The Pinnacle of Midnight Express

False Alarms and the Launch on Warning Strategy in the U.S. Nuclear Arsenal

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Master's thesis in History

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Autumn 2021

Preface

The writing of this thesis has benefitted substantially from the advice and support of numerous people. My supervisor, Olav Njølstad, has provided excellent advice in essential parts of the process, as well as ample recommendations for literature. My other supervisor, Hilde Henriksen Waage, supplied equally crucial comments, especially with regards to the literary aspects of the thesis. I am indebted to her, as well as my colleagues who have helped sharpen the writing and arguments this thesis contains. Any flaws this thesis may contain, however, are exclusively on the part of the author. Last, I am grateful to my family, in particular my sister Iben and my beloved Gudrun, without whose unconditional support this thesis would never have been completed.

Summary

This thesis investigates the launch on warning strategy and three false alarms which indicated that the Soviet Union had launched massive nuclear attacks against the United States. It does so by drawing on the scholarly literature written on these topics, as well as primary sources. Based on these, this thesis argues that the launch on warning strategy created an unacceptably high risk of accidental nuclear war and that the severity of the false alarms in 1979 and 1980 was not appreciated, neither in the immediate aftermath nor in the longer run. In doing so, this thesis attempts to contribute to a more complete understanding of how certain strategies and technologies increase or decrease the risk of accidental nuclear war.

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Chapter 1 – Introduction

Introduction

In November 1979 and June 1980, at the North American Aerospace Defense Command (NORAD) headquarters, false alarms indicating a Soviet nuclear missile attack occurred several times.[1] In all instances, the alarms were caused by human error or technical malfunction. Had these alarms been identified as false just a few minutes later, President Jimmy Carter (1977-1981) might have already "retaliated" against the imagined Soviet strike, and nuclear war might have broken out by accident. However, despite the possibly disastrous outcomes of these alarms, they have received relatively scarce attention. After the first false alarm, in November 1979, there were some press reports and expressions of concern from Soviet Premier Leonid Brezhnev (1963-1981), whereas the two occurring on June 3 and June 6 received somewhat less attention.[2] This thesis aims to explore the false alarms in their historical context to explain what caused them, detail how they unfolded, and evaluate their reaction, both immediate and belated, including their treatment in the scholarly literature.

These were not the first false alarms the US had experienced. There have been numerous nuclear accidents and false alerts since 1945, increasing in frequency in the 1960s. These false alerts and near-uses are challenging to paint with a broad brush. In one instance, during the Cuban missile crisis, a bear attempting to enter a US military facility caused nuclear-armed interceptors to be launched from an airbase hundreds of miles away.[3] In another instance, a moonrise over Norway was erroneously interpreted as a Soviet missile strike. However, doubts were cast over this interpretation because Soviet premier Nikita Krushchev was in New York as head of the Soviet UN delegation. [4] In yet another instance, a B-52 bomber carrying two 3-

[1] Scott Douglas Sagan, *The Limits of Safety: Organizations, Accidents, and Nuclear Weapons*, Princeton Studies in International History and Politics (Princeton, N.J: Princeton University Press, 1993), 228-233.
[2] Arthur Ochs Sulzberger Jr., "Error Alerts U.S. Forces To a False Missile Attack," *The New York Times*, November 11, 1979; Richard Thaxton, "Nuclear False Alarm Gives a Grim Warning," *The Observer*, March 2, 1980; Richard Halloran, "U.S. Aides Recount Moments of False Missile Alert," *The New York Times*, December 16, 1979, sec. Archives; Richard Halloran, "Computer Error Falsely Indicates A Soviet Attack; Alert to Military Is Second in Last Seven Months 'Weren't Close to World War III' Steps in the Alert," *The New York Times*, June 6, 1980, sec. A; Richard Burt, "False Nuclear Alarms Spur Urgent Effort to Find Flaws," *The New York Times*, June 13, 1980, sec. A.
[3] Sagan, *The Limits of Safety*, 3.
[4] Eric Schlosser, *Command and Control* (London: Penguin Books, 2014), 253-254.

4 megaton thermonuclear bombs broke up in mid-air. Both bombs dropped from the plane, and one of the bombs came very close to detonating.[5]

The events selected are interesting and relevant for a few reasons: first and foremost, they represent a specific type of error that distinguishes them from other types of errors. A false alarm by itself does not necessarily indicate anything extraordinary, but these false alarms are centered around an obscure aspect of nuclear strategy: launch-on-warning. The launch-on-warning posture has been shrouded in secrecy and seldomly discussed in scholarly literature. It refers to a posture whereby the US would launch intercontinental ballistic missiles (ICBMs) as soon as a warning of an incoming nuclear attack was present. This posture contrasts with a "retaliation after ride-out" posture, wherein a retaliatory attack would be launched after absorbing a nuclear first strike. It is also, of course, an alternative to nuclear preemption.[6] The false alarms in 1979 and 1980 may shed light on this strategy, to what extent it was implemented, and to what extent it was, and possibly is, even technically feasible. These false alarms may also shed light on the command and control structure of the US nuclear arsenal, which would be placed under enormous constraint had these alarms been real.

Secondly, these accidents did not occur during a crisis. This is significant, as it may shed light on nuclear posture in "normal" times. Accidents and false warnings in crises would presumably have received somewhat of a different reaction, owing both to their greater frequency and severity during crises. It may also reveal a change in US assumptions about how a Soviet attack would happen. Earlier in the Cold War, a "bolt from the blue" attack was a significant concern among US nuclear strategists, which was one reason a launch-on-warning posture was considered an option in the first place.[7] This point may also indicate the extent to which the US developed its nuclear strategy in conjunction with the most up-to-date assumptions and knowledge of how a Soviet attack would take place.

[5] Schlosser, *Command and Control*, 245-246.
[6] Bruce G. Blair, *The Logic of Accidental Nuclear War* (Washington, D.C: Brookings Institution, 1993), 168.
[7] Fred M. Kaplan, *The Wizards of Armageddon*, Stanford Nuclear Age Series (Stanford, Calif: Stanford University Press, 1991), 124.

Third, these events took place as the period of lowered tension between the US and the USSR, détente, was coming to an end. While they have undoubtedly been overshadowed in the scholarly literature and popular memory by the Iran hostage crisis and the Soviet invasion of Afghanistan, their timing is interesting. The following period, both during the end of the Carter administration and for a larger part of the Reagan presidency, saw a rekindling of the Cold War to levels of tension not experienced since the missile crisis. Fears of nuclear war also reached new heights, with movies such as The Day After (1983) spurring debates featuring some of the Cold War's most prominent foreign policy figures.[8] However, the topic of accidental nuclear war was mostly left out of the broader debate about nuclear weapons.

Background

At the outset of the nuclear age, the strategic landscape was vastly different from the late Cold War. The world was still heavily affected by the slaughter of World War II. While the United States had emerged from the war relatively unscathed, having doubled its gross domestic product (GDP), and losing "only" 400 000 men, much of Europe and particularly the Soviet Union lay in shambles. The Soviet Union had lost more than 26 million to the war and more than 31 thousand factories.[9] In the midst of all this, the Cold War, which had been brewing up both before World War II and during its later stages, was taking shape. During this period, the nuclear landscape was vastly different from that of the late 1970s and 1980s. The United States enjoyed a nuclear monopoly until 1949 when the Soviet Union tested their first atomic bomb.

Moreover, there was a widespread assumption that the technology needed to develop a nuclear weapon was so complicated, and the materials needed to produce more were so scarce that only the most powerful and advanced countries would possess them. The strategic thinking surrounding nuclear weapons likewise reflected these assumptions: Bernard Brodie, who was one of the first to write about the effect of nuclear weapons on warfare and politics, observed that nuclear weapons could serve almost no other use than to deter war. First, given their enormous destructive power, they were too indiscriminate to use on the battlefield. Second,

[8] On November 20, 1983, ABC News aired a special Viewpoint debate with the topic 'the nuclear dilemma,' featuring former Secretary of Defense Robert McNamara, former Secretary of State Henry Kissinger, former National Security Advisor Brent Scowcroft, Carl Sagan, William F. Buckley Jr., and Elie Wiesel.
[9] Robert McMahon, *The Cold War: A Very Short Introduction* (New York: Oxford University Press, 2003), 10.

given their relative scarcity, they would also best be reserved for use against cities as a powerful bargaining chip and deterrent in the event of a conflict.[10]

In the early 1950s, as some of the dust from World War II had settled, the United States started to come to grips with the nuclear age. The period of nuclear scarcity was over, and the hydrogen bomb development marked a revolution almost as large and significant as that of the first nuclear weapons. Once again, Bernard Brodie was a central figure in the geostrategic musings about the hydrogen bomb. Whereas he conceded that the regular fission bombs were not so powerful as to permit completely disregarding the limits of their destructive potential, the hydrogen bomb effectively put that question to rest. With fission bombs, powerful though they were, targeting plans still had some relevance. With hydrogen bombs, targeting plans were more about what not to hit. Brodie considered the hydrogen bomb to have made strategic bombing almost utterly irrelevant as a warfighting measure. While Brodie supported making hydrogen bombs because he figured they would enhance deterrence, this position was not unanimously held among the nuclear elite. Julius Robert Oppenheimer, who headed the Manhattan project, which saw the first nuclear bombs developed, was the most vocal opponent of the hydrogen bomb. Nevertheless, Brodie's view prevailed, and Oppenheimer was subjected to outrageous slander and had his security clearances revoked in a typical McCarthy-era campaign.[11]

Coinciding with this change, another major shift in strategic thinking about nuclear weapons also took place. The assumption that nuclear weapons would be scarce and therefore used only against cities was reexamined and eventually abandoned. Instead, the vulnerability of the nuclear forces was now taking center stage. This shift in focus resulted in a realignment of the nuclear strategy, which neatly fitted the ever-expanding US nuclear arsenal. Whereas most of the targeting plans previously aimed at destroying cities, various factors resulted in a change towards a nuclear warfighting posture. Nuclear weapons would, in other words, be used on the

[10] Fred M. Kaplan, *The Wizards of Armageddon*, 27.
[11] Kaplan, *The Wizards of Armageddon*, 74-84. See also John Lewis Gaddis, ed., *Cold War Statesmen Confront the Bomb: Nuclear Diplomacy since 1945* (Oxford ; New York: Oxford University Press, 1999), 114-115.

battlefield, and most significantly, to destroy the enemy's nuclear weapons before they could be used.[12]

In the late 1950s, missiles capable of delivering nuclear weapons anywhere on the globe in less than an hour were starting to be deployed by the superpowers. In the United States, this buildup was partially fueled by a widespread and mistaken perception that the Soviet Union was ahead in both missile technology and production. The 1960 presidential candidate John Fitzgerald Kennedy was one of the most prominent proponents of this myth called the "missile gap."[13] A year and a half after Kennedy took office, these new weapons would become the center of a crisis that would bring human civilization closer to annihilation than it ever had been, the Cuban missile crisis. The missile crisis ended because of a diplomatic settlement between the Soviet Union and the United States, although the whole story was unknown to the public for decades.[14]

For this reason, in the minds of many, the missile crisis proved that deterrence worked. However, while the missile crisis brought the issue of nuclear war close to home, it brought no end to the escalating arms race. In the years both preceding and following the crisis, the United States and the Soviet Union massively increased their nuclear arsenals. In the United States, the most significant buildup took place in the late 1950s and early 1960s. In the Soviet Union, the buildup was slower and steadier, eventually peaking in 1986.[15] Who was ahead in the arms race, however, was a moot point. Any use of nuclear weapons by one superpower against the other would result in a devastating retaliation, making any victory in a nuclear war a pyrrhic one. This was the essence of the concept of Mutually Assured Destruction (with the fitting acronym MAD), which was explained in the simplest terms by Ronald Reagan and Mikhail Gorbachev in 1985: "A nuclear war cannot be won and must never be fought."[16]

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[12] Kaplan, *The Wizards of Armageddon*, 109.
[13] Christopher A. Preble, "Who Ever Believed in the 'Missile Gap'?: John F. Kennedy and the Politics of National Security," *Presidential Studies Quarterly* 33, no. 4 (December, 2003): 801-826, https://www.jstor.org/stable/27552538
[14] An excellent history of the Cuban missile crisis is found in Richard Ned Lebow and Janice Gross Stein, *We All Lost the Cold War*, Princeton Studies in International History and Politics (Princeton, N.J: Princeton University Press, 1994).
[15] "Status of World Nuclear Forces," Federation of American Scientists, last modified October 7, 2021, https://fas.org/issues/nuclear-weapons/status-world-nuclear-forces/.
[16] Joint Soviet-United States Statement on the Summit Meeting in Geneva, November 21, 1985.

Theoretical perspectives

There are several theories on nuclear strategy. Indeed, one could argue that all nuclear strategy is firmly within the realm of theory, given the non-use of nuclear weapons in warfare except the bombings of Hiroshima and Nagasaki. In this sense, this thesis contains a wide variety of theoretical perspectives. With regards to accidents and mistakes involving nuclear weapons, however, different theories must be used. This topic has received relatively sparse attention in the scholarly literature, and therefore theoretical perspectives on accidents specifically are far from abundant. There are two noteworthy exceptions. Scott Douglas Sagan, professor at the University of Stanford, has made one contribution. In his 1991 book *The Limits of Safety: Organizations, Accidents and Nuclear Weapons,* Sagan evaluates two schools of thought that he labels "high reliability theory" and "normal accidents theory."[17] Both these schools of thought aim to understand how and why accidents happen in organizations dealing with dangerous technology. High reliability theory is the more optimistic of the two, positing that there are a number of features and procedures organizations can adopt to drastically reduce the frequency of accidents.[18] Normal accidents theory, by contrast, is skeptical of humans' ability to prevent catastrophic accidents, and argues that dangerous technologies have some inherent traits in common that make accidents impossible to prevent, and difficult to control once they occur.[19]

The second theoretical contribution was made by Bruce Gentry Blair in his 1993 book *The Logic of Accidental Nuclear War*. In this book, Blair develops a model to estimate the effects of warning on stability.[20] This model is, in essence, an attempt to model how assumed rates of false alarms would couple with NORAD operators' prior estimation of how likely a nuclear attack was. As one might expect, the higher an operator's estimation that an attack was underway, the more likely that operator was to mistake a false alarm for a real one. Blair then evaluates how often different types of false alarms have occurred and makes a judgment on the

[17] Sagan, *The Limits of Safety*, 5.
[18] Sagan, 14–28.
[19] Sagan, 28–45.
[20] Blair, *The Logic of Accidental Nuclear War*, 219–54.

overall effect of warning on stability based on these calculations. Both of these schools of thought will be further described in chapter 4.

