matter if it was in reaction to a major objective (like tanks rolling through Berlin) or a small and limited objective, as Massive Retaliation had promised. Kennedy said to Congress that he placed an "emphasis on minimizing risks by giving the United States sufficient flexibility to respond without either escalation or humiliation. This would require a capacity to act at all levels, ranging from diplomacy through covert action, guerrilla operations, conventional and nuclear. Equally important, though, it would require careful control: "We believe in maintain effective deterrent strength...but we also believe in making it do what we wish, neither more nor less."[119]

The Eisenhower-Dulles Massive Retaliation doctrine was simplicity reborn. With NSC-162/2, the United States signalled to the Soviet Union that they would launch an atomic or thermonuclear strike in response to aggression. The targeting plans outlined by SAC and JSCP had compiled a comprehensive list of targets ranging in the thousands,

[119] Gaddis, p. 213; Kennedy message to Congress, March 28, 1961, *Kennedy Public Papers: 1961*, p. 230; Kennedy remarks to the Military Committee of NATO, April 10, 1961, *ibid*., p. 255. See also Kennedy radio-television address, July 25, 1961, *ibid*., p. 535; and his address at the University of North Carolina, October 12, 1961, *ibid*., p. 668.

which would (according to a report codenamed Project BUDAPEST) and presented to the Joint Chiefs of Staff that the "resulting radiation [from SAC's target list] and fallout would be dangerously high."[120] The level of destruction raised by a strike called for in Massive Retaliation was exceptionally high, no matter if it was in response to the Soviet Union attempting to exert military influence over Western Europe or if there was a small skirmish involving an American and Soviet platoon in a state that was peripheral to the interests of both nations. The doctrine called for an all out response.

The problem was, however, that given the technological capabilities present at the time of Massive Retaliation in 1954 was best suited to this type of doctrine. The United States nuclear arsenal, especially during the early Eisenhower years, was large-yield and the bombs were big. It is difficult to get exact figures, but the reactions were in the magnitude of the Hiroshima, at 16 kilotons to the new thermonuclear bombs at Bikini Atoll, which were 15 *mega*tons. Furthermore, the bomb sizes were long and heavy; the Mark-VII, which entered service in 1952 weighed 2,700 pounds.[121]

Flexible Response was possible because of the technological innovations in the late 1950s and early 1960s. In order to meet possible Soviet aggression with a response that was not "suicide or surrender," a wide range of nuclear assets would have to be made available for the multiplicity of options for which the doctrine required. While the

[120] Rosenberg (1983), pp. 160-1; "Strategic Air Command Progress Analysis, 1948-1956," pp. 65-66; Robert Frank Futrell, *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force, 1907-1960* (Ann Arbour, MI: Air Force University Press, 1971), pp. 224-225DM-221-57, 9 July 1957, Memo for General Eddleman et al., Subject: Use of Large Weapons, CCS 471.6 (8-15-45) Sec. 9C, JCS; and Memo, Nathan Twining to Chairman, JCS, 8 May 1957, Subject: Studies of Large Yield Weapons, Subject File, Top Secret, 1952-1957, Folder 4, Box 122, Nathan Twining Papers, LC..
[121] Schwartz, p. 152.

massive retaliatory strike had been available since the first nuclear bomb was dropped at Hiroshima that levelled virtually the entire city, a very small yield was required for the theatre/tactical purposes for which a counterforce doctrine called to prevent a blowback effect that would destroy the United States Army as well as the Soviets. Additionally, so that the Army would be able to carry the warhead onto the battlefield, it would have to be sufficiently light and small enough to launch from a relatively small delivery system that could be brought into battle.[122] All of these, of course, are logical requirements for tactical nuclear weapons. In 1961, the Davy Crockett was fielded with its W54 warhead. It was known as a "low-yield" weapon and a variable yield between 0.01-1 kiloton (which was equal to 10 tons of TNT) and 0.02-1 kiloton.[123] This low-yield artillery shell would not cause damage to American forces during battlefield use against Soviet troops. Additionally, the Davy Crockett weighed just 51 pounds and could be launched from either a 120-millimeter or a 150-millimeter recoilless rifle.[124]

The new strategy was designed to present the political leadership and military decision-makers with a wide-range of nuclear response options to crises and Soviet aggression. American response in this doctrine would be similar to an escalatory strategy; nuclear forces would be held in reserve, while the U.S. response would be limited and measured, allowing for inter-conflict negotiation with the Soviet Union. In Flexible Response, the president could select from multiple options, and select which would be the appropriate U.S. response given the specific requirements of the crisis at hand: it need not be surrender to Soviet interests or suicide by making good on thermonuclear threats.

[122] "Requirements for Tactical Nuclear Weapons," Special Studies Group for JCS, October 1962.
[123] Schwartz, p. 156.
[124] *Ibid.*

Command and Control – the "Launch on Warning" Doctrine

A feasible LoW doctrine, or ABM system for that matter, would have to begin with a successful version of early warning sensors to detect an incoming enemy surprise attack. The passive defense system under consideration was heavily dependent on the technological capability is the development of an electronic warning system to "detect any significant attack with sufficiently low probability of false alarm."[125] The purpose of Early Warning Systems and Distant Early Warning (DEW) Line and Pinetree Line during the mid-1950s was to detect incoming Soviet bombers in the Canadian and Alaskan Arctic during a surprise attack with the purpose of scrambling fighter-interceptors and launch a retaliatory strike before enemy bombers delivered their payload.[126]

The report, however, stated that the BMEW System, due to its "overly elaborate" design would not be capable of operating efficiently until late 1960 or early 1961.[127] The report indicates that the Air Force should focus on "limited but useful capability" in order to become capable in early 1960 with these "necessary simplifications" to the overall design and mechanics of the system.[128] As sensor apparatuses became technologically viable, LoW doctrines became increasingly discussed at high-level doctrinal meetings with the U.S. President; the fact that the DEW Line and BMEW System were not yet feasible, however, pushed the planning of launch on warning off the table. While the sensor technology for BMEWS and subsequent advancements in early warning systems

[125] Ibid.
[126] Joseph T. Jockel. *Canada in NORAD: 1957-2007: A History* (Montreal: McGill-Queen's University Press, 2007) ,p. 11.
[127] Ibid.
[128] Ibid.

were being developed, President Eisenhower's two terms were drawing to a close. The advancements at the close of the Eisenhower Presidency set the stage for LoW doctrines under the Kennedy Administration.

The challenge at this point for deploying a fully functioning early warning sensor system were not so far advanced that the issue was whether or not intercept missiles would be able to hit an incoming ICBM, but whether or not sensors would be able to *detect* an incoming nuclear strike. The technological challenge for ABM technology at this point in time was to ensure that a functional and reliable electronic early warning system was up and running, which would "provide the information to alert our forces, get SAC alert aircraft into the air, ready missiles, wake up government officials who must authorize a response."[129] In other words, the same technological constraints that faced ABM designers in the late 1950's were shared by the proponents of the Launch on Warning doctrine.

While the LoW doctrine was discussed as early as 1959, it did not occupy a prominent position in strategy development during either term of the Eisenhower Administration. It is important to note that NORAD's DEW Line came online as of 1957; the Distant Warning System became feasible in the mid-1950s, nearly a half-decade before Launch on Warning was being discussed as potential doctrine for the administration – indicating that the technological development predated doctrinal choice.

[129] Report by Jerome Wiesner, President's Science Advisory Committee, "Warning and Defense in the Missile Age," 3 June 1959, memorandum from Goodpaster attached dated 11 June 1959, Top Secret. Dwight D. Eisenhower Library, Anne Whitman File, Dwight D. Eisenhower Diaries, box 42, Staff Notes June 1-15 1959. Found at http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB43/doc2.pdf retrieved on 22 September 2011

Furthermore, as stated earlier, Launch on Warning required a reliable and functional electronic early warning system to detect a Soviet attack – it was not until 4 February 1959 that the Ballistic Missile Early Warning System (BMEW) became operational, and only became fully operational in September 1960; there were doubts that the system would be capable of any operating efficiency until late 1960 or early 1961.[130] Technologically, the U.S. simply did not have the capability to stand on a LoW doctrine. It is also worth noting that Launch on Warning was first being considered in the same year as BMEW became operational but the DEW Line, however, was already operational two years earlier.