Primary sources

Due to the COVID-19 pandemic, obtaining primary sources has been rather tricky. Nonetheless, some primary documents pertaining to both the launch-on-warning posture, the ICBMs development process, and the 1979 and 1980 false alerts do exist and are available online. This is in no small part due to the National Security Archive's work, which has posted articles on these very issues with extensive primary documentation.[21] While the available documentation provided by the National Security Archive certainly helps this thesis, some problems remain. Information about nuclear weapons and the infrastructure surrounding them, the strategy, the technology, the command and control structure, is not readily obtainable. By now, enough documentation has become available to permit meaningful analysis, but the process is arduous. Documents of essential importance are kept secret, meaning that much of the analytical process needs to be based on inferences and secondary literature. This is best exemplified by the continuing classification of the Single Integrated Operational Plan (SIOP), the general nuclear war plans. The *Foreign Relations of the United States* (FRUS) series has been relied upon for the diplomatic discussions on false alarms and launch on warning, in particular *SALT 1, 1969-1972*.[22] The Jimmy Carter Presidential Library has also proved helpful in providing context to the events investigated in this thesis. Besides the documentation provided by the National Security Archive, primary sources regarding the launch-on-warning strategy and the false alarms have been tough to come by. The FRUS series provides only one document in addition to those provided by the National Security Archive, and the rest of the primary sources have mostly been found through the footnotes in Scott Sagan and Bruce Blair's works. The FRUS series and the Jimmy Carter Presidential Library have nonetheless been

[21] William Burr, "The 'Launch on Warning' Nuclear Strategy and Its Insider Critics," The National Security Archive, *The Nuclear Vault* (blog), June 11, 2019, https://nsarchive.gwu.edu/briefing-book/nuclear-vault/2019-06-11/launch-warning-nuclear-strategy-its-insider-critics; William Burr, "False Warnings of Soviet Missile Attacks Put U.S. Forces on Alert in 1979-1980 | National Security Archive," *The Nuclear Vault* (blog), March 16, 2020, https://nsarchive.gwu.edu/briefing-book/nuclear-vault/2020-03-16/false-warnings-soviet-missile-attacks-during-1979-80-led-alert-actions-us-strategic-forces#_ednref17.

[22] Erin R. Mahan and Edward C. Keefer, eds., *Foreign Relations of the United States: 1969-1976, Volume XXXII, SALT I, 1969-1972*, vol. XXXII, Foreign Relations of the United States (Washington, D.C: Government Printing Office, 2010).

useful by offering valuable insight into critical contextual factors which underscore the findings in this thesis.

Secondary literature

This has not precluded detailed accounts of US nuclear history, however, of which Fred Kaplan's *The Wizards of Armaggedon* and *The Bomb: Presidents, Generals and the Secret History of Nuclear War* are perfect examples.[23] The first, *The Wizards of Armageddon*, is widely considered the most detailed account of the evolution of US nuclear strategy. The second, *The Bomb*, is a less detailed but essential addition to the scholarly literature on the topic. Whereas *The Wizards of Armageddon* focuses more on the strategists and their workings, *The Bomb* is about the decision-makers; the generals, the white house officials, and of course, the presidents. Another important work on the history of nuclear weapons includes *Cold War Statesmen Confront the Bomb: Nuclear Diplomacy Since 1945*, edited by John Lewis Gaddis et al. Works on the early nuclear age include *The Atomic Bomb and the Origins of the Cold War* by Sergey Radchenko and Craig Campbell, which gives an account of the role of nuclear weapons in the early cold war.[24] Richard Rhodes has written some of the most extensive works on the development of the atomic bomb as well as the thermonuclear bomb. This has resulted in two straightforwardly named books: *The Making of the Atomic Bomb*, and *Dark Sun: The Making of the Hydrogen Bomb*.[25]

The topic of accidental nuclear war and false alarms, on the other hand, has seldom been discussed in the scholarly literature. The only two significant works on this topic are the ones mentioned above, *The Limits of Safety* by Scott Sagan and *The Logic of Accidental Nuclear War* by Bruce Blair. It is worth noting that these works are not first and foremost works of history. Both would more likely be categorized as works of political science, sociology, and nuclear strategy in general. Therefore, these works differ substantially in their approach from that of the historian, although they are by no means unemployable in the field of history. Accidents and misunderstandings more generally have been discussed, most convincingly by

[23] Kaplan, *The Wizards of Armageddon*; Fred M. Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War* (New York: Simon & Schuster, 2020).
[24] Campbell Craig and Sergey Radchenko, *The Atomic Bomb and the Origins of the Cold War* (New Haven: Yale University Press, 2008).
[25] Richard Rhodes, *Dark Sun: The Making of the Hydrogen Bomb*, Sloan Technology Series (New York: Simon & Schuster, 1995); Richard Rhodes, *The Making of the Atomic Bomb* (New York: Simon & Schuster, 1986).

Richard Ned Lebow and Janice Gross Stein in *We All Lost the Cold War*.[26] Their book is primarily a historical evaluation of the effectiveness of deterrence, and as with most other places where accidents are dealt with, it is in a more political, diplomatic context, mainly concerning crises.

Volumes have been written on the implications of nuclear weapons on geopolitics, of which *Arms and Influence* by Thomas Schelling and *The Meaning of the Nuclear Revolution* by Robert Jervis are the most notable.[27] Both these works are quite clearly works of political science and not history. However, they are also the most thorough (and widely read) theoretical contributions to international relations studies regarding nuclear weapons. Although their relevance to this thesis is minuscule, they are essential in understanding many of the concepts surrounding nuclear weapons in general, and thus this thesis too.

Disposition

This thesis is somewhat thematically organized. The second chapter will provide a broad overview of the development of the U.S. nuclear arsenal and its accompanying strategy. It begins in the early days of the US nuclear monopoly in 1945 and ends in 1972 when the nuclear arsenals, as well as the war plans, became both more sophisticated and more static. The third chapter delves deeper into the vulnerability problem, its relation to intercontinental ballistic missiles, and the development of those missiles. The main topic of chapter 3, however, is the launch on warning strategy. The fourth chapter investigates the false alarms in 1979 and 1980, the reaction to them, and evaluates the scholarly literature where they are described. The fourth chapter also contains the thesis' main argument, which consists of an interpretation of these false alarms, as well as the launch on warning strategy, in a broader historical context, drawing on perspectives outside of the general scholarly debate on nuclear weapons. Finally, the fifth and last chapter consists of a short summary.

[26] Lebow and Stein, *We All Lost the Cold War*.
[27] Thomas C. Schelling, *Arms and Influence* (New Haven, CT: Yale University Press, 2008); Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon*, Cornell Studies in Security Affairs (Ithaca: Cornell University Press, 1989).

Chapter 2 – The Evolution of American Nuclear Strategy

The Nuclear Revolution and Deterrence

On July 16, 1945, a bright flash in a remote Nevada desert marked the beginning of the nuclear revolution. The Manhattan Project had been kept highly secret since its inception, and one may wonder if its implications were truly realized by anyone until that date, or even after. The sentiment of the witnesses was perhaps most eloquently described by the scientific leader of the project, the father of the atomic bomb, Robert Oppenheimer:

> "We knew the world would not be the same. A few people laughed, a few people cried, most people were silent. I remembered the line from the Hindu scripture, the Bhagavad-Gita. Vishnu is trying to persuade the Prince that he should do his duty and to impress him takes on his multi-armed form and says, 'Now, I am become Death, the destroyer of worlds.' I suppose we all felt that way one way or another."[28]

Dr. Kenneth Bainbridge, the Director of the test, expressed something along the same lines, though in coarser fashion: "Now we're all sons of bitches."[29]

President Harry Truman, who had not been aware of the atom bomb until he took office a few months before its completion, was similarly concerned about its effects. Initially, he held off on building more bombs in case they were banned by the United Nations, but when it became clear that was not going to happen, he relented somewhat. Importantly, he kept the weapon under civilian control, explaining that:

> "I don't think we ought to use this thing unless we absolutely have to. It's a terrible thing to order the use of something that is so destructive, destructive beyond anything we've ever had. You have got to understand that this isn't a military weapon. It is used to wipe out women and children and unarmed people, and not for military uses. So we have got to treat this differently from rifles and cannon[s] and ordinary things like that."[30]

[28] Condé Nast, "'Now I Am Become Death, the Destroyer of Worlds'. The Story of Oppenheimer's Infamous Quote," *Wired UK*, accessed October 12, 2021, https://www.wired.co.uk/article/manhattan-project-robert-oppenheimer.
[29] Kenneth Bainbridge, «A Foul and Awesome Display," *Bulletin of the Atomic Scientists* 31, no. 5 (May 1975): 46.
[30] David Lilienthal, "Entry from Diary, 'Meeting with the President,'" July 21, 1948, The National Security Archive.

This last sentence touches on the essence of the nuclear revolution, as articulated by, for instance, Bernard Brodie, one of the founders of nuclear strategy.[31] Bernard Brodie was initially a naval strategist, having completed his Ph.D. at the University of Chicago in 1940, and worked at the Yale Institute of International Studies from 1945. Brodie quickly realized that nuclear weapons changed the entire concept of war, and thus he set out to understand what the nuclear bomb meant for international relations and warfare. In his best-known work, the seminal *The Absolute Weapon: Atomic Power and World Order* (1946), he articulated the core principle of the nuclear revolution: "Thus far the chief purpose of our military establishment has been to win wars. From now on its chief purpose must be to avert them. It can have almost no other useful purpose."[32] This argument was based on a few premises and assumptions of how nuclear weapons work. He essentially agreed with Truman's assessment that the bomb would be used against civilian targets. Since the bomb was so destructive, it would only make sense to use it against targets where the enemy's strength is concentrated, which were cities. Moreover, military forces are scattered and mobile, for which the atom bomb's destructiveness is much less useful. As he put it: "One does not shoot rabbits with elephant guns, especially if there are elephants available."[33] Secondly, beyond a certain point, more nuclear weapons yield diminishing returns. After all, the enemy has a limited number of larger cities, and "if 2000 bombs in the hands of either party is enough to destroy entirely the economy of the other, the fact that one side has 6000 and the other has 2000 will be of relatively small significance."[34] Furthermore, if both parties have the capacity to destroy the other, and neither have the ability to defend themselves against the other, there would be no incentive to strike first. As such, the only rational purpose of nuclear weapons would be to deter the other from using theirs.

The question of defense was dismissed rather quickly. Brodie had investigated Great Britain's attempt to defend London against Nazi Germany's V-1 rockets and found that on the most effective day, the British were able to shoot down 97 out of 101 rockets before they hit London.[35] This was indeed impressive, but he also recognized that if the four rockets that did not get shot down had been nuclear bombs, the survivors would not have considered themselves

[31] The term the nuclear revolution is most well known as part of the title of one of the most well known books on nuclear strategy, Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon*, Cornell Studies in Security Affairs (Ithaca and London: Cornell University Press, 1989).
[32] Bernard Brodie (ed.), *The Absolute Weapon* (New York: Harcourt Brace, 1946), 76
[33] Brodie, *The Absolute Weapon*, 36
[34] Ibid, 37
[35] Kaplan, *The Wizards of Armageddon*, 26.

lucky.[36] Defense against nuclear weapons had to be perfectly successful, and history offered few such examples. The number one concern for the United States, then, would be to ensure the ability to retaliate. This is what would later become known as second-strike capability and the essence of deterrence.

Targeting

As Brodie developed these arguments, however, much was still unknown about nuclear weapons, and specifically the requirements for building one. A major uncertainty was the available amount of uranium, which was already thought to be scarce. In the later part of the 1940s, rumors emerged that the supply was even scarcer than previously thought. If this was the case, Brodie asked himself, was the question of diminishing returns still relevant? The fundamental assumption was sound enough, but if instead of either party having thousands of bombs, what if they had hundreds, or tens? Would not a three-to-one superiority in nuclear bombs be significant then?[37] This brought up the question of targeting again. Brodie embarked on a study of the effects of strategic bombing during World War II and reconsidered his assumption that nuclear weapons would be used against cities.[38]

By this time, General Curtis LeMay had been appointed commanding general of the strategic air command (SAC). LeMay had been the commander of the US strategic bombing raids on Japan during the later parts of World War II, and his conception of warfare was profoundly shaped by his experiences of the war. This conception is neatly captured by his answer, and the reasoning behind, when asked by commander of the US air forces General Henry Arnold when the war would be over. He turned the question over to his staff and said to Arnold with his trademark confidence that the war would be over by September 1st. That was when his forces would run out of targets to bomb.[39] He was sharply critical of how the strategic bombing campaigns had been handled in Europe, and especially the focus on "precision bombing." Instead, he thought, the point of strategic bombing was to subject the enemy to a massive

[36] Kaplan, *The Wizards of Armageddon*, 26.
[37] Kaplan, *The Wizards of Armageddon*, 34.
[38] Kaplan, *The Wizards of Armageddon*, 38.
[39] Kaplan, *The Wizards of Armageddon*,, 43.

campaign of terror. Well aware of the ethical dilemmas presented by this strategy, he said, "I suppose if I had lost the war, I would have been tried as a war criminal."[40]

After a brief stint in Europe in the immediate post-war period, LeMay returned to the US to head SAC. What he found was an organization in disarray. In just two years, he transformed the organization into a well-trained, disciplined institution. This gave him great control of the bomb, and he was rather skeptical of the existing nuclear war plan, called "Delta-Bravo-Romeo." Delta referred to critical industries, "the *disruption* of the vital elements of the Soviets' war-making capacity," Bravo referred to "the *blunting* of Soviet capabilities to deliver an atomic offensive against the United States and its allies," and Romeo stood for "the *retardation* of Soviet advances into Western Eurasia."[41] In LeMay's mind, these phrases were comparable to vacuous slogans, so long as it remained unclear precisely which targets the plan called for hitting. Moreover, he echoed Brodie's point about the bomb being far too powerful for smaller targets.[42]

Instead, LeMay had a different vision, a vision in accordance with the principle he had deduced from his experiences from the war in the pacific. This plan, known as SAC Emergency War Plan 1-49, called for "deliver[ing] the entire stockpile of atomic bombs … in a single, massive attack."[43] This meant blasting seventy Soviet cities with 133 nuclear bombs over a thirty-day period. Brodie, who had reviewed both the "Delta-Bravo-Romeo" plan as well as the EWP 1-49, was unimpressed. While he shared LeMay's criticisms of the "Delta-Bravo-Romeo" plan, he also thought SACs war plan and the EWP 1-49 were less than well thought out. Brodie had criticized city-bombing as ineffective in an article in 1948, and the EWP 1-49 was calling for just that. To Brodie, the essential question was "'how many bombs will do what?' And the 'what' must be reckoned in over-all strategic results rather than merely in acres destroyed."[44]

[40] "Race for the Superbomb," Public Broadcasting Service, accessed October 14, 2020, https://www.pbs.org/wgbh/americanexperience/features/bomb-us-officials/
[41] Kaplan, *The Wizards of Armageddon*, 41–42.
[42] Kaplan, *The Wizards of Armageddon*, 43.
[43] Kaplan, *The Wizards of Armageddon*, 44.
[44] Bernard Brodie, "The Atom Bomb as Policy Maker," *Foreign Affairs*, October 1948

In an attempt to reply to his own question, he worked out an idea that would become central in US nuclear weapons policy in the subsequent decades. He figured that what had ended the war with Japan was *not* the two atomic bombs dropped on Hiroshima and Nagasaki, but rather the threat of more bombs unless they caved in.[45] Therefore, he suggested intentionally holding off on bombing cities, to hold them hostage, effectively using the remaining nuclear weapons as strategic leverage to end the war on terms favorable to the US.[46] If Soviet cities were blown up at the outset of a war, so too would the bargaining leverage the US had, and the Soviets would have no reason not to blow up American cities. This idea, if accepted, would have important implications for policy. First and foremost among these was the increased emphasis on the need for a survivable nuclear force. The idea of holding Soviet cities hostage would be very risky if the Soviets had a legitimate shot at destroying US nuclear weapons before they were launched. Secondly, it meant that deterrence did not necessarily cease to exist once war had broken out. Even if nuclear weapons failed to deter Soviet aggression, they might still deter the Soviets from attacking US cities. Lastly, this underscored the importance of carefully selecting targets based on a thorough analysis of overall war aims.[47]

LeMay and the Pentagon, however, viewed these ideas with disdain. To them, the idea that the next war would not be total, and that total war itself was something to be avoided and not won, belonged in the realm of dreams.[48] Secondly, the thought a civilian like Brodie had no business reading the war plans, much less criticizing them. Brodie did not remain at the Pentagon for long. In May 1951, his stay there came to an abrupt ending, but Brodie would continue to work on nuclear issues.[49]

The Hydrogen Bomb

Still reluctant to get back to academia, Brodie was recruited by the RAND Corporation, a nominally independent think tank that worked on (and continues to work on) defense issues.[50] This think tank would become central in US nuclear strategy, and its breakthrough came as the

[45] Kaplan, *The Wizards of Armageddon*, 47.
[46] Kaplan, *The Wizards of Armageddon*, 47.
[47] Kaplan, *The Wizards of Armageddon*, 46–47.
[48] Kaplan, *The Wizards of Armageddon*, 48.
[49] Kaplan, *The Wizards of Armageddon*, 48–49.
[50] Kaplan, *The Wizards of Armageddon*, 50.

hydrogen bomb was being considered. Unlike the atom bomb, developing a hydrogen bomb was a controversial question within the circles that were aware of its potential. For one thing, they were massively more powerful than regular nuclear bombs. Whereas an atom bomb's destructive power was – and still is - measured in kilotons, hydrogen bombs' were frequently measured in megatons.[51] RAND initiated a highly secret study on the implications of developing thermonuclear weapons (hydrogen bombs), which was to be completed when Los Alamos (the laboratory which developed the nuclear weapons) announced the H-bomb's feasibility to the presidential administration. RAND, which had gone on somewhat of a limb by creating social sciences and economics divisions, cashed in on its bet with interest. Almost everyone with the necessary security clearance wanted to hear the briefings offered by RAND, and RAND played a major role in the decision to go forward with the hydrogen bomb.[52]

The most prominent opponent of the hydrogen bomb was none other than "the father of the atom bomb," Dr. J. Robert Oppenheimer. He felt that the hydrogen bomb was way too powerful than any conceivable target could justify, and moreover, that it was immoral to drop such weapons on cities.[53] Still, the decision to produce hydrogen bombs was made, justified to a large extent by an argument that spurred the development of the atomic bomb: if we can build a hydrogen bomb, then so can the Soviets, and we better do it first lest they use it on us. On November 1st, 1952, the United States exploded the first thermonuclear bomb. Given the codename Ivy Mike, it released the equivalent of 10,4 million tons of TNT, almost 700 times more than the bomb dropped on Hiroshima. The USSR, too, would build and test thermonuclear weapons a few months later.[54]

Massive Retaliation

Three days after the Ivy Mike test, Republican Dwight D. Eisenhower was elected president in a landslide. When discussing security strategy, relying a lot more on nuclear weapons was a tempting choice for several reasons. For one, Eisenhower and the Pentagon believed the USSR had a massive conventional advantage in Europe. That conventional advantage, Eisenhower

[51] 1 kiloton equals 1 thousand tons of TNT. 1 megaton equals 1 million tons of TNT.
[52] Kaplan, *The Wizards of Armageddon*, 82–83.
[53] Kaplan, *The Wizards of Armageddon*, 83–84.
[54] Rhodes, *Dark Sun*, 524.

believed, could only be offset by a powerful nuclear arsenal. Secondly, Eisenhower was concerned about the economy. The "great equation," as he called it, was how to protect the nation without going bankrupt in the process.[55] Confronted with a massively superior Soviet army in Europe, a war in Korea, and the "loss of China to the communists," nuclear weapons seemed to offer a comparatively cheap and certainly powerful response.[56]

Thus, the strategy of massive retaliation was implemented. This plan was not entirely uncontroversial in some of the branches of the armed services. The Navy and the Army argued that they should at least try to hold back advancing communist forces with conventional means at the beginning of a conflict. This view reflected not so much a reluctance to nuclear weapons *per se*, but rather a competition between the branches for budgetary grants.[57] On the other side was the Air Force, with LeMay as the figurehead. Despite this strategy, which called for using nuclear weapons at the outset of a war, Eisenhower was not eager to drop nukes. He realized the destruction a nuclear war would cause, and when briefed on the consequences of a nuclear war, he was disturbed. Still, he concluded, the only way to keep that from happening would be to have a mighty deterrent.[58]

By this point, the arms race was taking on a self-sustaining form. As the increased number of bombs in the US arsenal allowed for a wider range of targets, so did the wider range of targets require more bombs. Furthermore, exaggerated estimates of Soviet nuclear forces and paranoia about Soviet intentions led to most weapon programs being passed without much debate. On October 4, 1957, the USSR launched *Sputnik*, the world's first artificial satellite. American nuclear strategists – and many others - were shocked.[59] They thought that if the USSR were able to launch a satellite on a rocket, they would also be able to launch a rocket with a nuclear warhead. Soviet missile tests only aggravated the concern. The intelligence estimates, which were widely inaccurate when they claimed there was a missile gap in the Soviet's favor, also assumed that a Soviet attack would seek to wipe out the US retaliatory capability.[60] The

[55] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 1.
[56] Kaplan, *The Wizards of Armageddon*, 176.
[57] Kaplan, *The Wizards of Armageddon*, 182–83.
[58] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 1.
[59] Mari K. Eder, "A 'Sputnik Crisis' for Today | RealClearPolicy," January 27, 2020, https://www.realclearpolicy.com/articles/2020/02/27/a_sputnik_crisis_for_today_485348.html.
[60] Kaplan, *The Wizards of Armageddon*, 109.

underlying assumption was that the USSR was an aggressive, expansionist state, that would seize any opportunity to attack the United States if it could avoid retaliation.[61]

Counterforce and crisis

When John F. Kennedy took office in 1961, an alternative to massive retaliation was again seriously entertained. This strategy, the counterforce strategy as it was called, was essentially the same as what Brodie had suggested years earlier: holding off on bombing cities, in the hopes that the enemy will yield before it becomes necessary. A problem with the massive retaliation strategy was its inflexibility. Robert McNamara, the Defense Secretary under President Kennedy, thought that it might not seem credible that the US would launch an all-out nuclear attack on the Soviet Union in response to the slightest Soviet incursion. Therefore, a more limited option was deemed more credible, and thus more deterring.[62] Nevertheless, there were a few problems with this idea. First, there was the risk that the Soviet Union was not going to play this game of nuclear volleyball, but instead retaliate with a massive attack in response to a limited US attack.[63] Still, McNamara thought, even if it would be hard to contain a nuclear war, it did not mean it was not worth trying.[64]

That question would become urgently relevant in October 1962. On October 16, 1962, President Kennedy was notified of what appeared to be Soviet ballistic missile launchers on Cuba, a mere 90 miles from the U.S. mainland.[65] The finding sparked the Cuban missile crisis, which is likely the closest humanity has ever come to nuclear war. Kennedy was in a tough position. He gathered a committee known as the ExComm, or the Executive Committee, which consisted of his closest advisors, military advisors, and cabinet members.[66] LeMay, unsurprisingly, argued that Kennedy should bomb the missile sites before invading the island.[67] Kennedy, who had come to doubt his military advisors after their repeatedly hawkish advice on international affairs, was immediately skeptical of LeMay's suggestion. He recalled the

[61] Kaplan, *The Wizards of Armageddon*, 108.
[62] Kaplan, *The Wizards of Armageddon*, 191–92.
[63] Kaplan, *The Wizards of Armageddon*, 274.
[64] Kaplan, *The Wizards of Armageddon*, 262.
[65] Lebow and Stein, *We All Lost the Cold War*, 111.
[66] William Burr and David Alan Rosenberg, "Nuclear Competition in an Era of Stalemate, 1963-1975," in *The Cambridge History of the Cold War*, ed. Melvyn P. Leffler and Odd Arne Westad, vol. 2 (Cambridge: Cambridge university press, 2010), 71.
[67] Lebow and Stein, *We All Lost the Cold War*, 295.

humiliating failed invasion of Cuba a year prior, the Bay of Pigs invasion, a repetition of which certainly did not entice him. More importantly, he feared what the possible consequences of such an attack would be. Kennedy, cold warrior though he was, had no wish to start a nuclear war, and this was the case during the missile crisis too.[68] He did, however, recognize that deterrence was a complex issue, and was open to the idea that the best way of preventing a nuclear war was to threaten one. When he announced the missile sites on national television on October 22, that is exactly what he did. Any missile attack from Cuba on US forces or her allies would result in a full retaliation, Kennedy proclaimed.[69]

What neither Kennedy nor anyone else in the US knew at the time, was that the Soviet Union had already deployed some missiles at Cuba. There were several factors resulting in that deployment. Cuba, for their part, felt threatened by the U.S. As mentioned, the US had tried to topple Castro the year prior, and Castro thought Soviet missiles would deter the US from attacking again. The Soviet Union, on their part, deployed the missiles in Cuba as a response to US missiles deployed in Turkey and Italy. The crisis reached its highest point on October 27, 1962, on what was later called "Black Saturday."[70] On that day, an American U-2 surveillance aircraft was shot down over Cuba. As Kennedy observed, "[t]his is much of an escalation by them, isn't it?"[71] The same day, a Soviet nuclear-armed submarine was trailing around the blockade line. The submarine commanders had been authorized to launch nuclear weapons if they were unable to contact Moscow and believed that a nuclear war had started. A U.S. Navy destroyer detected the submarine and started dropping depth charges, small bombs the size of hand grenades, to make the Soviet submarine surface. Unable to contact Moscow, the two commanders on the submarine agreed to a nuclear strike. Fortunately, Vasili Arkhipov, the commander of the larger flotilla, was also on board. Therefore, this particular submarine required the approval of Arkhipov as well, instead of just the two generals. Arkhipov disagreed, an argument broke out, and Arkhipov prevailed, thus narrowly avoiding nuclear war.[72] The crisis came to an end the same day after Kennedy and Khruschev agreed to a compromise: the

[68] Burr and Rosenberg, "Nuclear Competition in an Era of Stalemate, 1963-1975," 81.
[69] Burr and Rosenberg, "Nuclear Competition in an Era of Stalemate, 1963-1975," 75.
[70] Burr and Rosenberg, "Nuclear Competition in an Era of Stalemate, 1963-1975," 79.
[71] Burr and Rosenberg, "Nuclear Competition in an Era of Stalemate, 1963-1975," 80.
[72] Edward Wilson, "Thank You Vasili Arkhipov, the Man Who Stopped Nuclear War," *The Guardian*, October 27, 2012, sec. Opinion, https://www.theguardian.com/commentisfree/2012/oct/27/vasili-arkhipov-stopped-nuclear-war.

U.S. would remove its missile from Turkey, and the USSR would remove its missiles from Cuba.[73]

Intercontinental ballistic missiles and détente

A little more than a year after the missile crisis, on November 22, Kennedy was assassinated. Later in 1963, McNamara found himself embroiled in the by now familiar effort to keep the Joint Chiefs of Staff's appetite for additional weapons at bay. McNamara thought the JCS' wish for increased warfighting capabilities was militarily unwise and a waste of money. He found justification for his view in a study by General Glenn Kent, who was working as an assistant to Harold Brown, McNamara's director of research and engineering, and future Secretary of Defense under Carter. The study looked at various measures the US could implement to protect itself in the event of a nuclear war, including anti-ballistic missile systems (ABM), fallout shelters, and counterforce weapons. The study found that this was a surefire way of bankrupting America with only marginal security assurances. For every dollar the Soviet Union spent on offense, the United States would have to spend three dollars on defense. That study, together with previous studies which had shown that even a successful first strike would result in at least 50 million American fatalities, McNamara used to justify keeping the number of ICBMs much lower than what the JCS wanted.[74] The JCS were furious. McNamara argued along the lines of an "assured destruction" or "countervalue" type of rationale. The "assured destruction" or "countervalue" strategies called for having a secure second-strike force, so that no matter how powerful an enemy attack was, they would receive a devastating retaliation in return.[75] In reality, the weapons were primarily aimed at military facilities. In effect, what McNamara was doing, was arguing in favor of keeping the Minuteman program capped at 1000 missiles, justified by the "assured destruction" doctrine, when he knew that the SIOP was more of a counterforce plan. That counterforce plan, the SIOP, the JCS felt, required plenty more nuclear weapons than what McNamara was arguing. They saw this as nothing less than sabotage and duly fought back.[76]

[73] Burr and Rosenberg, "Nuclear Competition in an Era of Stalemate, 1963-1975," 82–83.
[74] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 4.
[75] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 4.
[76] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 4.