Negative control (also referred to as 'nuclear surety') "comprises the controls designed to prevent unauthorized use of nuclear weapons" while positive control "describes those elements that assure instructions to launch nuclear weapons reach the forces and will be carried out if given by the President."[131] The command and control systems remained in a very clumsy state of affairs when Kennedy took office in 1961. The United States, throughout the Eisenhower administration, lacked any semblance of positive control of nuclear weapons. In fact, the Eisenhower's command and control structure had a strictly delegative flavour.[132] Under President Kennedy, however, there was a return to more "assertive qualities" of command and control:[133] it was under

[130] Ibid.
[131] Robert D. Critchlow. "Nuclear Command and Control: Current Programs and Issues," *CRS Report to Congress* (3 May 2006), p. 6; John D. Steinbruner. "Choices and Trade Offs," in *Managing Nuclear Operations*, Ashton B. Carter, John D. Steinbruner, Charles A. Zraket, eds., (Washington, DC: Brookings Institution, 1987), pp. 539-543
[132] Peter D. Feaver. "Command and Control in Emerging Nuclear Nations," *International Security*, vol. 17, no. 4 (Spring, 1984), p. 174.
[133] Ibid, p. 174.

Kennedy that Permissive Action Links (PALs), "which block unauthorized detonations,"[134] were first introduced in the early 1960s. These were "electronic locks that prevent a nuclear weapon from being armed without the explicit instruction of the national command authority."[135] While the move towards negative control fits the Administration's theme of penultimate presidential prerogative over all nuclear weapons issues, the PAL systems were becoming available as of the early 1960s. In fact, it was only in the autumn of 1960 that the Permissive Action Link system was demonstrated as a prototype.[136]

The Permissive Action Link system advancement increased negative control, therefore tightening the President's grip on nuclear surety and command and control. Problematically, however, the new technology was not deployed on all nuclear assets even after it was first tested. While there were some in the military circles who felt that these systems were an unnecessary redundancy, the cost of operating the system was estimated to run $23.3 million dollars.[137] For obvious reasons, the PAL system innovation was not tested in actual combat and, therefore, their reliability and effectiveness remained in doubt. The several branches of military services were concerned about the effectiveness of the Command-and-Control system and were debated; the Navy and Air Force put forward the claims that these systems would impede operational use of these weapons, thus potentially undermining the deterrent function of

[134] Ibid, p. 166.
[135] Michael D. Intriligator and Dagobert L. Brito, "Accidental Nuclear War: A Significant Issue for Arms Control," *Current Research on Peace and Violence*, vol. 11, no. ½, Accidental Nuclear War (1988), p, 16; Peter D. Feaver, "Command and Control in Emerging Nuclear Nations," *International Security*, vol. 17, no. 3 (Winter, 1992-1993), pp. 160-187.
[136] Schwartz, p. 514.
[137] Schwartz, p. 515.

nuclear weapons.[138] These military advisors feared that the efficiency of nuclear launches would be undermined by these systems. However, here Kennedy broke with his military advisers, arguing along the lines that the PALs were a necessary requirement for the security of the nuclear arsenal in National Security Memorandum 160, which mandated the use of Permissive Action Links on selected systems; by the autumn of 1962, PALs were put in place on Nike Hercules, Honest John missiles, Davy Crockett, W33 and W48 artillery shells, and atomic demolition munitions.[139] In this case, we see an example of the armed services arguing about the new Permissive Action Link technology, but the system was deemed to be crucial for the security of American nuclear forces (by President Kennedy, himself) and the order was given to implement the technology regardless of organizational disagreement.

In the development of SIOP-62, nuclear planners argued that SAC's bombers should be in the air and en route to the Soviet Union upon receiving warning from the electronic warning system, BMEWs and the DEW Line. In a memoranda from Carl Kaysen to General Maxwell Taylor, he wrote that the "problem raised by a false alarm, whether arising from a deliberate feint or a misinterpretation of events, that results first in the launching of SAC and then a decision to recall it at the positive control line."[140] Kaysen continues:

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[138] Ibid, p. 515.
[139] Ibid, p. 515.
[140] Carl Kaysen. "Strategic Air Planning and Berlin," National Security Archives, Record Group 218, Records of the Joint Chiefs of Staff. Retrieved at http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB56/BerlinC1.pdf (accessed 27 September 2011).

> After some lapse of time, we may conclude that we had been wrong, and, under the positive control arrangement, recall the force. There is, roughly, a six-hour interval between bases and the positive control line for aircraft in the first wave. After recall and return to base, that part of the force which had been launched would require a stand-down of about eight hours before it was again ready to launch. Thus, there would be significant degradation of our capability for a short period of time after such a false alarm. How large it was would depend on how much time had elapsed when the recall was ordered. If the full six hours had elapsed, not only would the alert force (one-third of the vehicles carrying nearly one-half the weapons and a higher proportion of the megationnage [SIC]) have reached the neighbourhood of the control line, but 22% of the full force would already have been launched.[141]

While Kaysen illustrates the clumsiness of the command and control environment of the SAC ready-alert scenario, the PAL system, as it stood with the ICBMs stationed in the U.S. and IRBMs stationed in NATO countries, as well as Greece and Turkey since the Eisenhower Administration,[142] the United States was much closer to being in position to implement a LoW doctrine than it had previously. However, technical problems persisted that made LoW infeasible at this time, especially given that the (1) U.S. would only have 15 minutes notice of an incoming Soviet Strike,[143] and (2) the new generation of ICBMs such as Atlas I could not be fueled quickly and was an unlikely candidate as a

[141] Ibid.
[142] Larry M. Loeb, "Jupiter Missiles in Europe: A Measure of Presidential Power," *World Affairs*, vol. 139, no. 1 (Summer 1976), pp. 27-39.
[143] U.S. National Security Council Planning Board, "U.S. Policy on Continental Defense," 14 July 1960, National Archives, Record Group 59, Department of State Records, Records of Department of State Participation in the Operations Coordination Board and the national Security Council, 1947-196, "NSC 5802 Memoanda."

LoW asset.[144] For now, LoW would have to remain a discussion point and not U.S. doctrine.

Vulnerability – The First Strike Doctrine

First Strike doctrine during the Eisenhower years was particularly intense, as the concept was considered, discussed, and debated between members of the National Security Council (NSC), Joint Chiefs of Staff (JCS), President Eisenhower and his top advisors. While the debate continued sporadically during the Kennedy Administration, it was in terms of an ad hoc strategy during a crisis, as opposed to a consideration of a new doctrine. First Strike as doctrine simply was not considered during the Kennedy Administration. The lack of a First Strike doctrine was due to the fact that the American nuclear force was no longer vulnerable; SSBN submarines had their Polaris and Trident missiles deployed at sea where it was virtually impossible to locate them, Honest John, Davy Crockett and Corporal counterforce nuclear weapons were deployed in the Europe, American IRBMs were stationed abroad, and the Soviet Union could not hope to destroy a fraction of U.S. ICBMs in the continental United States. Given that the U.S. could survive a Soviet surprise attack, there remained little need to adopt First Strike, as this section will demonstrate.

[144] Letter from Secretary of Defense Robert S. McNamara to Senator John Stennis, Chairman, Preparedness Investing Subcommittee, Senate Armed Services Committee, enclosing study commenting on "requirements" for warning and detection systems, 3 November 1961, National Archives, Record Group 200, Papers of Robert S. McNamara, box 113, Reading File Nov. 1961.

A First Strike option by 1961 would have come in the form of a pre-emptive strike. The discussions revolving around the U.S. nuclear monopoly as a 'wasting asset' had come and gone in the early-to-mid 1950s, and discussions about the possibility of a preventive strike was no longer put on the table; in fact, NSC 68 had rejected the idea of preventive war but, as Richard Betts points out, "tentatively embraced pre-emption."[145] Furthermore, as Betts also points out, surprise attack had never been an option: "A surprise strike against an enemy who is not yet preparing his own attack...simply aggressive...No responsible Americans have ever contemplated an aggressive first strike."[146]

What is left is the pre-emptive strike, one made in anticipation of an immediate attack.[147] During the Berlin Crisis of 1961, "the Air Force advised that a U.S. first strike might keep losses down to ten million (although this was glaringly inconsistent with SAC's position in other forums that Moscow might have many undetected, and therefore untargeted, missiles). Civilian staff planners working separately under Paul Nitze developed a Berlin-related counterforce plan in great secrecy with projected bounds of 2-15 million U.S. fatalities."[148] However, this option was just one on the table and it was considered at the same time (1) the most limited of options given the Soviets, themselves, had enough dispersed nuclear weapons to make a disarming like unlikely (making it an

[145] Richard K. Betts, *Nuclear Blackmail and Nuclear Balance* (Washington, D.C.: The Brookings Institute, 1987), pp. 161-62; Rosenberg (1983), pp. 17, 25.
[146] Betts (1987), p. 161.
[147] Ibid.
[148] Richard K. Betts, "A Nuclear Golden Age? The Balance before Parity," *International Security*, vol. 11, no. 3 (Winter, 1986-1987), p. 18; Fred Kaplan, *The Wizards of Armageddon* (New York, NY.: Simon and Schuster, 1983), pp. 294-301; Gregg Herken, *Councels of War* (New York, NY.: Knopf, 1985), p. 161.