Their workaround of McNamara's missile cap was called MIRV, or Multiple Independently targetable Reentry Vehicles. Most American missiles, and all of the land-based ones, carried a single nuclear warhead, a single nuclear bomb. Because these missiles were quite inaccurate for a long time, the warhead was usually quite powerful. MIRV, by contrast, meant equipping each missile with several warheads that could each be directed at separate targets.[77] This was much more effective against certain types of targets, military bases in rugged terrain, for example. Against those types of targets, a single nuclear bomb might devastate one part of the target while leaving another entirely intact. MIRV solved this problem. MIRV was also good against ABM systems. Missile defenses might conceivably stop a single warhead, although even that was highly doubted by most everyone. Against MIRVs, even a comprehensive ABM system would be all but useless.[78] Although McNamara was against the idea, he relented. By this point, in mid-1964, McNamara was more occupied with the escalating Vietnam war and figured that if MIRVs would make the JCS accept the cap on a thousand Minuteman missiles, so be it. The end result, however, would be almost exactly the increase in the number of nuclear weapons McNamara wanted to avoid.[79]

When Richard Nixon took office in 1969, he found the SIOP more or less unaltered since McNamara's minuscule changes in 1962.[80] The only significant difference was the size of the nuclear arsenals of the two superpowers, which had grown steadily. Therefore, naturally, the expected damage in a general nuclear war was also significantly greater. Both Nixon and Kissinger, his national security adviser, were left shaken by the SIOP. Even though it contained three main options, the most modest one called for firing over a thousand nuclear weapons at Soviet military installations. That would certainly not be perceived by the Soviets as a limited strike.[81] Nuclear strategy nonetheless took a backseat to the Vietnam war, which both Kissinger and Nixon felt was more urgent. In a weird twist, however, Nixon would exploit nuclear weapons in a unique way. Nixon called it the "madman theory," and its purpose was to make the North Vietnamese believe that he might do anything, including using nuclear weapons, to end the war. "In two days," Nixon said, the Ho Chi Minh and North Vietnam would come

[77] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 4.
[78] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 4.
[79] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 4.
[80] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 5.
[81] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 5.

"begging for peace."[82] By all accounts, the North Vietnamese called the bluff, and Nixon ended the experiment in October 1969.[83] The madman theory was a bluff, but Nixon seriously considered using nuclear weapons in Vietnam. In a recorded conversation with Henry Kissinger, he said he considered using the nuclear bomb, and when Kissinger resisted, Nixon yelled, "I just want you to think big, Henry, for Christ's sakes!"[84]

Despite Nixon's reckless attitude towards nuclear weapons, his achievements in arms control were significant.[85] Two, in particular, stood out. The first was a so-called "Interim Agreement," which temporarily froze the number of ICBM to current levels.[86] The by far most significant, however, was the 1972 Anti-Ballistic Missile treaty that limited the number of anti-ballistic missiles (ABM) the Soviet Union and the U.S. were allowed to deploy.[87] This treaty was widely credited to have prevented an arms race in this field of nuclear weapons for the 30 years it lasted.[88] Both treaties were parts of a larger set of negotiations called the Strategic Arms Limitation Talks (SALT I) that also resulted in the signing of an interim agreement, freezing the number of ICBMs to each party.[89]

While these treaties constituted an important part of détente, nuclear strategy was still being formulated according to conservative schools of thought. As détente came under increasing pressure, so too would the pressure increase on the more dovish nuclear strategists. By then, the U.S. and the Soviet Union had reached parity in the realm of nuclear weapons. One result of this was an obscure strategy known as launch on warning, which is the subject of the next chapter.

[82] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 5.
[83] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 6.
[84] Audio recording of conversation, April 25, 1972, http://www.aparchive.com/metadata/youtube/30521e6b002bb207229898cf069e0c91.
[85] Burr and Rosenberg, "Nuclear Competition in an Era of Stalemate, 1963-1975," 107–10.
[86] Burr and Rosenberg, "Nuclear Competition in an Era of Stalemate, 1963-1975," 108.
[87] Raymond L. Garthoff, *Détente and Confrontation: American-Soviet Relations from Nixon to Reagan* (Washington, D.C: Brookings Institution, 1985), 426.
[88] Burr and Rosenberg, "Nuclear Competition in an Era of Stalemate, 1963-1975," 108.
[89] Burr and Rosenberg, "Nuclear Competition in an Era of Stalemate, 1963-1975," 108.

Chapter 3 – Midnight Express

In the early 1950s, as the Cold War was becoming ever tenser and the period of atomic scarcity was over, a new set of issues occupied nuclear strategists' minds in the United States. As awesome as the first atomic bombs were, which were pure fission weapons, they would dwindle compared to the "super," the thermonuclear weapons, which were hundreds of times more powerful.[90] This revolution's implications formed the new line of strategic thinking, in which the concept of vulnerability took center stage. This coincided with and created a justification for the massive arms race between the United States and the Soviet Union that began in these years. Soon, the ever more powerful nuclear weapons would be carried by ever more efficient delivery vehicles, culminating in the development and deployment of long-range missiles capable of attacking places thousands of kilometers away in less than an hour. This, in turn, presented nuclear strategists and policymakers with difficult doctrinal problems. This chapter intends to demonstrate how the development of intercontinental ballistic missiles contributed to the formulation of a launch-on-warning strategy, and investigate whether this strategy was in fact adopted, and what may explain how this came to be.

Vulnerability

After Bernard Brodie had figured that nuclear weapons would be used against cities and that beyond a certain point, more nuclear weapons did not enhance deterrence, an alternative line of thinking was taking shape. This new line of thought had at its core the problem of vulnerability. While nearly everyone accepted Brodie's conclusion that defending cities against nuclear attacks was unfeasible, the question of protecting the nuclear weapons themselves had been given little attention. This stemmed partly from one of the assumptions in Brodie's argument: since nuclear weapons were so powerful and since the material needed to build them was scarce, using them against military targets would be terribly inefficient. Thus, the argument went, they would only be useful against large targets such as cities. Nevertheless, beginning in early 1950, military strategists and analysts started to pay more attention to the problem of how vulnerable nuclear weapons were to attack. This was particularly the case at the RAND Corporation (Research and Development), which was the think-tank most intimately involved

[90] Rhodes, *Dark Sun*, 117.

in shaping U.S. nuclear strategy. Over time, this concept became a cornerstone in U.S. strategic thinking, both at RAND and elsewhere.

One of the first times this problem was raised was in early 1950 by the Weapons Systems Evaluation Group (WSEG). The Weapons Systems Evaluation Group was a group formed by Secretary of Defense James V. Forrestal in December 1948.[91] Its purpose was continually subject to change, but when founded, it was to analyze and evaluate both present and future weapons systems.[92] In their very first report to the JCS, they wrote that U.S. overseas airbases in England were vulnerable to a surprise attack and that they might be "'Pearl Harbored' at the outset of future hostilities."[93] In responding to the report, the Joint Intelligence Committee added their support to that claim. Still, the problem of vulnerability did not arouse much concern within the military, which was much more preoccupied with being on the offense.[94]

At RAND, meanwhile, a scientist named Albert Wohlstetter stumbled onto the same issue. He was initially tasked with conducting a study of the use of overseas airbases, which he conceived of as a task in attack planning. As he was working on the study, however, he became preoccupied with the vulnerability problem. While the United States preferred to have bases at locations from which they could strike the Soviet Union relatively quickly, Wohlstetter realized that this also meant that the Soviet Union would be able to strike at those bases equally fast. From that realization, he delved into an arduous process of calculating the number of U.S. forces vulnerable to a Soviet nuclear strike at given airbases. The result was a massive report completed in 1954, which concluded that with just 120 nuclear bombs, each with an explosive force of 40 kilotons, the Soviet Union could destroy 75 to 85 percent of the U.S. medium-bomber force.[95]

Wohlstetter started presenting the study as early as January 1953. His findings caused somewhat of an uproar. Apparently, the Strategic Air Command staffers had never even considered the matter. They assumed that they would have enough warning time for the planes

[91] "Analytical Support for the Joint Chiefs of Staff: The WSEG Experience, 1948-1976," n.d., xii.
[92] "Analytical Support for the Joint Chiefs of Staff: The WSEG Experience, 1948-1976," xii.
[93] Fred Kaplan, *The Wizards of Armageddon* (Stanford, California: Stanford University Press, 1991), 93
[94] Kaplan, *The Wizards of Armageddon*, 93.
[95] Albert James Wohlstetter, "Selection and Use of Strategic Air Bases" (Santa Monica, California: RAND Corporation, April 1954), xxiii.

to take off the ground, which is somewhat bemusing given the surprise attack on Pearl Harbor just 12 years prior.[96]

The report recommended several remedies. One of these was to improve radars and warning systems, which would have reduced the number from 75-85% down to less than 20%.[97] Another was to use overseas airbases only for refueling.[98] A third recommendation was sheltering the bombers so they would be less vulnerable to attack.[99] Many were impressed, others less so. Commander of the Strategic Air Command (SAC), General Curtis LeMay, was one of the biggest skeptics. This was partly a matter of LeMay's peculiar personality. He had a penchant for distrust, primarily, but not exclusively, towards foreigners. By some accounts, he often said that "on some Mondays, I don't even trust myself."[100] LeMay also disliked taking orders. Although SAC was a command of the Air Force, it took orders only from the Joint Chiefs of Staff. The idea that a logician from RAND should dictate SAC policy, therefore, seemed ludicrous to him. If that were to happen, LeMay feared, SAC's relative independence might be threatened.[101] Reluctant to spend time and money protecting the aircraft, LeMay instead preferred more bombers so that the number surviving would be higher. That was in stark contrast to the report's recommendation that the U.S. spend less on bombers and more on defensive measures.[102] He also preferred an intercontinental bomber force that would not rely on foreign bases at all.[103] More importantly, as would become evident during the Cuban Missile Crisis, he thought the study underscored the importance of getting in the first blow.[104]

Despite the skepticism towards the report, it was convincing enough to make the Air Staff appoint an ad-hoc committee to study the report independently before it could make changes in policy.[105] Several of its conclusions were implemented even before the study's release (he had given 92 briefings of the study before the release to top officials at SAC and the White

[96] Kaplan, *The Wizards of Armageddon*, 103.
[97] Wohlstetter, "Selection and Use of Strategic Air Bases," xxiii.
[98] Wohlstetter, "Selection and Use of Strategic Air Bases," xxxv–xxxvii.
[99] Wohlstetter, "Selection and Use of Strategic Air Bases," xxix.
[100] Kaplan, *The Wizards of Armageddon*, 104
[101] Kaplan, *The Wizards of Armageddon*, 104-106
[102] Wohlstetter, "Selection and Use of Strategic Air Bases," xvi.
[103] Kaplan, *The Wizards of Armageddon*, 106.
[104] Kaplan, *The Wizards of Armageddon* 104.
[105] Kaplan, *The Wizards of Armageddon*, 103.

House).[106] There were, however, some problems. For one, nuclear bombs were becoming more powerful. The hydrogen bomb, which the U.S. first exploded on November 1, 1952, exploded with a yield of 10,4 megatons.[107] That was several hundred times more powerful than the bombs dropped on Hiroshima and Nagasaki.[108] Such powerful bombs threatened to make even the hardening measures irrelevant. Simply put, a shelter equipped to protect against a 100-kiloton weapon would not be capable of protecting against a weapon in the megaton range. Moreover, as LeMay wanted, the intercontinental B-52 bomber was soon to be ready. That would not require foreign bases at all. The influence of Wohlstetter's study can nevertheless hardly be overstated. The vulnerability study's most important legacy was not primarily the reduced dependence on foreign airbases. More important was that the concept of vulnerability was now starting to take center stage in strategists' minds. When the Ad Hoc Committee appointed by the Air Staff presented its analysis of Wohlstetter's report, it recommended, among other things, "[t]hat the vulnerability of Air Force facilities be recognized in all Air Staff planning and actions."[109] And while the original intention of Wohlstetter's recommendations was to protect the U.S. nuclear weapons, the shift in thinking also resulted in a change in offensive strategies. Brodie's assumption that nuclear weapons would be used against cities was undermined and replaced with a nuclear warfighting assumption.

Moreover, many perceived Wohlstetter's study as a confirmation of the notion that the Soviet Union would strike at the U.S. as soon as they perceived it to their advantage to do so. The fact that the U.S. would be able to retaliate with about 600 bombs, even after absorbing a first strike, and the question of whether that would deter the Soviets from striking in the first place, was not considered.[110] In this sense, the study underlined the thinking that drove the arms race from the 1950s to the 1970s, as well as the one in the 1980s. [111] And while the study did not consider the development of Intercontinental Ballistic Missiles (ICBM), it turned out that its methodology and focus fitted very well onto the new weapons complexes that were under development.

[106] Kaplan, *The Wizards of Armageddon*, 104.
[107] 1 megaton equals 1 million tons of TNT
[108] The bombs dropped over Hiroshima and Nagasaki were estimated to have a yield of about 15 and 21 kilotons respectively.
[109] Kaplan, *The Wizards of Armageddon*, 105.
[110] Kaplan, *The Wizards of Armageddon*, 109–10.
[111] Kaplan, *The Wizards of Armageddon*, 109-110

Thermonuclear bombs and intercontinental missiles

On November 4, Dwight David Eisenhower was elected president of the United States (1953-1961). One of his main concerns was the reduction of federal deficits, and therefore, shortly after taking office, a careful review of the government structure was conducted. All programs, including military, were subjected to scrutiny. One part of this effort was directing the Air Force to review the missile systems currently under development. Trevor Gardner, Assistant Secretary of the U.S. Air Force for Research and Development, was appointed to the task. The review he was ordered to undertake had as its purpose to eliminate duplication (i.e., map out and bring together parallel development programs), pursue promising technologies, and standardize production.[112] To accomplish this task, in October 1953, he formed the Strategic Missile Evaluation Committee, codenamed the Teapot Committee, to consider the feasibility of an intercontinental ballistic missile (ICBM). The chairman of the committee was the prominent mathematician John von Neumann. Other members included were Dean Wooldridge, who would become one of the ICBM program's systems engineers, and Brigadier General Bernard Schriever, the program's future director and later known as the "father of the ICBM."[113]

Up until that point, the ICBM program had been progressing slowly. The ballistic missile program MX-774, later named Atlas, had been put on hold in 1949 due to budgetary constraints, and though it was reinitiated in 1951, it was given low priority.[114] The technical obstacles were cumbersome, especially the weight and accuracy requirements. It was not just the teapot committee that worked on the ICBM. At RAND, a rocket scientist named Bruno Augenstein was engaged with the same issue. What Augenstein and the committee soon discovered, however, was that these requirements were unnecessarily strict. The warhead, which was initially required to weigh around 1350 kilos, could be reduced to a mere 680 kilos without any loss in explosive yield. That meant that the missile's weight also could be cut in half, from about 200 000 kilos to about 110 000 kilos. Moreover, and perhaps most significantly, the hydrogen bomb's increased explosive power meant that an ICBM could be

[112] Jacob Neufeld, *The Development of Ballistic Missiles in the USAF 1945-1960* (Washington D.C.: Office of Air Force History, United States Air Force), 93
[113] Neufeld, *The Development of Ballistic Missiles in the USAF*, 93.
[114] Kaplan, *The Wizards of Armageddon*, 111

substantially less accurate than Convair had first thought.[115] As a result, the Teapot Committee recommended that the Atlas be put on a crash program, estimating that the earliest units could be ready for use by June 1958.[116]