unpopular proposal from the start, with little hope of being selected)[149] and, (2) the invulnerability of U.S. forces allowed breathing room for negotiation. The second argument requires a bit of an explanation: because the United States possessed invulnerable weapons, the Soviet Union could not hope finding enough of them to eliminate the American second strike capability. As a result, U.S. decision makers were not compelled to rush to pre-empt before Secretary Khrushchev blunted the American retaliatory force. The invulnerability of American nuclear weapons produced a stabilizing effect in which Kennedy was able to negotiate a non-military solution to the Berlin Crisis.[150]

As technical operating characteristics allowed the American nuclear doctrine to take on a more invulnerable character with Polaris submarines and the miniaturization of tactical warheads deployed on artillery pieces with NATO, there was less reason to consider such a hasty doctrine like First Strike. According to Warner Schilling, "the United States has sought to maintain not only a second-strike capability for assured destruction but a capability for assured destruction that does not have to be used in a hurry."[151] The Minuteman I (which could be fueled and launched much more quickly than *Thor* and *Jupiter*) and Polaris programmes in the early 1960s were the keys to increasing the invulnerability of the American nuclear arsenal, thereby reducing the necessity of adopting a First Strike Doctrine.

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[149] Betts (1987), pp. 165-7.
[150] Gary King, Robert O. Keohane, Sidney Verba, *Designign Social Inquiry: Scientific Inference in Qualitative Research* (Princeton, NJ.: Princeton University Press, 1994), pp. 77-78; James D. Fearon, "Counterfactuals and Hypothesis Testing in Political Science," *World Politics*, vol. 43, no. 2 (Jan., 1991), pp. 169-195.
[151] Warner R. Schilling, "U.S. Strategic Nuclear Concepts in the 1970s: The Search for Sufficiently Equivalent Countervailing Parity," *International Security*, vol. 6, no. 2 (Fall, 1981), p. 61.

The United States would be able to launch a nuclear strike within a very short period of time with the development of the Minuteman I in late 1959. The Minuteman fixed missiles would be fired from hardened underground silos (reinforced concrete offered fairly strong protection from a Soviet first strike)[152] – according to a briefing from scientific advisors Dr. Kistiakowski and Dr. Long to President Eisenhower while the Minuteman I programme was still in development in 1960, "the fixed missiles will be in underground silos highly protected. The big thing is simply to dissuade the Soviets from taking any adventures."[153] The purpose of placing missiles in hardened underground silos was not only to deter the U.S.S.R from undertaking any military "adventures," but to reduce the vulnerability of American assets. By making the U.S. nuclear arsenal less vulnerable, there would be a reduced necessity to launch a first strike disarming blow against the Soviet Union to blunt their attack; since the U.S.S.R. would not be able to destroy the American ability to launch a second-strike attack, the necessity of getting in the first blow would be dramatically reduced. Between the years 1960 and 1967, the United States government built a total of 1,180 underground silos for missiles.[154]

While the Minuteman I went a long way to improve the invulnerability of American nuclear forces, it would be difficult to understate the implications of the Polaris missile deployed aboard American submarines. The ability to launch an undetectable

[152] Hardened silos were made of reinforced concrete mixtures that offered much better protection from nuclear attacks, especially since they would not be able to penetrate underground. This advance in concrete technology would (predictably) allow missiles to escape unscathed even if targeted directly by a nuclear attack that would detonate on the surface level.
[153] "Memorandum of Conference with President Eisenhower," *FRUS* vol. III, National Security Policy; Arms Control and Disarmament, Document 99 (Washington: May 4, 1960).
[154] Stephen I. Schwartz. *Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons Since 1940* (Washington, D.C.: Brookings Institution Press, 1998), p. 132

strike via Sea-Launched Ballistic Missile (SLBM) from anywhere in the ocean was limited only by missile range and weather conditions. This meant that the United States would have the capability to deploy a strike force from virtually anywhere they could station a submarine. The SLBM was made possible due to technological advances in both solid propellants, as well as the ability to produce lighter warheads.[155] The first nuclear reactor propulsion ballistic missile submarine (SSBN), the USS *George Washington* was deployed for its first patrol on 15 November 1960.[156] With the ability of the United States Navy (USN) to achieve near-permanent deployment of a strike force capable of firing 16 A1 missiles (per submarine)[157] at a yield between 1,200 – 1,500 Kt (dependent upon whether an EC47 or W47 warhead).[158] A single American submarine, therefore, would be able to launch a combined total of 19.2 Megatons (Mt) against the Soviet Union without detection from a range of approximately 1,000 nm (nautical miles).[159] Furthermore, the U.S. could deploy a submarine near permanently, dependent only upon food storage and manpower fatigue – technologically speaking, the SSBN could almost permanently remain on patrol.

Ballistic missile submarines were a game changer for nuclear strategy. As the Americans were able to obtain higher yield and more accurate SLBMs, there would be a truly invulnerable nuclear arsenal for the first time that was capable of full retaliation

[155] Schwartz, p. 136.
[156] Schwartz, p. 136.
[157] Federation of Atomic Scientists http://www.fas.org/programs/ssp/man/uswpns/navy/submarines/ssbn598gw.html accessed 18 November 2011.
[158] Schwartz, p. 89.
[159] Federation of Atomic Scientists http://www.fas.org/nuke/guide/usa/slbm/a-1.htm accessed 18 November 2011.

against the Soviet Union; even if the U.S. was caught unaware by a surprise attack, they had achieved second strike survivability. This invulnerability allowed the United States breathing room in crisis situations and minimized the incentive to pre-empt. The Polaris submarines, however, were riddled with early technical difficulties during the early 1960s. While the Polaris submarines would be able to deliver a strike with much greater speed than SAC, achieving a high degree of accuracy from a nuclear missile launched at sea presented many difficult challenges. Whereas the accuracy of the land-based missiles was being drastically improved from Minuteman I to Minuteman II, the USN had "an array of data on variations in gravity across the seabed, gathered to improve the accuracy of submarine-launched ballistic missiles; geomagnetics used for navigation...Arctic ice shape and depth (the Arctic Ocean was a key cold war battleground for submarines)."[160] These technical innovations improved the accuracy of the American SSBN fleet and, as a result, a more reliable second strike deterrent which rendered the U.S. arsenal further invulnerable.

Alternative Explanation

According to the first hypothesis in the offensive bias model, military decision-makers will pursue offensive doctrines regardless of the balance of forces or new technologies or advancements in technical operating characteristics or capabilities. This was not the case during the Kennedy Administration, however. The decision to place counterforce units, such as the new Davy Crocket (available as of 1961), in the European

[160] Schwartz, 242.

field was specifically based to counter Soviet superiority of conventional forces. It has been well documented that the earlier pessimistic estimates of the Eisenhower Administration on the overwhelming superiority of Soviet conventional forces in the European theatre had been overturned and reassessed by Secretary McNamara.[161] The revised estimates were front and centre for decision makers in assessing American doctrine. "Many came to believe during this time [1961-69] that NATO could, at minimum, hold its own conventionally. This, in turn, buttressed Kennedy's push for NATO's adopting flexible response."[162] While the primary driving mechanism of flexible response was the technical operating factors made available by the miniaturization of warheads on small assets, the balance of force consideration was a factor under consideration in doctrinal decision-making, which is not what the offensive bias hypothesis predicts.

The second hypothesis in the offensive bias model is that military doctrines will produce overly simplified SOPs and war-fighting plans in order to reduce uncertainty and simplify complex environments. The Eisenhower/Dulles doctrine of Massive Retaliation was simplicity itself. The Kennedy/McNamara Administration pushed towards Flexible Response, which, at its core, is a range of options for the President to select from rather than being doctrinally obliged to retaliate on a massive scale for low-level Soviet aggression into Western Europe. When President Kennedy was briefed on the Single Integrated Operations Plan, known as SIOP-62, a point of discussion included was "what

[161] John Lewis Gaddis. *Strategies of Containment* second edition (New York: Oxford University Press, 2005), pp. 204-207.
[162] Richard A. Bitzinger. "Assessing the Conventional Balance in Europe, 1945-1975," (Santa Monica, Ca.: The Rand Corporation, 1989) , p. v

attack options would the President have in a nuclear war? SIOP-62 contained fourteen so-called 'options' based on the U.S. alert level" and, while it was advisable to limit the number of options available to the President (for starters, the range of possibilities were virtually limitless given the 800 targets included and 1,000 DGZs), he would be presented with a range of options to select from in the case of nuclear war.[163] These fourteen preselected options that would launch an "optimum-mix" of available strategic forces were selected by the President and not the JCS.