When the Soviet Union launched Sputnik 1, the first artificial satellite, in 1957, it caused a crisis in the United States.[117] The launch came seemingly out of nowhere; few had seriously entertained the idea that the Soviet Union might be ahead of the United States in technological development. By itself, the satellite posed no threat. What caused the panic in the United States was instead the implications the launch had for nuclear missiles.[118] The Soviet Union used ICBM technology to launch Sputnik, thus "proving" their capability of striking the U.S. Edward Teller, frequently called the father of the hydrogen bomb, said that Sputnik was "a greater defeat for our country than Pearl Harbor."[119] Senator Mike Mansfield was no less dramatic, claiming that "what is at stake is nothing less than our survival."[120] This capability, and the perceived discrepancy in missile technology and deployment, labeled the "missile gap," became a significant issue in the following years.[121] Sputnik, however, was not the only driver of the missile gap controversy. According to the National Intelligence Estimates of 1957 and 1958, the Soviet Union would have the capacity to deploy 500 ICBMs in late 1962, maybe even sooner.[122] While these estimates were not publicly available at the time, similar or more pessimistic figures frequently appeared in the media.[123]

Although President Eisenhower often denied the claims of the missile gap, the frenzy went on. Democratic presidential candidate John F. Kennedy frequently criticized the Eisenhower administration for supposedly having let the USSR get ahead in missile development and deployment, saying that: "[W]e are facing a gap on which we are gambling with our

[115] Neufeld, *The Development of Ballistic Missiles in the USAF*, 98
[116] Neufeld, *The Development of Ballistic Missiles in the USAF*, 105
[117] ROBERT D. LAPIDUS, "SPUTNIK AND ITS REPERCUSSIONS: A HISTORICAL CATALYST," *Aerospace Historian* 17, no. 2/3 (1970): 89.
[118] Kaplan, *The Wizards of Armageddon*, 135
[119] Mari K. Eder, "A 'Sputnik Crisis' for Today." *RealClearPolicy*. February 27, 2020, https://www.realclearpolicy.com/articles/2020/02/27/a_sputnik_crisis_for_today_485348.html.
[120] Eder, "A 'Sputnik Crisis' for Today | RealClearPolicy."
[121] Christopher A. Preble, "'Who Ever Believed in the "Missile Gap"?': John F. Kennedy and the Politics of National Security," *Presidential Studies Quarterly* 33, no. 4 (2003): 803.
[122] Preble, "'Who Ever Believed in the "Missile Gap"?'," 804.
[123] Preble, "'Who Ever Believed in the "Missile Gap"?'," 810.

survival."[124] In fact, the claims of Soviet superiority in the missile realm were vastly exaggerated.[125] There was a missile gap, but it was in the United States' favor.[126] Kennedy was elected president in 1960, and in 1961, when he had taken office, the Department of Defense, headed by the newly appointed Robert McNamara, decided to acquire 1000 Minuteman ICBMs. While the Atlas ICBMs had been deployed as early as December 1959, it was in 1962 that the missile deployment really took off. The Titan I ICBM was deployed in April 1960, and the first Minuteman I ICBMs were deployed in October 1962, at the height of the Cuban Missile Crisis.[127]

Wohlstetter's vulnerability study had shifted the focus of strategic thinking from attack and initiative to vulnerability, and the development of ICBMs fitted this shift in a peculiar way. Several measures to reduce vulnerability were discussed, and some implemented, as the ICBMs were being deployed. This included, among other things, placing missiles in concrete siloes to protect them from attack and increased reliance on submarine-launched ballistic missiles (SLBM). This coincided with John Fitzgerald Kennedy assuming the presidency (1961-63) and Robert Strange McNamara becoming the Secretary of Defense (1961-68). They brought with them a change in nuclear doctrine, whose main component was an option to hold off on bombing cities. The goal behind this new doctrine, which became known as "flexible response," was to target military goals and hold cities "hostage," which would ideally offer an opportunity to negotiate an end to a nuclear war before cities were bombed. This new strategy was also given the appellation "counterforce/no cities" and demonstrates clearly how the concept of nuclear war had gone from being an enormous, pyrrhic bombardment of cities, to a nuclear battlefield where one side could prevail relatively unscathed. However, as described in chapter 2, McNamara harbored serious doubts that such a strategy would work.

[124] John Fitzgerald Kennedy, "An Investment for Peace," (Speech, U.S. Senate Floor, February 29, 1960).
[125] Greg Thielmann, "LOOKING BACK: The Missile Gap Myth And Its Progeny," *Arms Control Today* 41, no. 4 (2011): 44–48.
[126] Thielmann, "LOOKING BACK," 44-48
[127] John C. Lonnquest and David F. Winkler, "To Defend and Deter: The Legacy of the United States Cold War Missile Program," USACERL Special Report (U.S. Army Construction Engineering Research Laboratories (USACERL), November 1996), 77, 445.

Launch on warning during the Eisenhower, Kennedy, and Johnson administrations

Assuming that the Soviet Union would also try to destroy military targets, that is, American nuclear weapons before cities, the question of how to retain the capability to retaliate became pertinent. There were, in essence, three options: First, preemption, or striking first, which was LeMay's clear preference. Second, what became known as retaliation after ride-out. This meant absorbing a first strike from the Soviet Union and then retaliating with the weapons that were still usable. A large portion of the weapons would presumably have been destroyed in the Soviet first strike. Third, launch-on-warning, or launch-under-attack. This was certainly the most time-sensitive option and would have meant that the American intercontinental ballistic missiles would have been launched after warning of a Soviet attack but before the Soviet missiles actually hit. Ideally, this would cause the Soviet missiles to hit empty siloes.[128]

The first discussion on this strategy was on June 3, 1959, in a meeting between Jerome B. Wiesner, James R. Killian, and President Eisenhower.[129] Wiesner had served as a member on the Teapot Committee, was a member of the President's Science Advisory Committee, and would end up being the future president of the Massachusetts Institute of Technology (MIT). Richard Killian was also the president at MIT, from 1948 to 1959, as well as chairman of the President's Science Advisory Committee. The subject for discussion was the anticipated development and deployment of Soviet ICBMs and how the U.S. should prepare for it. In a study carried out by the President's Science Advisory Committee, of which Wiesner was also a member, three subjects had been identified as especially important: ballistic missile warning systems, national response to warning, and defense against ballistic missile attack.[130] The study reiterated the futility of installing anti-ballistic missile defenses and instead suggested other means of overcoming the vulnerability problem. Most subsequent appraisals reached the same conclusion. Wiesner outlined a set of measures to reduce the vulnerability of U.S. nuclear forces, such as hardening, dispersal, or "as a *minimum*, to permit them to be launched prior to an attack, so that they are not destroyed on the ground."[131] Although the launch-on-warning option was less palatable to Wiesner, which referred to it simply as "rapid response to

[128] Blair, *The Logic of Accidental Nuclear War*, 170.
[129] Brigadier General A.J. Goodpaster, "Memorandum for Record," June 11, 1959, The National Security Archive.
[130] Goodpaster.
[131] Jerome Wiesner, "Warning and Defense in the Missile Age," June 3, 1959, 2, The National Security Archive.

warning," it does not seem to have been so because of the dangers of false alarms.[132] On the contrary, Wiesner was convinced that a "properly designed electronic warning system can detect any significant attack with sufficiently low probability of false alarm to be a most important component of our deterrent force."[133] It is unclear why Wiesner was so confident in a system that did not yet exist. He does refer to a proposed warning system using airborne heat sensors which would detect missiles during their boost phase, just after launch. Such a system would be "[p]ractically impossible to spoof" because of the difficulty of imitating the heat signals of a missile, but this was another system than that which was in development and in which he placed his confidence.[134] It is also unclear what Eisenhower thought of the issue.

Whatever Eisenhower may have thought of launch-on-warning, there seems to have been reluctance elsewhere in accepting this strategy. In July 1960, the topic of SAC vulnerability was on the agenda in the National Security Council. In a paper prepared for the discussion, the National Security Council's Planning Board noted that the warning systems in development would allow the bomber force to be launched on warning before they were destroyed on the ground. With ICBMs, however, that was highly inadvisable. There were two main reasons for this. First, ICBMs, as opposed to bombers, could neither be recalled nor disarmed after launch. Secondly, as opposed to Wiesner, the NSC Planning Board was skeptical that the early warning system in development would have an acceptably low probability of false warning. Thus, they found it "[q]uestionable whether U.S. response doctrine will permit the launch of 'irrecallable' ballistic missiles solely on the basis of information received from a warning system."[135] Instead, they emphasized that there were several "passive measures" that could be enacted to protect U.S. missile forces, including dispersal, mobility, hardening or sheltering, and concealment. Although they did highlight the need for early warning systems, the idea of a launch-on-warning strategy for ICBMs was dismissed as unfeasible. In the missile age, the warning time would become "severely limited," which was "inadequate to permit the decision to release aircraft and missiles to targets prior to the impact of enemy missiles on the United States."[136]

[132] Wiesner, 2.
[133] Wiesner, 3.
[134] Wiesner, 3–4.
[135] James S. Lay, Jr., "Discussion Paper on Continental Defense," Memorandum for the National Security Council, July 14, 1960, 6, The National Security Archive.
[136] Lay, Jr., 12.

This statement by itself may be interpreted as merely pointing out the practical issue of launch time. The NSC Planning Board did indeed point out that launching ICBMs would likely take more time than what the early warnings would allow for. That was certainly the case when they wrote the paper, when early warning systems were still being developed. Nevertheless, the decisive factor appears to have been the possibility of false alarms. The NSC Planning Board noted that "[i]t is, of course, essential that the United States avoids the possibility of irrecallable launching of strike forces based on the erroneous conclusion that an attack is under way."[137] And though it was not yet operational, they found it improbable that the Ballistic Missile Early Warning System (BMEWS), "[o]r any other warning system," would be reliable enough for launch on warning.[138] The solution, then, was twofold. First, they considered it of vital importance to install a bomb alarm system, which would detect nuclear explosions as they occurred. Then the President might be sure that they were actually under attack and launch the missiles which were not yet destroyed. Second, they had to make sure that the command system could survive the initial strike, so that retaliation could be ordered.[139] It is difficult to determine what the outcome of this discussion was. At the time it occurred, in July 1960, the BMEWS was still under development. A launch on warning strategy therefore could not have been adopted at this point, even if there had been unanimous support for it.

A year after, during Kennedy's first year in office, the U.S. may have acquired the ability to launch on warning. Crucially, the Ballistic Missile Early Warning System, which was developed in direct response to the launch of Sputnik, was now functional.[140] On October 5, John Cornelius Stennis - a Democratic senator from Mississippi who would later be involved in several nuclear weapons issues - asked Robert McNamara several questions regarding warning times and responses. McNamara gave a detailed response on November 3 and assured him that launch-on-warning was possible, writing that "15 minute warning time is sufficient to permit launch of all SAC alert aircraft and ATLAS E ICBM's and one third of the ATLAS D ICBM's."[141] These ICBMs, the ATLAS, were the first ICBMs deployed by the United States,

[137] Lay, Jr., 12.
[138] James S. Lay, Jr. 'Memorandum for the National Security Council', July 14, 1960
[139] Lay, Jr., "Discussion Paper on Continental Defense," July 14, 1960, 12.
[140] Lay, Jr., 12.
[141] Robert McNamara. Letter to Senator John Cornelius Stennis, November 3, 1961 https://nsarchive.gwu.edu/dc.html?doc=6144764-National-Security-Archive-Doc-05 p. 21

starting in 1959. They would serve for a relatively short time, soon being made redundant by the Minuteman missiles.

It may appear, however, that McNamara was reluctant to actually adopt the strategy. According to one account, he was furious when Schriever brought up the strategy to justify the Missile Defense Alarm System (MIDAS). He allegedly told Schriever that "as long as he was Secretary of Defense and Jack Kennedy was President, the United States would never launch on warning, even if that required a force of 10 000 Minuteman ICBMs."[142] McNamara would, in other words, rather ensure that parts of the U.S. ICBM force survive a first strike by massively expanding that ICBM force, than to launch on warning. If true, that is an as strong indication as can be that the launch on warning strategy was not adopted by the Kennedy administration. After all, this was during McNamara's conflict with SAC about the number of Minuteman missiles to be built, which McNamara wanted to cap at 1000.[143] It is, however, difficult to draw categorical conclusions based on this account. The account is given in *America's Space Sentinels* by Jeffrey Richelson and is based on a phone interview with Jack Ruina, who was director of Advanced Research Projects Agency (ARPA) in the Department of Defense when the conversation with McNamara and Schriever took place. Assuming that Richelson accurately recounts what Ruina said in the interview, one still has to account for the fact that the interview took place thirty years after the conversation.[144] Moreover, there are no other accounts on either Kennedy or McNamara's opinions on the strategy that could shed light on Richelson's account.

On October 26, at the height of the Cuban missile crisis, the first Minuteman I ICBMs were being deployed. Notifying President Kennedy of this achievement, Secretary of the Air Force Eugene M. Zuckert wrote that in one month, when the entire squadron was deployed, the Minuteman missiles could be launched in thirty seconds.[145] In fact, officers at the Malmstrom Air Force Base, Montana, where the Minuteman were deployed, went to great lengths to reduce the launch time from the start.[146] This was, of course, due to the ongoing missile crisis and the

[142] Jeffrey Richelson, *America's Space Sentinels: The History of the DSP and SBIRS Satellite Systems*, 2nd edition expanded, Modern War Studies (Lawrence, KS: University Press of Kansas, 2012), 256, n.37.
[143] See previous chapter for an account of this conflict
[144] Richelson, *America's Space Sentinels*, 256, n.37.
[145] Eugene M. Zuckert, Letter to President John F. Kennedy, October 26, 1962, The National Security Archive.
[146] Sagan, *The Limits of Safety*, 81.

DEFCON 2 order to SAC.[147] Since the Minuteman missiles had just been deployed, few of the officers were aware of the safety risks and proper procedures for raising the alert level to such a degree. Although the deployment was fraught with danger, a Minuteman launch on warning would have been unlikely at this time. The crews were inexperienced with the Minuteman, naturally, and technical communication issues would likely have precluded launch on warning.[148] Still, if there were doubts over the U.S. capability to launch on warning, these were becoming increasingly weak with the deployment of the Minuteman I ICBM.

The launch on warning strategy remained a subject of discussion later on in the 1960s. In a June 1967 Defense department debate on nuclear strategy, launch on warning briefly came up. Alain Enthoven, which was the Assistant Secretary of Defense for Systems Analysis, wrote a memo to Robert McNamara, summarizing the points brought up in the debate. The memo, which was to lay the basis for McNamara's further discussions on the subject with President Johnson, considered a host of issues. Of chief importance to Enthoven was an argument that the U.S. deterrent was not adequate. Unconvinced by this, Enthoven noted, there was the plethora of factors the Soviet Union ought to have worried about, such as "launch-on-warning tactics."[149] This does not, of course, entail that the launch on warning strategy would be used. That would be the president's decision. The way it is phrased, however, in passing among several other factors, suggests that the strategy was well ingrained in the upper echelons of the Department of Defense. This is also, incidentally, the first time the strategy is referred to as launch-on-warning in internal records, further suggesting that the strategy was making its way into the everyday parlance of U.S. nuclear strategy.[150]

The record, however, is contradictory. A 1969 internal study by the History & Research Division at the Strategic Air Command noted that a launch on warning strategy was politically

[147] Sagan, *The Limits of Safety*, 81. DEFCON stands for Defense readiness Condition, and prescribes the level of readiness of U.S. armed forces, with DEFCON 1 signifying that a nuclear war has broken out. DEFCON 2 is the second highest level of alert.
[148] Sagan, *The Limits of Safety*, 81–90.
[149] Alain Enthoven, "Recycle of DPM on Strategic Offensive and Defensive Forces," Memorandum for the Secretary of Defense, June 23, 1967, 2, The National Security Archive.
[150] Nuclear weapons strategists have long had a penchant for jargon, often strangely sexualized. See for instance Carol Cohn, "Sex and Death in the Rational World of Defense Intellectuals," *Signs: Journal of Women in Culture and Society* 12, no. 4 (July 1987): 687–718, https://doi.org/10.1086/494362.

unacceptable.[151] Although not elaborating specifically as to what made it "politically" unacceptable, the subsequent appraisal of the strategy suggests that it may have been due to concerns over reliability. According to the study, the development and deployment of more advanced early warning systems, which would grant both a longer time to determine whether an attack was underway, as well as a more "[s]treamlined national command authority procedures," and a "[m]inimal reaction posture" might make launch on warning feasible.[152] The second point, improving the command authority procedures, suggests that an erosion of the command and control structure, for instance, an unauthorized launch, was a concern too. However, given the principally approving attitude towards launch on warning, it is more probable that the study simply referred to a general improvement. By minimal reaction posture, the study presumably referred to a state of readiness whereby ICBMs could be launched at a moment's notice.

It is difficult to interpret the point on minimal reaction posture. On the one hand, Zuckert's letter to Kennedy, updating on the Minuteman deployment, suggests that such a capability was already in place.[153] On the other hand, Zuckert may have overestimated the launch time. A third possibility is that only a portion of the ICBMs deployed could be launched at a moment's notice, and that the study referred to a general reduction of the time required to launch an ICBM. However, the study notes that a minimal reaction posture was studied in 1967 and that in March 1968, three ICBM bases were directed to test time-saving measures.[154] In light of this fact, a likely interpretation is that the launch procedures may have been subject to extensive revision from 1962 to 1968, and by 1968 had become considerably more time-consuming. If this was indeed the case, it would have adversely affected the U.S. capability to launch on warning.

Launch on warning in the Nixon and Ford administrations

[151] General B.K. Holloway, CINCUSAF, "History of Strategic Air Command January-June 1968," Historical study (History & Research Division, Headquarters Strategic Air Command, February 1969), 301, The National Security Archive.
[152] Holloway, CINCUSAF, "History of Strategic Air Command January-June 1968," 301.
[153] Zuckert, October 26, 1962.
[154] Holloway, CINCUSAF, "History of Strategic Air Command January-June 1968," 301.

The most explicitly negative characterization of the strategy yet came later that same year. As part of the ongoing debate over anti-ballistic missile systems (ABM), the recently inaugurated Nixon directed Kissinger to have a conversation with prominent journalists on the debate.[155] Shortly after Nixon's inauguration, Nixon and Kissinger had brazenly endorsed an ABM system, whose purpose was to shoot down Soviet missiles targeting Minuteman ICBMs. Critics, of which there were many, argued that such systems were highly unlikely ever to work, and could spark an arms race.[156] The alternative to an ABM system, as the Nixon administration argued, would be to launch on warning. Put simply, if there were no ABM systems to protect American ICBMs, then American ICBMs would have to be launched before they were destroyed on the ground by Soviet missiles. In preparation for the meeting between Kissinger and the journalist, an NSC staffer named Lawrence Lynn, therefore, wrote a list of talking points. The talking points reiterated the concerns about false alarms, though in a more polemical tone. Lynn describes the launch on warning posture as "dangerous and irresponsible" because it would be based on "totally inadequate information," resulting in a "very real possibility of disastrous mistakes."[157] To bolster this argument, Lynn referred to the frequent occurrence of false alarms.[158] One could argue that this dichotomy that the Nixon administration drew up was false. Critics of ABM systems may well not have endorsed launch on warning, which Lynn also concedes. Still, Lynn does indeed seem to have been critical of launch on warning, as he notes in the personal message to Kissinger to which the talking points were attached.[159]

This dichotomy nevertheless played a role in the first phase of the Strategic Arms Limitation Talks (SALT), a series of disarmament negotiations between the U.S. and the USSR with the goal of reducing the number of strategic nuclear weapons. In April 1970, as part of a discussion on a ban on Multiple Reentry Vehicles (MRV), Deputy Foreign Minister of the USSR Vladimir Semenov referred to launch on warning. Attempting to dispel the notion that ICBM vulnerability was a serious problem, Semenov referred to submarines and the launch on warning strategy as precluding a successful first strike. In other words, neither the U.S. nor the

[155] Lawrence Lynn to Henry Kissinger, "Talking Paper on 'Firing on Warning' Issue," Memorandum, May 1, 1969, 1, The National Security Archive.
[156] Kaplan, *The Wizards of Armageddon*, 346–49; Robert E. Hunter, "The ABM: President Nixon's Safeguard Programme," *The World Today* 25, no. 5 (1969): 194.
[157] Lynn to Kissinger, "Talking Paper on 'Firing on Warning' Issue," May 1, 1969, 2.
[158] Lynn to Kissinger, 2.
[159] Lynn to Kissinger, 1.

USSR would be able to destroy all of the enemy's strategic nuclear weapons since they could either be launched on warning or hidden in the ocean.[160] The American delegation, taken aback by Semenov's comments, asked whether this meant that the USSR had a launch on warning strategy. Reluctant to answer, General Nikolai Ogarkov replied that he assumed this was the American posture. This prompted a discussion within the U.S. delegation. The U.S. delegation figured that letting the Soviets believe that the U.S. had a launch on warning strategy might have some deterrent value. After all, if the Soviet Union knew that the U.S. would *not* launch on warning, a first strike might seem more tempting. Still, they concluded, it would be better to correct it if the Soviets "[m]istakenly believe that the United States had a 'launch on warning' policy."[161] Going further, they considered it highly undesirable that either the U.S. or the USSR should "[f]eel compelled to rely on a launch on warning doctrine."[162]

The concern over accidental launches due to false alarms thus seems to have been genuine in the Nixon administration. Closer inspection of the documentary record, however, suggests that this concern was limited. When arguing against launch on warning in the SALT discussions, the American delegation was careful to avoid "any 'implication of possible establishment of joint systems' on accidental or unauthorized launch."[163] What this referred to was a system by which the two superpowers could notify each other in the case of an accidental or unauthorized launch of ICBMs. The Nixon administration appeared to regard such a proposal with suspicion. In July 1970, a memorandum by the NSC staff to Henry Kissinger, Lawrence Lynn and his colleague Helmut Sonnenfeldt noted that it was the Soviets who had insisted on discussing accidental nuclear war during the disarmament talks.[164] Lynn and Sonnenfeldt assumed that this was merely an effort by the Soviets to gain information about U.S. nuclear forces and sow doubt among U.S. allies.[165] Kissinger agreed. A few months later, Nixon instructed the SALT delegation to keep any discussion on accidental nuclear war within the framework of the SALT agreement. Although he was not completely against an agreement on accidental nuclear war, a

[160] "The 'Launch on Warning' Question in the First Phase of SALT" (U.S. Arms Control and Disarmament Agency (ACDA), Public Affairs Bureau, December 21, 1973), 1, The National Security Archive.
[161] "The 'Launch on Warning' Question in the First Phase of SALT," 2.
[162] "The 'Launch on Warning' Question in the First Phase of SALT," 3.
[163] "The 'Launch on Warning' Question in the First Phase of SALT," 2, note 1.
[164] "Memorandum From Laurence Lynn and Helmut Sonnenfeldt of the National Security Council Staff to the President's Assistant for National Security Affairs," in *Foreign Relations of the United States: 1969-1976, SALT I, 1969-1972*, vol. XXXII, Foreign Relations of the United States, eds. Erin R. Mahan and Edward C. Keefer (Washington, D.C: Government Printing Office, 2010), Document 86, p. 296.
[165] Ibid p. 297

separate agreement on that issue was not on the table at that time.[166] Whatever the Soviets' intent may have been, the U.S. relented. A year later, on September 30, 1971, the U.S. and the USSR signed the Agreement to Reduce the Risk of the Outbreak of Nuclear War Between the United States of America and the Union of Soviet Socialist Republics.[167] It seems, then, that the Nixon administration may very well have recognized the dangers of launch on warning, but that this was a rather low priority.[168]

Bolstering such an interpretation is the signing of the Anti-Ballistic Missile Treaty a mere eight months later, on May 26, 1972. This treaty placed restrictions on ABM systems, with both the U.S. and the USSR agreeing not to build more than two ABM complexes each. Each of these complexes was allowed up to 100 anti-ballistic missiles.[169] Does this mean that the Nixon administration reverted to a launch on warning strategy, despite their misgivings about it? It is dubious to draw such a conclusion based on primary sources alone. The documentary record on launch on warning in the 1970s is much larger than that in the 1960s. What that documentary record reveals in terms of actual strategy during the Nixon and Ford administrations, however, is very limited. The documentary record from 1971 to 1977, in some sense, mirrors that of the previous periods. Much of the available primary sources consist of studies into the technical feasibility of launch on warning, as well as risks associated with the strategy. The actual war plans remain classified, and neither Nixon nor Ford commented directly on the issue.[170]

Bruce Blair's account

It might therefore be productive to consider alternative sources. The most extensive scholarly work on launch on warning was done by the eminent nuclear weapons expert and disarmament

[166] "National Security Decision Memorandum 90," in *Foreign Relations of the United States: 1969-1976, SALT I, 1969-1972*, vol. XXXII, Foreign Relations of the United States, eds. Erin R. Mahan and Edward C. Keefer (Washington, D.C: Government Printing Office, 2010), Document 113, p. 360-361.
[167] "UNION OF SOVIET SOCIALIST REPUBLICS-UNITED STATES: AGREEMENTS TO REDUCE RISK OF NUCLEAR WAR," *International Legal Materials* 10, no. 6 (1971): 1173–76.
[168] See also 'We could, of course, move to launch-on-warning, but I wouldn't recommend it.' in "Minutes of Verification Panel Meeting," in *Foreign Relations of the United States: 1969-1976, SALT I, 1969-1972*, vol. XXXIV, Foreign Relations of the United States, eds. M. Todd Bennett and Edward C. Keefer (Washington, D.C: Government Printing Office, 2010), Document 168, p. 682.
[169] "Treaty between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems," *Daedalus* 114, no. 3 (1985): 379–84.
[170] The National Security Archive's posting on the launch on warning strategy is the most extensive collection of primary sources on the strategy. Burr, "The 'Launch on Warning' Nuclear Strategy and Its Insider Critics."

activist Bruce Gentry Blair (1947-2020).[171] However, besides being an expert and an activist, Blair also worked as a launch control officer at a Minuteman missile silo between 1970 and 1974. According to Blair, he was "postured for LOW [launch-on-warning] during the early 1970s, and the whole force and command system were geared to this timing."[172] This lends further credence to the claim that the capability to use it was in place, and perhaps also the willingness, although it may not have been official policy. While Blair does not provide direct evidence for his claim that the U.S. did adopt a launch on warning strategy, he does provide a strong argument.[173]

Blair argues that launch on warning became increasingly feasible in the early 1970s, as the U.S. deployed a wider range of early warning systems. Especially crucial in this regard was the capability for dual-sensor detection. As the name implies, dual-sensor detection was a capability that consisted of separate systems providing early warning, so that if a false alarm occurred at either of them, the other would correct the picture.[174] In the late 1970s, Blair argues, the vulnerability of U.S. ICBMs was increasingly appreciated. Therefore, Secretary of Defense Harold Brown ordered an explicit launch on warning option to be included in the SIOP, the general nuclear war plan.[175]

Blair offers an explanation and critique of the launch on warning strategy in his 1993 book *The Logic of Accidental Nuclear War*. The launch on warning strategy, Blair argues, was adopted not because of its advantages but because of the drawbacks of the alternatives.[176] Launch on warning was, in other words, a compromise. The alternatives, being preemption and retaliation after ride-out, were problematic for different reasons. Retaliation after ride-out would have meant absorbing a nuclear attack before launching one in return.[177] The main concern with that strategy was quite simple: a retaliatory attack would simply not be powerful enough given that

[171] Blair, *The Logic of Accidental Nuclear War*, 168-255. To the author's knowledge, there is only one other discussion of launch on warning in the scholarly literature, namely Garwin, Richard L. "Launch Under Attack to Redress Minuteman Vulnerability?" *International Security* 4, no. 3 (1979): 117–39.
[172] Burr, "The 'Launch on Warning' Nuclear Strategy and Its Insider Critics," note 21.
[173] Blair, *The Logic of Accidental Nuclear War*, 168–254.
[174] Blair, *The Logic of Accidental Nuclear War*, 186.
[175] Blair's claim is based on interview with an unnamed U.S. defense consultant. See Blair, *The Logic of Accidental War*, p. 342, note 39. For a list of the different SIOPs, see Olav Njølstad, *In Search of Superiority: US Nuclear Policy in the Cold War*, Forsvarsstudier (Oslo: Institutt for forsvarsstudier, 1994), 131.
[176] Blair, *The Logic of Accidental Nuclear War*, 170.
[177] Blair, *The Logic of Accidental Nuclear War*, 170.

many of the nuclear weapons would be destroyed by the Soviet first strike.[178] And although Blair does not go into much further detail on this particular point, one might reasonably assume that another concern was an erosion of the command and control structure. The command and control structure responsible for transmitting the orders from the President to the launch control officials would have been put under enormous strain after absorbing a first strike. Even if a sizable portion of the U.S. ICBM force survived a first strike, the communications network surrounding those ICBMs might not have remained intact.