Additionally, the Kennedy-McNamara was far from simple. In SIOP-62, the target "list is broken into two parts: a minimum NSTL [National Strategic Target List] containing 2220 primary objective targets, together with 835 active defense installations which must be hit in order to reach the primary objectives; and the full NSTL, which contains 3729 targets. Since many of these targets are co-located, and can be destroyed by a single weapon of sufficiently high yield, the actual number of Desired Ground Zeros (DGZ's) in SIOP-62 adds up to 1077."[164] SIOP-62 was a highly nuanced, intricate, and complex targeting doctrine produced by the administration.

The Permissive Action Link systems episode in which President Kennedy overruled bureaucratic bargaining and debate between branches of the military, namely Strategic Air Command and the Navy, serves to illustrate that the technical necessity

[163] Scott D. Sagan, "SIOP-62: The Nuclear War Plan Briefing to President Kennedy," *International Security*, vol. 12, no. 1 (Summer, 1987), p. 37; Briefing the President, SIOP-62, pp. 15-17.
[164] Carl Kaysen to General Maxwell Taylor, Military Representative to the President, "Strategic Air Planning and Berlin," 5 September 1961, Top Secret, excised copy, with cover memoranda to Joint Chiefs of Staff Chairman Lyman Lemnitzer, released to National Security Archive; National Archives, Record Group 218, Records of the Joint Chiefs of Staff, Records of Maxwell Taylor.

filled by the PALs was a more crucial consideration than the organizational politics being played. While this should not be overstated from one interlude, the President's decision to move forward highlights the crucial role of technology.

Chapter IV – The Nixon and Carter Presidencies

President Nixon

The Richard Nixon years marked yet another period of technological breakthroughs and innovations that would influence American nuclear doctrine. By 1972, the United States had been able to deploy the newly developed Multiple Independently-targeted Re-entry Vehicles (MIRV) LGM-30G Minuteman III ICBMs (which had, themselves been a fully realised development only as of 1970) and MIRVed C-3/UGM-73A Poseidon SLBMs at sea.[165] Additionally, the Nixon Administration was to develop the MGM-52C Lance missile to replace the Honest John delivery system; this self-propelled guided missile was ideal as a counterforce weapon and a choice of yields between 1-50 kt and a maximum range of 140 km – deployment of Lance began in 1974.[166]

With these technological innovations in mind, the United States altered doctrine once again. In the 'Selective Options' doctrine, also referred to as the "Schlesinger Doctrine," named after Secretary of Defense James R. Schlesinger, the U.S. moved away from the Kennedy era's Flexible Response. In Flexible Response (including SIOP-62), the United States planned for a series of options that escalated in severity of response, depending on Soviet actions (actions that precipitated the conflict or actions along the chain of interactions once the conflict got started): the goal of the doctrine was to give the

[165] Schwartz, pp. 131-2, 492.
[166] Jorma K. Miettinen, "Mininukes and Neutron Bombs: Modernization of NATO's Tactical Nuclear Weapons. Introduction of Enhanced Radiation Warheads," *Instant Research on Peace and Violence,* vol. 7, no. 2 (1977), pp. 50, 53-4.

President a range of options from a limited response to a massive strategic strike against Soviet cities.[167] In the Schlesinger Doctrine, however, the goal of a range of nuclear response options were retained, but the counterforce component was bolstered, while the city-strike component was downplayed to an even greater extent.[168] Schlesinger introduced the concept of 'escalation control', "which signified the potential to undertake a limited attack and, owing to various 'withhold' options that would hold important enemy interests (e.g. population, socio-economic targets) hostage, prevent an adversary from escalating to a higher level of violence. In other words, the focus on escalation control is indicative of the post-MAD attempt to prevent the Soviet Union from dominating the escalation process and obtaining any political advantages from such dominance."[169]

The ability of the U.S. arsenal to present a highly destructive, countervalue asset such as the MIRVed Minuteman III, along with the several counterforce-capable weapons systems such as the 1-50 kt Lance guided missile presented a number of interesting solutions to serious theoretical problems with practical implications. According to Kenneth Waltz, the credibility of moving up the escalatory ladder would increase the credibility requirement to signal to the adversary that the United States was

[167] Scott D. Sagan, "SIOP-62: The Nuclear War Plan Briefing to President Kennedy," *International Security*, vol. 12, no. 1 (Summer, 1987), p. 37; Briefing the President, SIOP-62, pp. 15-17; Carl Kaysen to General Maxwell Taylor, Military Representative to the President, "Strategic Air Planning and Berlin," 5 September 1961, Top Secret, excised copy, with cover memoranda to Joint Chiefs of Staff Chairman Lyman Lemnitzer, released to National Security Archive; National Archives, Record Group 218, Records of the Joint Chiefs of Staff, Records of Maxwell Taylor.

[168] Joseph A. Cernik, "The Current United States Targeting Doctrine of Nuclear Weapons: An Explanation and Analysis," *Presidential Studies Quarterly*, vol. 6, no. ½ (Winter-Spring, 1976), p. 61.

[169] David S. McDonough, "The Evolution of American Nuclear Strategy," *The Adelphi Papers*, vol. 46, no. 383, p. 24.

serious in their commitment.[170] A limited response would control escalation, as Schlesinger's doctrine designed. In a sense, the new MIRVed assets would be Schelling's "threat that left something to chance", while Lance would provide the United States with credibility to climb the controlled escalatory ladder. It is worth noting that the Lance rockets were designed to launch an 'Enhanced Radiation Bomb', specifically a neutron bomb, this capability did not come into existence until 1981; until the enhanced radiation version of the warhead was available, the Lance weapons system would launch conventional warheads.[171]

Vulnerability – First Strike Doctrine

While the United States was concerned as the Soviet Union approached nuclear parity, the Nixon Administration did not seriously consider first strike doctrine as a feasible strategy. This was, however, not due to an organizational bias against instigating nuclear warfare; American security policy makers did not consider striking the Soviet Union first because they did not have the capability to do so. In a memorandum of conversation, dated 1971, National Security Adviser Henry Kissinger is recorded as saying: "we have no disarming capability against the USSR but we do have some against China. But we cannot use our land-based missiles against China (over USSR); we have to use our bombers and submarines. Thus, we must decide whether to dedicate a part of our force. And do we have the intelligence capability to define the targets? As long as we have a disarming capability we can use it to regulate their actions in local situations."[172]

[170] Kenneth N. Waltz. "Nuclear Myths and Political Realities," *The American Political Science Review*, vol. 84, no. 3 (Sep., 1990), pp. 739-740.
[171] Cernik, p. 61; Schwartz, p. 90.
[172] Memorandum of Conversation," *FRUS*, vol. I, document 96 (13 August 1971, 10:05-11:50)

While the above excerpt illustrates the Administration's position vis-a-vis first strike doctrine, they were not a major point of discussion in the early 1970s. The U.S. was concerned about crisis stability vis-a-vis the "prelaunch survivability of its fixed-site ICBMs,"[173] the solution of a disarming blow in a crisis was not dually considered. Instead, the United States reconsidered the Kennedy/McNamara Administration's Flexible Response solution in the form of 'Selective Options.' While the Flexible Response doctrine "derived from having many preplanned target sets from which to choose and from force capabilities, such as retargeting capability and employment adaptability. Selectivity, on the other hand, was a function of target grouping – that is, the number and types of targets – and of minimizing collateral damage."[174] As is evident from the consideration of a "selective" version of McNamara's doctrine, we can see a mix of selecting options and achieving the capability of the Kennedy Administration in terms of achieving flexibility (e.g. moving away from assured destruction) and towards the goal of damage limitation in the hope of keeping nuclear fighting as a limited war engagement.

While the Sea-Launched Ballistic Missile (SLBM) capability had the potential to be used for counterforce strikes, they are traditionally used for countervalue targeting; in fact, only about five Fleet Ballistic Missile (FBM) submarines (counterforce capable SLBMs) were assigned to NATO forces out of a total 80 Polaris and/or Poseidon

[173] Warner R. Schilling. "U.S. Strategic Nuclear Concepts in the 1970s: The Search for Sufficiently Equivalent Countervailing Parity," *International Security*, vol. 6, no. 2 (Fall 1981), p. 69.
[174] Terry Terrif. *The Nixon Administration and the Making of U.S. Nuclear Strategy* (Ithaca, NY: Cornell University Press, 1995), p. 3).

missiles.[175] The reason why the FBM-capable submarines did not fill the gap in counterforce capabilities was due to the technical difficulties in striking from a rolling sea, which made potential strikes against enemy forces highly inaccurate; furthermore, the requirements for striking Soviet cities from SLBMs was far less exacting.[176] With the MIRV development in 1970, the potential for counterforce doctrine was beginning to become technologically feasible for the first time as the lynchpin of the American nuclear strategy. The deployment of MIRVed missiles would give the United States the capability of a robust counterforce capability against Soviet bomber bases and ICBMs before they were launched.[177]

While first strike doctrines were briefly and very sporadically discussed by the Nixon Administration, these conversations did not seriously constitute a cornerstone of American nuclear doctrine. In actuality, the purpose of Henry Kissinger's discussion of a first strike option against the People's Republic of China served to illustrate the point that it was not tactically feasible to launch this type of strike against their rivals in the Soviet Union. There were two reasons the United States did not consider launching a first strike attack against the U.S.S.R.: (1) American nuclear assets were not sufficient to disarm the Soviet Union, thus depriving their enemy of a substantial capability to respond in kind; (2) Launching a first strike against the Soviet Union was simply unnecessary. In any given aggressive nuclear action taken by the U.S.S.R., the United States possessed a nuclear arsenal that would be able to respond with a substantial second strike.

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[175] Desmond J. Ball. "The Counterforce Potential of American SLBM Systems," *Journal of Peace Research*, vol. 14, no. 1 (1977), p. 23-4.
[176] Ibid.
[177] Schilling, 53.

Conclusion

The Defense Program Review Committee concluded that the necessities of developing a Limited War doctrine required greater technological requirements than previous strategies were built upon. Limited War planning burdened doctrinal planning by placing stringent technological requirements on retargeting systems (which were not yet developed), enhanced accuracy and guidance abilities, as well as hard-target kill capabilities. The biggest of these requirements was the ability to re-target missiles after they had left their silos and submarines. "Not knowing the political, the objectives to be achieved, or the signal to be sent, the United States needed to have a great flexibility in its targeting capacity, which depended on it having a sure capability to strike very hard targets, as well as other targets of interest."[178]

Alternative Explanation

In the offensive bias model, military decision makers will pursue offensive doctrines regardless of the balance of forces or advances in technical operating characteristics. The hypothesis that the military will pursue offensive doctrines regardless of the balance of forces is falsified. The discussion surrounding pre-emptive or preventive action versus the U.S.S.R. was rejected (partially) upon the basis that the Soviet military had virtually reached nuclear parity with the United States and any attempt, therefore, to disarm their opposition could not be successfully undertaken without rendering themselves catastrophically vulnerable to a retaliatory strike.

[178] Ibid, p. 90

Secondly, the offensive bias hypotheses predict that military doctrine will produce overly simplified standard operating procedures and war-fighting plans in order to reduce uncertainty and simplify complex environments. The Nixon/Kissinger Schlesinger Doctrine was far from an overly simplified procedure. The Richard Nixon years became increasingly complex in developing a doctrine that would significantly "add to the number of preplanned strikes in the SIOP which entail the use of less than all of its strategic forces and to design strikes that would use far smaller numbers of warheads than did the options previously planned for the SIOP."[179] The addition of preplanned strikes coupled with the balancing act of holding a sufficient reserve force was a complex task for military planners. The expansion of American nuclear targeting policy enshrined in Selective Options built on Secretary McNamara's earlier "emphasis on flexible no-cities targeting, focused on smaller, flexible, and selective nuclear options."[180]

Additionally, the Schlesinger Doctrine created a more complex doctrine in a similar way to the Kennedy Administration. As was noted in the last chapter, SIOP-62 culminated in the President choosing among fourteen nuclear strike options. The new doctrine and SIOP were designed to give the president more flexibility in the execution of nuclear strikes and represented a "sensitive person's response to the suicide-or-surrender scenarios of yesteryear."[181] SIOP-5 continues along the same lines as SIOP-62 during the Kennedy Administration, where the President selects from a group of pre-planned

[179] Schilling, p. 62.
[180] David S. McDonough. "Nuclear Superiority or Mutually Assured Deterrence: The Development of the US Nuclear Deterrent," *International Journal*, vol. 60, no. 3, Canada in the World: Annual John W. Holmes Issue on Canadian Foreign Policy (Summer, 2005), p. 818.
[181] Peter Pringle and William Arkin, *SIOP: The Secret U.S. Plan for Nuclear War* (New York, NY.: W.W. Norton & Company, 1983), p. 176.

targeting options; in the case of the Schlesinger SIOP, this version is more nuanced and includes more counterforce options for Presidential consideration.[182]

Lastly, as a note on potential geopolitical variables influencing the establishment of nuclear doctrine, it is worth noting that East-West normalization of diplomatic relationships appears to have not had an effect on doctrine. The Nixon Administration was marked by a period of *detente* with the Soviet Union, characterized by a sense of partnership to establish arms control guidelines, as two Strategic Arms Limitation Treaties were signed. Although there appeared to be a thawing of tensions between the two superpowers, the Schlesinger Doctrine went ahead, establishing a dynamic of inter-strike bargaining,[183] and a series of counterforce options, and the creation of a new Single Integrated Operations Plan (SIOP-5) which contained well over 40,000 targets.[184]

President Carter

The Carter Administration was one of the most interesting periods in terms of nuclear analysis. Jimmy Carter took office under circumstances that were less dramatic and tense than Richard Nixon. While the Soviet Union was approaching strategic parity with the U.S., Carter took office with a mind to wind down the Cold War arms race and bring the American arsenal under control. Initially, President Carter sought to persuade

[182] Michael Brenner, "Decision Making in a Nuclear-Armed World," *Annals of the American Academy of Political and Social Science*, vol. 430, Nuclear Proliferation: Prospects, Problems, and Proposals (Mar., 1977), p. 151.
[183] Henk W. Houweling and Jan G. Siccama, "The Risk of Compulsory Escalation," *Journal of Peace Research*, vol. 25, no. 1 (Mar., 1988), pp. 51-3.
[184] National Security Council, Defense Program Review Committee, "U.S. Strategic Objectives and Force Posture Executive Summary," 3 January 1972, Top Secret, excerpt. Retrieved from www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB173/SIOP-4.pdf 14 August 2012.

the Pentagon and the Joint Chiefs of Staff to accept the idea that they had rejected twenty years prior: the concept of minimum deterrence.[185] However, with the military establishment in the middle of a crucial debate about the necessity for the development of measures to "cope with the Soviet Union's new generation of more accurate missiles,"[186] Whereas Carter initially hoped to reduce the U.S. arsenal to 200 SSBNs,[187] he led the charge to incorporate "new weapons into a new and better national strategy."[188]

PD-59 and the "Countervailing Strategy"

President Carter's Presidential Directive 59 (PD-59 nominally reaffirmed American commitment to the strategic policy of nuclear deterrence, while introducing a harder-line approach to Soviet actions. The position of the Carter Administration would be to demonstrate to the Soviets that any aggressive action could lead to not plausibly lead to victory. According to PD-59:

> To continue to deter in an era of strategic (as well as conventional) forces such than in considering aggression against our interests any adversary would recognize that no plausible outcome would represent a victory on any plausible definition of victory. To this end and so as to preserve the possibility of bargaining effectively to terminate the war on acceptable terms that are as favorable as practical, if deterrence fails initially, we must be capable of fighting successfully so that the adversary would not achieve his war aims and would suffer costs that are

[185] Peter Pringle and William Arkin. *SIOP: The Secret U.S. Plan for Nuclear War* (New York: W.W. Norton & Co., 1983), p. 173.
[186] Ibid, 173.
[187] Ibid, 174.
[188] Ibid, 173.

unacceptable, or in any event greater than his gain, from having initiated an attack.[189]

PD-59 suggested that the nuclear strategy of the United States would, going forward, overtly demonstrate that any Soviet revisionism would be met with overwhelming force, so that any victory would necessarily be pyrrhic. Furthermore, Carter made direct reference to the necessity of an American war-fighting (even war-*winning*) strategy. It was this presidential directive that ultimately became the administration's "Countervailing Strategy."

The Countervailing Strategy was an advancement of the Nixon Administration's Schlesinger Doctrine. While Flexible Response was the first doctrine to move away from 'suicide or surrender' and produce a range of response options for the President besides targeting Soviet cities, the Schlesinger Doctrine in 1973 outlined a strategy of 'controlled escalation' that would allow for inter-conflict bargaining. "Ultimately, PD-59 attempts to deny the Soviet leadership the perception that nuclear war is winnable at any level of conflict."[190] This was made possible due to increases in technological capabilities made under the Carter Administration, as will be demonstrated in this section.