Preemption, on the other hand, at first glance seemed like a more appealing option. As the Soviet Union lagged behind the United States until the late 1960s in both numbers of nuclear weapons as well as in their options on how to use them, preemption may have offered the United States the possibility to fight and win a nuclear war.[179] However, as the Soviet Union eventually surpassed the United States in numbers of nuclear weapons and developed a capacity for launch-on-warning themselves, the advantages of preemption waned. While these developments in Soviet posture took place over decades, preemption nevertheless had problems associated with it since its inception. Preemption required reliable intelligence of Soviet intent, which would have constituted a strategic warning, something the wild intelligence estimates of Soviet nuclear arsenal size proved was dangerous to rely on.[180] Last, preemption was less politically acceptable because of the difficulties in distinguishing preemption from a first strike.[181]

Launch on warning was by no means a flawless compromise, however. Though the available documentary record demonstrates false alarms as being of concern to nuclear strategists, Bruce Blair goes further in his critique of launch on warning. First, Blair argues, launch on warning was flawed from a practical standpoint. He lists six reasons for this: First, launch on warning was inflexible because it relied on quick information processing, decision making, and execution, and would not work if any of these were hampered in any way.[182] Blair was not the first to raise this issue. A June 1975 internal study on the U.S. command and control and

[178] Blair, *The Logic of Accidental Nuclear War*, 170.
[179] Blair, *The Logic of Accidental Nuclear War*, 171
[180] Blair, *The Logic of Accidental Nuclear War*, 172-173, 178-183
[181] Blair, *The Logic of Accidental Nuclear War*, 178.
[182] Blair, *The Logic of Accidental Nuclear War*, 174.

warning systems found that reports of malfunctioning were commonplace, and this was apparently a cause of considerable concern.[183] Secondly, launch on warning might be defeated by an unforeseen stratagem.[184] What such a stratagem would have looked like is difficult to imagine, but it might involve the disruption of warning systems, stealth technology (i.e., weapons that cannot be detected by warning systems), or a combination of both. Third, the physical infrastructure which launch on warning requires, such as communication lines, radar systems, and command centers, might be damaged or destroyed during a conventional phase of a war. Fourth, stealth technology such as cruise missiles, which can evade detection by radars, might penetrate vital nodes of said infrastructure undetected. Fifth, the time and information constraints put decision-makers under great pressure, to the point where rational decision-making would be close to impossible. As described above, this too was a point of concern in discussions on launch on warning. Last, those constraints might be directly at odds with professed values regarding the use of nuclear weapons by political leaders. Political leaders, especially Soviet ones, had worked carefully to ensure that the use of nuclear weapons would only take place by a "[c]ollective, centralized, and conservative (risk-averse)" order.[185] There is a conceptual distinction between the professed values and the actual dissemination of launch authority. What Blair refers to here specifically is the attitudes among political leaders, which is, of course, related to concerns of a breakdown of the chain of command.[186]

How did these flaws relate to the danger of an accidental nuclear war? Blair offers two noteworthy points. First, as previously discussed, false warnings might have resulted in an unwarranted launch of ICBMs. Second, it created pressure to pre-delegate launch authority down the chain of command in cases where the normal chain of command was compromised. Launch on warning, in other words, might be impossible to carry out while at the same time maintaining civilian launch authority. Put differently, in a situation where a decision to use a nuclear weapon would have to be made extremely quickly, there might not be time to consult with civilian leaders.[187]

[183] L. Wainstein et al., "The Evolution of U.S. Strategic Command and Control and Warning, 1945-1972" (Arlington, Virginia: Institute for Defense Analyses, International and Social Studies Division, June 1975), 412–14, The National Security Archive.
[184] Blair, *The Logic of Accidental Nuclear War*, 174.
[185] Blair, *The Logic of Accidental Nuclear War*, 174.
[186] Blair, *The Logic of Accidental Nuclear War*, 174
[187] Blair, *The Logic of Accidental Nuclear War*, 174

On the topic of false alarms, Blair laid out a more expansive argument than those described in primary sources. Blair claimed that, in order to facilitate a launch on warning, NORAD relaxed the standards of evidence required in the early to mid-1980s.[188]. This happened, he argued, as a result of "diffuse modifications of decision rules made deep within the bowels of an organization [NORAD]."[189] What this entailed was a major shift in the balance between what is referred to as positive and negative control.[190] Positive control in the field of nuclear weapons refers to the capability to launch a weapon, in this case an ICBM. Negative control refers to the capability to ensure that an ICBM is not launched accidentally. These two are inherently detrimental to each other, especially in the case of launch on warning. The negative control needed to avoid an accidental launch would invariably affect the time required to launch. Conversely, the ability or need to launch ICBMs quickly increases the risk that a launch may occur by accident.[191] Thus, the relaxation of evidence standards with regards to tactical warning (i.e., detection of missiles by early warning systems) increased the chance of false alarms causing a nuclear war.[192]

These relaxations, Blair argued, blurred the distinction between preemption and launch on warning.[193] Accepting this conclusion, one may also surmise that these relaxations marked a departure from a launch under attack strategy to a launch on warning strategy. Although these terms were – and are – frequently used interchangeably, there was a slight, possibly only nominal difference between them. Whereas launch under attack implied a launch *after* nuclear weapons explosions had been detected, launch on warning required only warning of an attack for retaliation to be launched. Blair argued that the distinction between them, however, was minimal. Launch under attack was *not* an iteration of retaliation after ride-out, but much closer to launch on warning.[194] While one would presume that a confirmation of a nuclear explosion was quite a different standard of evidence, Blair claimed that such a confirmation did not entail evidence of massive destruction.[195] While this distinction is interesting, its significance appears

[188] Blair, *The Logic of Accidental Nuclear War*, 192.
[189] Blair, *The Logic of Accidental Nuclear War*, 187–88.
[190] Blair, *The Logic of Accidental Nuclear War*, 187–88.
[191] John Steinbruner, "Launch under Attack," *Scientific American* 250, no. 1 (1984): 38, 45–46.
[192] Blair, *The Logic of Accidental Nuclear War*, 188.
[193] Blair, *The Logic of Accidental Nuclear War*, 192–95.
[194] Blair, *The Logic of Accidental Nuclear War*, 342, note 40.
[195] Blair, *The Logic of Accidental Nuclear War*, 342, note 40.

marginal. As stated, the terms were used interchangeably, usually describing the launch on warning strategy.

What then about the other major issue, that of a breakdown in the command-and-control structure? Blair argued claimed that, in order to make launch on warning feasible, the U.S. chain of command was subject to great pressure.[196] In the event that the normal chain of command was disrupted, the authority to launch ICBMs would fall to high-level military officers. In such a situation, these officers would then have the exact same authority that was usually reserved for the president.[197] Any failure of the command and control system (the structure by which the Commander in Chief (usually the president) receives information and transmits orders) then would have resulted in a severe weakening of the negative control of ICBMs. To add to that danger, a disruption of the command and control structure and the chain of command could itself easily have been interpreted as an indication that an attack had occurred. These factors would likely have increased the chance of accidental nuclear war.

In order to assess the risk carried by the launch on warning strategy, Blair developed a theoretical framework.[198] The model attempts to determine how certain a NORAD operator would be in the face of a tactical warning, that is, a warning from satellites or radar. While the specific workings of the framework are too technical for this thesis, the general point can be appreciated: the more probable a NORAD operator considers an attack to be, the more likely he or she is to mistake a false alarm for a real one. The purpose of this simple statement is to add a new factor in calculating how likely false alarms are to go unrecognized as false. In other words, whereas some models may look only at how often false alarms occur, Blair argued that this needs to be looked at in relation to the operator's biases and preconceptions.[199]

Using this model, Blair attempted not only to quantify the risk of a false alarm being mistaken for a real one, but also to explain why NORAD had such great confidence in the early warning system. When certain parameters were used in the model, the chance of a false alarm being

[196] Blair, *The Logic of Accidental Nuclear War*, 187.
[197] Blair, *The Logic of Accidental Nuclear War*, 187.
[198] Blair, *The Logic of Accidental Nuclear War*, 219–54.
[199] Blair, *The Logic of Accidental Nuclear War*, 220.

mistaken for a real one, and a real alarm being mistaken for a false one, were negligible.[200] Empirical evidence would seem to confirm this. After all, no false alarm has resulted in either the president or the secretary of defense being notified as the false alarm was taking place.

Blair, however, pointed out that the frequency of false alarms is a relative measure. That is, how often false alarms occurred and whether that frequency was acceptable, was a matter of perspective. Blair explained that the NORAD early warning system would create a warning report every five minutes and that these reports were what the NORAD operators would see. A 0,0001 error rate would thus rarely occur in any given five-minute period but would be statistically likely to occur every 35 days.[201] According to this estimation, a crisis lasting for a week would have a 20 percent chance of a false alarm. This false alarm would also have been more likely to be taken seriously, given the increased suspicion among NORAD operators that an attack would come.[202]

Based on this model and its predictions, Blair concluded that even logically sound conclusions by NORAD operators could be false even if the early warning system was functioning well. This was – and is – an inherent risk to launch on warning. Because the short time operators had to make their judgments, launch on warning increased the risk that those judgments would be based on the operators' preconception to an unacceptable degree. Put simply, the short time an operator had to make a judgment would not have been enough to check the warning system very many times. This could result in either a false alarm being mistaken for a real one or a real one being mistaken for a false one.[203] In sum, therefore, Blair concluded that "launch on warning was inherently risky […]."[204]

What conclusions may be drawn, then, regarding the development and adoption of the launch on warning strategy? It seems reasonable to conclude that the U.S. ICBM forces were developed with an explicit expectation that they could be launched quickly. It is hard to imagine other reasons than launch on warning for such an expectation. The deployment of ICBMs in vulnerable, stationary siloes further strengthens this conclusion. Although these siloes were

[200] Blair, *The Logic of Accidental Nuclear War*, 233.
[201] Blair, *The Logic of Accidental Nuclear War*, 234.
[202] Blair, *The Logic of Accidental Nuclear War*, 234.
[203] Blair, *The Logic of Accidental Nuclear War*, 252.
[204] Blair, *The Logic of Accidental Nuclear War*, 253.

hardened, that is, built to withstand shockwaves, it was well known that this measure would not suffice as Soviet ICBMs became more accurate and powerful.[205] Blair's claim that the U.S. nuclear weapons system was geared toward launch on warning thus seems trustworthy. However, despite the capability to launch ICBMs quickly, political leaders seem to have been reluctant to adopt launch on warning openly. Although these claims are plausible, the documentary record is hardly unanimous. Blair's account, too, convincing though it is, would benefit from further independent analysis if historical conclusions are to be drawn from his statements. To do so, the next chapter investigates a series of false alarms that occurred in 1979 and 1980 and whether these strengthen or weaken Blair's account.

[205] Blair, *The Logic of Accidental Nuclear War*, 177.

Chapter 4 – The False Alarms

The foreign policy of the Carter administration

Jimmy Carter's presidential term had been plagued by difficulties from the beginning, both foreign and domestic.[206] With regards to foreign policy, division was ubiquitous. The period of relatively peaceful relations between the US and the USSR, known as détente, was under attack from conservatives such as future president Ronald Reagan.[207] They warned of growing Soviet power and the need to confront it. Carter, on the other hand, wanted to maintain détente and develop it further. Having campaigned on standing up for human rights while simultaneously supporting détente, Moscow was confused and affronted by the Carter administration.[208] They much preferred to deal with Nixon and Kissinger, who never mentioned human rights in the Soviet Union at all.[209] Moreover, détente was differently understood by Washington and Moscow. To Washington, détente signified, first and foremost, a common acceptance of the status quo of world order, marked by a climate of relative peace and cooperation. To Moscow, détente was perceived as a recognition of the Soviet Union as a superpower and by no means an obstacle to continued support of revolutionary movements in the third world.[210]

Disagreements about foreign policy ran deep within the Carter administration as well, which became emblematic of the entire Carter presidency.[211] On the more hawkish front was Zbigniew Brzezinski, the polish-born National Security Advisor. Brzezinski had a long background in foreign policy, having been a member of the influential Policy Planning Council of the State Department under President Johnson, as well as having been a foreign policy advisor to Vice President Hubert Humphrey. In 1973, Brzezinski co-founded the Trilateral Commission, a group of prominent political and business leaders aiming to strengthen relations

[206] Nancy Mitchell, "The Cold War and Jimmy Carter," in *The Cambridge History of the Cold War*, ed. Melvyn P. Leffler and Odd Arne Westad (Cambridge: Cambridge university press, 2010), 66; Garthoff, *Détente and Confrontation*, 563.
[207] Olav Njølstad, "The Collapse of Superpower Détente," in *The Cambridge History of the Cold War*, ed. Melvyn P. Leffler and Odd Arne Westad, vol. 3 (Cambridge: Cambridge university press, 2010), 140.
[208] Njølstad, "The Collapse of Superpower Détente," 142–43.
[209] Njølstad, "The Collapse of Superpower Détente," 143.
[210] Mitchell, "The Cold War and Jimmy Carter," 71–72.
[211] Mitchell, "The Cold War and Jimmy Carter," 68.

between North America, Western Europe, and Japan.[212] It was through this group that he came to know Carter, and Carter's administration was heavily staffed by members of the group. While someone considered Brzezinski to be "Carter's Kissinger," Brzezinski had held dovish positions in the past.[213] Moreover, he was skeptical of détente, which Kissinger had been instrumental in bringing about.[214] He had resigned his post on the Policy Planning Council because of his disagreement with Johnson over his expansion of the Vietnam War in 1968, and he opposed aggressive conduct against Eastern Europe, favoring instead to sow tension within the Warsaw pact by opening for economic and cultural cooperation with eastern European countries.[215]

Nevertheless, as National Security Advisor under Carter, Brzezinski often found himself at odds with Secretary of State Cyrus Vance. Vance had also worked for the Kennedy and Johnson administrations. First as General Counsel of the Department of Defense from 1961 to 1962, then as Secretary of the Army from 1962 to 1964, and last as Deputy Secretary of Defense from 1964 to 1967. And just like Brzezinski had held relatively dovish views in the past, so too had Vance held hawkish views. He was an initial supporter of the Vietnam War, but he too changed his mind, and in 1968, as part of a group of 'Wise men,' advised Johnson to pull out.[216] The lack of a unified vision for American foreign policy during the Carter administration made for an inconsistent, and to many unconvincing, response to the numerous crises the administration faced on the world stage. Coupled with the popular perception that the Soviet Union was surpassing the US in power and prestige on a global scale, the Carter administration invariably became associated with weakness and defeat.[217]

One of the biggest such defeats was the revolution in Iran, which resulted in what has been called "the most significant loss of an ally in U.S. history"[218] On January 16, 1979, the Shah of

[212] Justin Vaïsse and Catherine Porter, *Zbigniew Brzezinski: America's Grand Strategist* (Cambridge, Massachusetts: Harvard University Press, 2018), 11.
[213] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 6.
[214] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 6.
[215]Lewis, "Zbigniew Brzezinski, National Security Adviser to Jimmy Carter, Dies at 89," *New York Times*, May 26, 2017; Charles Gati, *Zbig: The Strategy and Statecraft of Zbigniew Brzezinski* (Baltimore: The John Hopkins University Press, 2013), chapter 1
[216] Berger, "Cyrus R. Vance, a Confidant Of Presidents, Is Dead at 84," *New York Times*, Jan 13, 2002, 1, 34
[217] Mitchell, "The Cold War and Jimmy Carter," 68.
[218] Mitchell, "The Cold War and Jimmy Carter," 82.