The Countervailing Strategy, at its heart, was a doctrine designed to allow the president strategic and tactical options over the full range of contingencies.[191] While this doctrine is clearly not a first-strike doctrine, it is a strategy of deterrence under what nuclear policymakers determined to be the full breadth of Soviet responses – indeed, this

[189] http://www.jimmycarterlibrary.gov/documents/pddirectives/pd59.pdf (accessed 26 February 2012).
[190] Charles A. Appleby, "Nuclear Strategy at the Crossroads," *SAIS Review*, no. 1 (Winter, 1981), p. 75.
[191] Walter Slocombe. "The Countervailing Strategy," *International Security*, vol. 5, no. 4 (Spring, 1981), p. 21.

was meant to be the strongest possible second-strike doctrine.[192] The Countervailing Strategy was meant to discourage the Soviet Union from any attempt at achieving revisionist goals; the doctrine had a decidedly war-fighting flavour to it. The U.S.S.R. would surely understood that the U.S. would not credibly attack Soviet cities in a full-scale countervalue response, according to Secretary of Defense Harold Brown, the United States could attack "in a selective and measured way, a range of military, industrial, and political control targets, while retaining an assured destructive capability in reserve."[193] While President Carter's new strategy placed less importance on the countervalue aspects of nuclear deterrence, it now gave "priority to attacking military targets in the Soviet Union rather than to destroying cities and industrial complexes."[194]

The United States would seek to plan for the worst-case scenario (e.g. deterrence failure resulting in a general nuclear war) with the most detailed war-fighting strategy in American history; military and political decision makers would seek to maximize their chances before a prospective nuclear conflict presented itself. The emphasis in this war-fighting doctrine was a distinctly counterforce-slanted. According to Sovietologist Henry Trofimenko, "practically all the new U.S. systems of strategic offensive weapons now being deployed have counterforce capability. Examples include Trident I (let alone Trident II which is still at the development stage), strategic cruise missiles, the new and more powerful MARK-12A warheads with a more accurate guidance system for

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[192] Ibid, p. 25-26.
[193] Louis Rene Beres. "Tilting Toward Thantos: America's "Countervailing" Nuclear Strategy," *World Politics*, vol. 34, no. 1 (Oct., 1981), p. 27; Secretary of Defense Harold Brown, *Department of Defense Annual Report for FY 1981* (Washington, D.C.: 1980), p. 66.
[194] Richard Burt, "Carter Reported to Approve a Plan for Limiting Any Nuclear Warfare," *The New York Times*, p. 1; Desmond Ball, "U.S. Strategic Forces: How Would They Be Used?" *International Security*, vol. 7, no. 3 (Winter, 1982-1983, pp. 31-2; Michael Getler, "Carter Directive Modifies Strategy for a Nuclear War," *The Washington Post*, August 6, 1980, p. A10.

Minuteman and finally, the MX mobile ICBM now being built."[195] Significantly, this comes just on the heels of the *enhanced radiation* version of the W70 warhead coupled to the Lance guided missile.[196] The enhanced radiation, also referred to as the 'neutron bomb' presented some capabilities that were unheard of with existing warheads: "[First] since heat and blast are limited to the immediate zone around the blast, it is thus argued that there would be less damage to buildings and landscape than with other weapons. Secondly, since there is virtually no residual radiation from the weapons (other than the radiation from the fission trigger), forces could occupy the attacked area within a matter of hours without special protective clothing and without fear of contamination. Third, if the armor were attacked outside the limited area where heat and blast effects occur but inside the zone of intense radioactive heat...the tanks themselves would be largely undamaged and could be appropriated for NATO use."[197]

With the development of the MX missile, the United States was in a far greater position to launch blunting strikes against the Soviet Union than during any other time during the nuclear era. With the MX breakthrough, the U.S. had finally obtained the capability to destroy the hardened Soviet missile silos that prevented them from launching a blunting strike.[198] This was especially important, as Soviet hardened silos were up to twice as effective as the hardness of the American hardened silos; U.S. silos would be able to withstand blast pressures up to 2,000 pounds per square inch, while the

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[195] Henry A. Trofimenko. "Counterforce: Illusion of a Panacea," *International Security*, vol. 5, no. 4 (Spring, 1981), p. 43-4.
[196] Schwartz, p. 90.
[197] Donald M. Snow, "Strategic Implications of Enhanced Radiation Weapons: A Preliminary Analysis," *Air University Review* (July – August, 1979), retrieved from http://www.airpower.maxwell.af.mil/airchronicles/aureview/1979/jul-aug/snow.html accessed 14 August 2012.
[198] Victor Utgoff. "In Defense of Counterforce," *International Security*, vol. 6, no. 4 (Spring, 1982), p. 54.

figures for the Soviet Union was 2,000 – 4,000 pounds per square inch.[199] While the MX programme was the most expensive (on a per missile basis it reached $189 million each when used in conjunction with an ICBM)[200] the development of this penetrating warhead allowed the targeting of Soviet silos as DGZs for the first time. With the ability to destroy hardened silos, the United States' tactical/theatre capability was able to take on a distinctly counterforce bias, which is heavily reflected in President Carter's Countervailing Strategy of the 1980s. In fact, it is these capabilities that allowed U.S. nuclear strategists to put into place the doctrine envisioned by the Kennedy and Nixon Administrations: a nuclear doctrine of deterrence that "was focused on a threat to destroy Soviet leadership and military targets, rather than Soviet society at large."[201] The Countervailing Strategy, with its heavily focused-counterforce bias is consistent with the prediction that advanced technical operating characteristics will lead to nuclear doctrine that is slanted, to a great degree, towards counterforce use.

First Strike Doctrine

The introduction of the Countervailing Strategy was tantamount to a declaration that the United States would not attack the Soviet Union in either a first strike or preventive attack. President Carter's Countervailing Strategy confidently illustrated that the U.S. was prepared with virtually any contingent strategy to meet virtually any Soviet aggression. Although the prospect of absorbing a first strike from the Soviet Union was (obviously) an extremely unpleasant proposition, tactical and strategic forces would not be in a position of vulnerability vis-a-vis their Soviet adversaries should Secretary

[199] Curtis Crawford. "Freezing Missile Accuracy," *Foreign Affairs*, vol. 62, no. 1 (Fall, 1983), p. 201.
[200] *Atomic Audit*, p. 106.
[201] Stephen Biddle. "Strategy in War," *PS: Political Science and Politics*, vol. 40, no. 3 (Jul., 2007), p. 462.

General Leonid Brezhnev attempt a disarming strike against American nuclear forces. By the year 1980 the United States presented a number of survivable second strike assets in the form of the 37 ballistic submarines (5 Polaris, 31 Poseidon, and 1 Trident SSBNs),[202] the development of the mobile MX ICBM system,[203] 108 Pershing II missiles and 464 GLCM cruise missiles deployed in the European theatre,[204] as well as various nuclear-capable delivery systems and the bomber component of the TRIAD.

The Countervailing Strategy represented an affirmation that U.S. nuclear strategy would be a second strike employment policy.[205] As Walter Slocombe articulates, "deterrence will be enhanced by our countervailing strategy to the degree that the USSR recognizes that aggression entails not only the risk of unlimited retaliation against the whole Soviet target system, but also the choice of a more selective and measured response that would itself be so devastating as to deny any advantage from having initiated the conflict."[206] The Carter doctrine was overtly deterrent (to a far greater degree than the Kennedy or Nixon doctrines) and, therefore, reactionary in its employment implications. Additionally, the Countervailing Strategy enhanced the credibility of American doctrine, as "unlimited retaliation" was not the overwhelming response to Soviet aggression, but there existed a feasible potential to strike at Soviet military targets. This allowed the United States to respond to lower levels of aggression without having to

[202] Secretary of Defense Harold Brown, *Department of Defense Annual Report for FY 1981* (Washington, D.C.: 1980), p. A-9.
[203] Ibid, p.6
[204] Ibid, p. 93, table 5-4.
[205] Although American doctrine never officially declared a "No First Use" policy, there is widespread agreement that this was done to deter the Soviet Union from attempting to strike a first blow against the U.S. or her Allies. As Thomas C. Schelling (and others) have pointed out, the 'threat that leaves something to chance' is a highly effective deterrent strategy to induce an element of caution between nuclear rivals.
[206] Slocombe, 23.

immediately strike at Soviet cities (or industrial/economic targets which were, again, usually located near urban areas).

The ability of the United States to strike virtually any Soviet asset, especially in hardened ICBM silos, in effect made American forces even less vulnerable. The fleet of SSBNs were continuously deployed throughout waters adjacent to the Soviet Union, thereby making the US an invulnerable force – along with the inclusion of several forms of mobile ground units. However, these assets had been available and deployed since the Kennedy presidency – and first strike doctrine no longer held much stray in subsequent administrations. Because the United States could now launch a blunting strike against the U.S.S.R., the Soviet Union could be more easily deterred and American forces were now thought as invulnerable to a greater degree, combined with the heightened vulnerability of their Soviet counterparts.

Launch on Warning

There is no evidence to suggest that the Carter Administration had a Launch on Warning doctrine on the books; in fact, there does not seem to be any high-level policy documents even discussing the doctrine. American nuclear policy has had a tenuous relationship with LoW doctrines throughout the nuclear era. Policymakers have considered pre-emption and, at times, preventive action especially during the Harry Truman Administration, "the U.S. has consistently rejected the launch-on-warning option in its declaratory policy"[207] but, as we have seen before, have considered pre-authorization and "launch on confirmation of attack." Technological innovations during

[207] Benjamin S. Lambeth. "Deterrence in the Mirv Era," *World Politics*, vol. 24, no. 2 (Jan., 1972), p. 227.

the Eisenhower and Kennedy years, such as the Ballistic Missile Early Warning System (BMEWS) seemed to be leading nuclear doctrine towards a LoW doctrine.

Command and Control grew with several technological innovations: early warning systems such as BMEWS triggered alerts of a potential incoming nuclear strike and Permissive Action Links (PALs) created control mechanisms designed to prohibit unauthorized launch. In the 1970s, command and control was extended to communication and intelligence – thus, C^3I. Technological innovations such as Very Low Frequency (VLF), Extremely Low Frequency (ELF) wavelengths were designed to communicate with deployed Fleet Ballistic Missile (FBM) submarines, and navigational technologies such as the Ships Inertial Navigation System (SINS) allowed FBMs and SSBNs to traverse the oceans and patrol enemy coastlines in deterrent missions.

As these new C^3I technologies evolved, however, they became more tenuous. The prediction that as C^3I technologies become more advanced, LoW doctrines become more likely to be adopted has been falsified. While counterforce doctrines demanded innovations in command, control, communication, and intelligence, these systems became increasingly vulnerable to enemy subversion, interference, and destruction. Even if counterforce doctrines remained the goal of American nuclear strategists, a LoW doctrine emphasis became less and less feasible. As Desmond Ball explains, by the 1980s C^3I systems become increasingly vulnerable to the Soviet Union. Early warning systems are subject to dangerous false alarms; radar sites, communication stations, and satellite

ground stations are vulnerable to Electro-Magnetic Pulse (EMP) weapons.[208] Additionally, C^3 systems are generally more vulnerable to the blast effects of nuclear weapons than are the strategic forces, and have various peculiar vulnerabilities as well – susceptibility to electromagnetic pulse, electronic jamming, deception, etc."[209] Ironically, as C^3I systems became more technologically advanced they became more vulnerable to their adversary – LoW doctrines became less and less feasible as technical operating characteristics became more and more advanced.

[208] Desmond Ball. "U.S. Strategic Forces: How Would They Be Used?" *International Security*, vol. 7, no. 3 (Winter, 1982-1983), pp. 57-58; Desmond Ball, *Can Nuclear War Be Controlled?* Adelphi Paper, Number 169 (London: International Institute for Strategic Studies, 1981), Section II.
[209] Ibid.

Conclusion

This thesis examined the causal role technological capabilities, specifically the technical operating characteristics, played in the determination of American nuclear doctrine during the Cold War. The research question of this thesis is: what was the driving force behind nuclear doctrine in the United States during the middle years of the Cold War (comprising the Eisenhower until the Jimmy Carter Administrations). If, as political scientists usually assume bureaucratic politics and military decision makers have a propensity towards *offensive biases*, analysts need to look at how the state's military organization behaves. Furthermore, doctrine will have an offensive flavour and nuclear strategy will proceed to be highly aggressive, and likely unstable. If, however, nuclear doctrine is largely determined by the technical operating characteristics of the available technology, a much different story is told: doctrine need not be offensive and aggressive, but its character is reflective of the technical operating characteristics of the state's weapons and weapons systems.

This chapter serves as both the conclusion and a note on the necessity of further research into this research programme. Firstly, this section will review the analyses of the empirical record through the two frameworks outlined in the theoretical chapter, e.g. the technological model and the offensive bias model. Secondly, some brief conclusions will be drawn, although they will be tempered through the limited longitudinal analysis that comprises the presented case studies. Thirdly, I will discuss some thoughts as to how this research project should proceed moving forward.

The main empirical component of this thesis is the examination of four U.S. presidencies, namely Dwight Eisenhower, John Kennedy, Richard Nixon, and Jimmy Carter. These case studies represent the evolution of American technology during the Cold War, ranging from a primitive capability under President Eisenhower that possessed only a fission reaction, no miniaturization capability, and was highly vulnerable to an enemy first strike, to an advanced capability under the Carter Administration. These four presidencies are equally drawn from the Democratic Party (Kennedy and Carter) and the Republican Party (Eisenhower and Nixon), which should control for political skewness, at least on average.

Argument and Hypotheses

This thesis argues that American nuclear doctrine during the Cold War was primarily driven by technical operating characteristics of nuclear weapons. Given specific technical operating characteristics based on the technological capability of the nuclear weapons possessed by the United States between the years 1953-1981, military decision makers produced doctrine based on these characteristics.

Military doctrine is inextricably linked to the capabilities a state possesses; what the armed services of a state plans to do on the battlefield cannot be accomplished, or at all considered if it does not possess the tools to succeed at a given task. The choices of tools at the disposal of military planners are far more limited: there are far fewer types of assets to draw from. Additionally, nuclear weapons are driven, to an enormous extent, by research and development, changes in the accuracy, delivery mechanisms available, warhead sizes, yield strength, command, control, and communications systems (C^3I) – all

of this serves to demonstrate that nuclear weapons, at their very core, are technologically driven. It should not be surprising, therefore, that what the military is able to do with nuclear weapons should also be driven by technological factors.

While the United States was in the primitive stages nuclear doctrine reflected a countervalue (e.g. city strike) strategy. The purpose of establishing a countervalue doctrine is to make the cost of war sufficiently prohibitive to deter the enemy or to surrender rather than continue to incur punishment should military action begin. Countervalue doctrines are easiest to implement: they require the capability of reliable delivery system to reach the enemy's target and enough nuclear bombs to sufficiently punish a civilian population, industrial infrastructure, and political/governmental networks. Countervalue strategies require a few fission bombs to get through an enemy's air defense network and reach their target; bombers can be used instead of ballistic missiles (and therefore a miniaturized warhead is not crucial) and it does not have to be highly accurate.

Counterforce doctrines, however, are more nuanced and technologically difficult strategies to employ. Delivery mechanisms must include miniaturized nuclear warheads that can be distributed to infantry or armoured units; miniaturization requires a high degree of technological proficiency. Additionally, counterforce-capable weapons must be highly accurate in order to strike enemy forces. Also, the yield strength of the weapon cannot be so high that it would be just as destructive to one's own forces. Lastly, there must be a diversity of delivery systems so that military planners can produce a coherent and fluid plan of operations. Because the technical operating characteristics of weapons are more (or less) appropriate to either counterforce or countervalue doctrines, we expect

that the availability of these weapons or weapons systems would influence what doctrine was implemented.

Nuclear weapons are sudden and decisive weapons. As result of this fact, states are concerned with the possibility that a rival may pre-empt or launch a surprise attack. Because of this first move advantage, the possibility of being caught unawares is a constant source of insecurity in the nuclear environment. This is especially present if the state's arsenal is vulnerable, that is, it lacks mobility and/or stealth qualities such as present in nuclear ballistic submarines or ground mobile nuclear weapons. The more vulnerable a state's nuclear arsenal is, the more likely it is to have a doctrine of First Strike.

States may make use of a Launch on Warning (LoW) doctrine to mitigate the insecurity that comes from the *use-it or lose-it* character of nuclear weapons. With a LoW doctrine, a country will launch their nuclear weapons when it becomes reasonably clear that the opposition has taken the first blow. This doctrine, however, requires two technological necessities: (1) a fully reliable sensor system, and (2) a fully reliable command-and-control infrastructure. While command-and-control capabilities are not choose-able facets since nuclear arsenals must be secure against accidents, the technological advancement of this area of nuclear weapons may ultimately be a determinant of specific launch-on-warning strategies. Because of these technological necessities, at the outset of this thesis the hypothesis was that the more advanced a state's Command, Control, Communications (C^3I) systems are, the more likely a Launch on Warning doctrine is to exist.

Evidence from Case Studies

Countervalue versus Counterforce

The record from the case studies confirms the expectation that the technical operating characteristics of nuclear weapons drove the decision to adopt a countervalue or counterforce doctrine in American strategy during the Cold War. During the Eisenhower Administration, Defense Secretary Dulles established a doctrine of Massive Retaliation. While President Eisenhower was uncomfortable with the idea of holding cities hostage, in 1953 the Mark-12 1,000 pound bomb was put into production, and this was a step forward towards miniaturization as its predecessor was a 10,000 pound bomb. These bombs, of course, could only be delivered from a Strategic Air Command bomber sortie; it was not possible to equip infantry or armored units with these weapons and, therefore, counterforce was not possible given this factor. Furthermore, it was not until 1957 that the United States possessed the ability to produce a sufficiently low yield so as to prevent blowback that would harm American troops if they were used on the battlefield. It was at this point that the two kiloton Douglas MB-1 "Genie" was available, which was used for atomic air-to-air missile strikes against enemy bombers.

The Kennedy Administration took office and immediately launched a review of the Eisenhower-Dulles doctrine of Massive Retaliation. On Defense Secretary Robert McNamara and President Kennedy's agenda was to create a doctrine that was not as rigid as Massive Retaliation and produce one that did not target cities and civilian population. Secretary McNamara pushed for a range of options beyond the 'suicide or surrender' that came to characterize Massive Retaliation and would come to establish what would

ultimately become the doctrine of Flexible Response. In this doctrine, a new strategy was designed to present the political leadership with a wide range of nuclear response options to crises. The breakthrough in miniaturized and reduced yield assets, however, allowed military decision makers to strongly consider the strongly counterforce slanted doctrine as outlined in Flexible Response.

The Nixon Administration's implementation of the Schlesinger Doctrine (often called Controlled Response) was a hybrid of counterforce and countervalue flexible response options with the inclusion of 'controlled escalation.' Multiple Independently-targeted Re-entry Vehicles, enhanced guidance systems, and Lance guided missiles had all been technical innovations during Nixon's term as president, and American nuclear doctrine changed. It was with this that the Nixon Administration launched the Defense Program Review Committee (DPRC) and concluded that the necessities of developing a Limited War doctrine required greater technological requirements than previous strategies were built upon.

The Jimmy Carter Administration enacted the Countervailing Strategy doctrine, which was based on Presidential Directive 59 (PD-59), which allowed the political and military leadership to reaffirm its commitment to deterrence, but it would now be policy to demonstrate to the Soviet Union that any aggressive action could not lead to victory (see quote in Chapter 4). With the availability of MIRVed warheads, enhanced guidance systems and improved accuracies, President Carter went a step further than Kennedy's Flexible Response and Nixon's Schlesinger Doctrine/Selective Options; the Countervailing Strategy allowed the President of the United States to have a doctrine that incorporated a tentative plan over virtually all strategic and tactical options, over the full

range of contingencies. While an Assured Destructive capacity was available if the American limited war strategy failed, this was a decidedly counterforce application of U.S. doctrine and it came at a time when the technical operating characteristics ultimately came together with reduced yield, enhanced guidance and retargeting ability, and the miniaturization capability that was established in the mid-1960s. The Countervailing Strategy would be the first truly and completely counterforce doctrine the United States possessed, from top to bottom as city strikes would only be considered should limited war graduate to a general nuclear war.

First Strike Doctrine

Out of all the case studies under investigation, the Eisenhower Administration considered the First Strike doctrine most closely. Especially during the Korean War and as military decision makers considered American nuclear superiority as a 'Wasting Asset', a 'window of vulnerability' and a 'window of opportunity'[210] tempted President Eisenhower with a potential First Strike against the Soviet Union. The Administration was still reeling from the Soviet Union crossing the thermonuclear threshold in 1952, as they successfully test detonated their first fusion-based nuclear bomb; the Massive Retaliation doctrine "really meant massive pre-emption,"[211] as the United States would certainly be unwilling to absorb the first blow when they had the possibility to "blunt" an enemy attack. Adding to U.S. vulnerability, the means of delivering a nuclear strike was by a SAC bomber sortie, which would have extremely high attrition rates as they attempted to fly their way through Soviet air defenses. It was not until 1956 that the *Thor*

[210] Trachtenberg (1988-1989), p. 33.
[211] Trachtenberg (1988-1989), p. 33.

Intermediate Ranged Ballistic Missile (IRBM) was available, which would greatly reduce the attrition numbers the American arsenal would be subject to during a nuclear strike. The *Thor* and, later, *Jupiter* missiles were not without their own vulnerabilities, however, as they possessed a limiting effective range of 1,500 nautical miles and could be fired only with 15-20 minutes' notice;[212] the American IRBMs would need to be based dangerously close to Soviet targets. In the end, although, the Eisenhower Administration obviously declined the tempting option of launching a preventive strike against the U.S.S.R., however, no Administration came so close. However, no other Administration was so vulnerable.

By the time the Kennedy Administration moved into the White House, the technical operating characteristics of the U.S. arsenal had become less vulnerable than under President Eisenhower. With the successful deployment of the Polaris SSBN submarine fleets, the United States had an invulnerable nuclear deterrent in their possession. The Polaris fleet would be able to patrol areas just off the coast of the U.S.S.R. undetected. The Minuteman I programme in the early 1960s was crucial to the achievement of American nuclear invulnerability, as the Soviet Union would not be able to destroy all U.S. nuclear assets in a First Strike attack. The United States, therefore, would no longer need to consider a First Strike doctrine of their own, and it was the policy of subsequent U.S. administration to not consider such a doctrine in the future.

Launch on Warning

[212] http://www.fas.org/nuke/guide/usa/theater/thor.htm accessed 21 November 2011.

While the historical record was promising for the hypothesis that as command, control, and communications (C^3I) technology improved, states would be more likely to develop a launch on warning doctrine. During the Eisenhower and Kennedy Administrations, as early warning systems such as BMEWs, Pinetree and the DEW Line alerted the American military to incoming threats, the Permissive Action Link (PAL) system would guard against unauthorized or accidental use. At this point, nuclear surety would suggest that a LoW doctrine would be considered, and it was considered by both Eisenhower and Kennedy. During the Eisenhower years, the technology was not so robust as to allow this doctrine's implementation, as the BMEW system would not come online until after his time expired. This is, of course, a timing problem with technology, but the technical operating characteristics of the early warning systems were the driving force behind the consideration of LoW; the doctrine was advisable when the technology became feasible.

With the establishment of negative control, that is nuclear surety that came with the PAL system, it would seem that a LoW doctrine would be feasible to protect American assets from being destroyed by a Soviet surprise attack. However, the fact that LoW was not actually implemented should not be seen as a failure in technology driving doctrine, but it was production; the new PAL technology was untested, costly at an estimated $23.3 million dollars,[213] and most importantly, was only placed on a small number of weapons in comparison to the entire arsenal. While these issues persisted, launch on warning remained a discussion point at high level committee meetings and

[213] Schwartz, p. 515.

memoranda. LoW seemed destined to become doctrine when the technology and testing allowed for it to become feasible.

Under the Jimmy Carter Administration, we see the nature of the relationship between the development of C^3I technology and a launch on warning doctrine. As C^3I technology evolved, they became increasingly sophisticated, they also became increasingly vulnerable to Electromagnetic Pulse (EMP) weapons, false alarms, electronic jamming, subversion, and interference from the enemy.[214]

Counter to the hypothesis expected in this thesis, as C^3I technology became more sophisticated and advanced, they became increasingly vulnerable to enemy interference; LoW doctrine, therefore, became less likely as C^3I technology progressed.

Future Research

This was an important question: does technology play a primary driving factor in determining nuclear doctrine. The answer is, yes, nuclear doctrine in the United States during the Cold War, was primarily driven by the technical operating characteristics of the weapons available to them.

This thesis demonstrates that the technical operating characteristics of nuclear weapons were a primary driving factor in American during the Cold War. While the above conclusions are compelling, the structure of the longitudinal study of the United States does not allow these conclusions to be generalizable without more empirical work.

[214] Desmond Ball. "U.S. Strategic Forces: How Would They Be Used?" *International Security*, vol. 7, no. 3 (Winter, 1982-1983), pp. 57-58; Desmond Ball, *Can Nuclear War Be Controlled?* Adelphi Paper, Number 169 (London: International Institute for Strategic Studies, 1981), Section II.

We cannot, as yet, generalise the results of these findings to the post-Cold War United States or in a post-nuclear Iran, etc. The next step in this research programme will be to test if this conclusion holds in (1) a post-Cold War, higher technology environment and, (2) in different countries.

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