Iran fled into exile. In his place came Ayatollah Ruhollah Khomeini, a religious leader who declared Iran an Islamic republic, and the U.S. the "Great Satan."[219] On November 4, 1979, the US embassy in Tehran was stormed by a large group of students. This marked the beginning of the hostage crisis, where 52 American embassy personnel were held hostage for a total of 444 days. The crisis was a major issue for the Carter administration and is widely considered to be one of the most important reasons for his failure to win reelection in the 1980 general election.[220]

Nuclear policy of the Carter administration

Jimmy Carter had made his apprehension towards nuclear weapons clear long before he became president. Ha had campaigned on eliminating the threat of nuclear weapons, and a big part of the military was highly skeptical. Carter added fuel to the fire when he attended a briefing by the JCS shortly before taking office. Carter asked how long it would take to reduce the number of ICBMs to 200, a five-fold decrease from the 1000 the US fielded at Carter's inauguration.[221] Carter was, in other words, at this point clearly favoring drastic cuts in the US nuclear arsenal, which was more in line with the proponents of minimum deterrence. Harold Brown, the new Secretary of Defense, was also not a big fan. He considered such a reduction, which Carter seemingly considered to carry out unilaterally, extreme and dangerous. Even though Brown himself was sympathetic to the line of thought underlying Carter's wishes for cuts, he thought the Soviet Union was unlikely to reciprocate. Therefore, he thought, they might be tempted in a crisis to strike first if there was such a great disparity in strategic forces. Last, even if Brown accepted the proposition that the Soviets would be deterred by 200 ICBMs, such a cut might make NATO allies doubt whether 200 ICBMs would deter a Soviet attack on them too. Carter reluctantly assented to Brown's remarks.[222]

[219] Amin Saikal, "Islamism, the Iranian Revolution, and the Soviet Invasion of Afghanistan," in *The Cambridge History of the Cold War*, ed. Melvyn P. Leffler and Odd Arne Westad, vol. 3 (Cambridge: Cambridge university press, 2010), 120.
[220] David R. Farber, *Taken Hostage: The Iran Hostage Crisis and America's First Encounter with Radical Islam*, Politics and Society in Twentieth-Century America (Princeton, NJ: Princeton University Press, 2005), 179.
[221] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chapter 6.
[222] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 6.

Carter's apprehension towards nuclear weapons was also challenged by an ongoing debate within NATO over nuclear-armed missiles in Europe. The debate over these missiles had gone on for a while and was prompted by the Soviet deployment of a new missile, the SS-20.[223] The SS-20 was deployed in 1976, the year Carter was elected president, and was viewed with great concern by NATO. The SS-20, a medium-range ballistic missile, had the capacity to strike Western European targets from within the Soviet Union. Although previously fielded missiles also had that capability, the SS-20 was not only mobile, but also more reliable and equipped with three nuclear warheads.[224] By contrast, NATO did not have any missiles with the range to hit the Soviet Union from Western Europe. Several options were considered to respond to the deployment of the SS-20. One was a ground launched cruise missile (GLCM), which was very accurate, and the other was the Pershing II ballistic missile, which was much faster than the cruise missile and almost as accurate.[225]

Carter opposed the deployment of the Pershing II missile but consented to it to avoid another foreign policy blow. In 1978, Carter had canceled a project to build a so-called "dirty bomb," a nuclear bomb with a low explosive yield, but which released a great amount of radiation. Germany, in particular, was upset with Carter's canceling of the dirty bomb and his reluctance to deploy new nuclear weapons in Europe.[226] Still, the desire for the Pershing II missile in Europe was by no means unanimous. On the contrary, it became one of the most important impetuses for the resurging disarmament movement.[227] Other European leaders wanted nothing to do with the Pershing II unless it was accompanied by arms control measures. The NSC attempted to alleviate some of this concern by promising reductions in other nuclear-armed missiles deployed in Europe. On December 12, 1979, NATO leaders voted in favor of deploying the missiles.[228]

This question over the deployment of the GLCM and the Pershing II was debated for the first two and a half years of the Carter administration. Carter, however, was more preoccupied with reducing the number of strategic nuclear weapons, the very powerful bombs which would be

[223] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 6.
[224] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 6.
[225] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 6.
[226] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 6.
[227] John Vincour, "A Missile Protest Prepared in Bonn," *The New York Times*, October 9, 1981, sec. A.
[228] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 6.

used against cities. Therefore, he continued with the Strategic Arms Limitation Talks (SALT) negotiations which had begun under Nixon. The result was the most ambitious arms control agreement to that date, at least between the Soviet Union and the U.S. The talks resulted in the signing of the Strategic Arms Limitation Treaty (SALT II) on June 18, 1979.[229] The treaty would come at a very high cost to Carter. As had become almost tradition at the time, the Joint Chiefs of Staff refused to endorse any arms control agreement unless it was also accompanied by some other weapons program. Without a JCS endorsement, the two-thirds majority required for senate ratification would be virtually impossible to obtain. In the case of the SALT II agreement, the price was a new ICBM, the MX-missile. The missile, nicknamed "the peacekeeper," would carry 10 MIRV warheads and would be twice as accurate as the Minuteman missile.[230]

Paul Nitze, the hawkish elder statesman who had been among the most influential early cold war warriors, rose as the most prominent critic of the SALT II agreement. Nitze's opposition to SALT II and Carter had a personal swing to it as well. Nitze had been an early supporter of Carter, and Nitze joined Carter's transitioning team. When Carter took office, however, he did not offer Nitze a job. To add insult to injury, Carter hired people whose views were in stark opposition to Nitze's. By some accounts, Nitze took it personally and made it his mission to obstruct Carter.[231] In some ways, Nitze fitted the role perfectly. Nitze was one of the most influential people in the entire Cold War and well versed in the geostrategic jargon on nuclear weapons. Nitze's opposition to the SALT II agreement was rooted in a highly abstract future scenario in which the Soviet Union, having achieved strategic superiority, would initiate a massive first strike causing the deaths of tens of millions of Americans.[232] More to the point, Nitze attacked the treaty for allowing the Soviets to achieve strategic superiority and threatening American ICBMs. The generals on the Joint Chiefs of Staff were hardly convinced by Nitze and thought his arguments overblown. In fact, they did not care very much whether the Minuteman were vulnerable, assuming that the US would launch on warning. But such fearmongering would ultimately galvanize support for the MX-missile, the generals figured, so they went along with Nitze's basic line of thought.[233]

[229] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 6.
[230] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 6.
[231] Kaplan, *The Wizards of Armageddon*, 380.
[232] Kaplan, *The Wizards of Armageddon*, 377–79.
[233] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 6.

Carter despised the MX-missile and called it both "nauseating" and "a gross waste of money."[234] Still, after a meeting between Leslie Gelb, Assistant Secretary of State for politico-military affairs, Lieutenant General Willie Y. Smith, General David Jones, chairman of the JCS, and Cyrus Vance, in which it was agreed that the State Department would support the MX, and the JCS would support SALT II, Carter eventually relented.[235] Once again, however, Carter would be left with the short end of the stick. As the treaty was being considered by the Senate, the Soviet Union invaded Afghanistan. Détente was declared dead, and so too was the hope of getting the SALT II agreement passed in the senate. Carter later described this as his greatest disappointment. [236]

The November 9, 1979 Exercise Tape Incident

A little over a month prior, just five days after the Iran hostage crisis broke out, on November 9, 1979, at 8.50 a.m., a realistic display of a Soviet nuclear attack appeared at the North American Aerospace Defense Command (NORAD) headquarters in Colorado, in the Strategic Air Command (SAC) command post at the Pentagon, and the Alternate National Military Command Center (ANMCC) at Fort Richie, Maryland. The display showed a large-scale attack on U.S. nuclear forces and command system, seemingly consisting of a launch of both Submarine-launched ballistic missiles (SLBM) and intercontinental ballistic missiles (ICBM). At NORAD, a threat assessment conference was immediately called, involving more senior officers than those who initially saw the display. Several actions were ordered during the threat assessment conference in response to this alarm: at first, the entire air defense interceptor force was alerted, and at least ten interceptor aircraft were launched. At some locations, NORAD instructed air traffic controllers to order commercial aircraft to prepare for immediate landing. The most serious action taken in response to this incident was the launching of the National Emergency Airborne Command Post, the President's special "doomsday plane." President Jimmy Carter, however, was not on board and was not even notified of the alarm until after the plane had landed again. This conference went on for about eight minutes until it was determined

[234] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 6.
[235] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 6.
[236] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 6.

that the alarm was false, and the NORAD commander called the conference off.[237] What caused this alarm, and how was NORAD able to determine that it was false? What were the reactions to the alarm? Was there a serious danger of a "retaliatory" strike? Is it more appropriate to view the event as successful prevention of an accidental launch or a dangerous failure of the warning system to prevent false alarms? And, on a related note, should false alarms such as this one alleviate concern over launch on warning or exacerbate it?

The event was quickly picked up by the press, although the Carter administration somewhat successfully managed to tone down the severity of the alarm. The cause of the alarm was an exercise tape that had been transferred into the live warning system, in what the Pentagon described as a "mechanical error."[238] There was some confusion as to how exactly the exercise tape data had been transferred onto the live warning system, and about a month after the incident, defense officials claimed it was due to a human error.[239] As it was reported by the press, the alarm involved only mid-level officials and was regarded with suspicion from the beginning.[240] The Pentagon explained that neither the Secretary of Defense Harold Brown nor Jimmy Carter were notified, though they added that had the alarm lasted another minute, they would have been notified. Furthermore, the Pentagon claimed that the alarm showed only a "minor" nuclear attack and not a full-scale one.[241] The Pentagon even admitted that such false alarms had happened several times before, due to "computer failures, natural phenomena and test firings," although they also claimed that this was the first time such an alarm had resulted in an alert being sent out.[242] Last, the Pentagon made numerous claims in what seems to be an attempt at reassurance. They said they were "quite satisfied" with the response to the false alarm and assured that the event was being investigated.[243] They also pointed out that there were several human and mechanical checks to prevent such incidents from resulting in the launch of an American "counterattack."[244] The White House was even more dismissive of

[237] Sagan, *The Limits of Safety*, 228–29; Sulzberger Jr., "Error Alerts U.S. Forces To a False Missile Attack"; Thaxton, "Nuclear False Alarm Gives a Grim Warning," 12; Halloran, "U.S. Aides Recount Moments of False Missile Alert," 28; "Excerpts of History of ADCOM/ADC, 1 January-31 December 1979" (Aerospace Defense Command, undated), The National Security Archive.
[238] A.O. Sulzberger Jr., "Error Alerts U.S. Forces to a False Missile Attack," *New York Times*, November 11, 1979, 30
[239] R. Halloran, "U.S. Aides Recount Moments of False Missile Alert."
[240] Sulzberger Jr., "Error Alerts U.S. Forces To a False Missile Attack."
[241] Sulzberger Jr., "Error Alerts U.S. Forces To a False Missile Attack."
[242] Sulzberger Jr., "Error Alerts U.S. Forces To a False Missile Attack."
[243] Sulzberger Jr., "Error Alerts U.S. Forces To a False Missile Attack."
[244] Sulzberger Jr., "Error Alerts U.S. Forces To a False Missile Attack."

concerns about the seriousness of the false alarms. The White House Press Secretary, Jody Powell, referred to the Iran hostage crisis which had broken out just a few days before, and said that "given the fact that our people are sitting over there in Iran, anybody who wants to get angry about a technical error is not going to get a long hearing."[245]

Not everyone was relieved by the Carter administration's attempt to shift the focus elsewhere and seemingly relaxed attitude toward the incident. The Secretary General of the USSR, Leonid Brezhnev, was not at all convinced by Washington's reassurances. On the contrary, the false alarm aroused enough concern that Brezhnev ordered the Soviet ambassador to the US, Anatoly Dobrynin, to contact President Carter about the issue. In the message Dobrynin sent to the White House, he made clear the Soviet concern with the incident, stating that such incidents should "cause a feeling of extreme anxiety in the mind of every state leader" and that they are "[f]raught with a tremendous danger."[246] He further expressed his concern that neither the President nor the Secretary of Defense were notified, concluding that "it turns out that the world can find itself on the brink of a precipice without the knowledge of the president or other U.S. leaders."[247] While Jimmy Carter's personal reaction to the message remains unknown, the ensuing debate within the administration over how to respond to it followed the established lines of conflict. A first draft was submitted by Brigadier General USAF Carl R. Smith, Military Assistant to the Secretary of Defense, to Colonel William Odom, Military Assistant to the National Security Advisor. This first draft response, which was written in the Department of Defense, was rather belligerent in tone, deeming the assertions in the message "[i]naccurate and unacceptable" because they were based on "[f]alse information."[248] It went on to say that "[i]t does not serve the purposes of peace or strategic stability for the Soviet Union to base its actions or its diplomatic exchanges on press reports, or to exploit such reports for purposes of propaganda."[249] Furthermore, Smith noted, this reply would have the Secretary of Defense's support.[250]

[245] Sulzberger Jr., "Error Alerts U.S. Forces To a False Missile Attack."
[246] State Department Cable 295771 to U.S. Embassy Moscow, "Brezhnev Message to President on Nuclear False Alarm," November 14, 1979.
[247] State Department Cable 295771 to U.S. Embassy Moscow, "Brezhnev Message to President on Nuclear False Alarm," November 14, 1979
[248] Brigadier General Carl R. Brigadier General Carl Smith to William Odom, "Memorandum for Colonel William Odom, Military Assistant to the Assistant to the President for National Security Affairs, 'Proposed Oral Message Response,'" November 16, 1979, The National Security Archive.
[249] Smith memorandum to Odom, November 16, 1979.
[250] Smith memorandum to Odom, November 16, 1979.

Predictably, criticism of this draft came from the State Department. A memorandum to Vance agreed that the tone in Brezhnev's message was unacceptable but considered it important to carefully consider how to respond. It urged Vance to resist attempts by Brzezinski and Brown to go forward with the draft. Should that fail, however, it suggested Vance argue that the Soviets might try to exploit the false alarm to sow discontent in Europe about the suggested deployment of nuclear-tipped missiles.[251] Although the author of the memorandum is unknown, it clearly suggests that senior State Department officials were skeptical of a rushed response and wanted to deliberate further. Marshall Darrow Shulman, the assistant to Secretary of State Cyrus Vance for Soviet policy, made clear his dissatisfaction in straightforward terms. He considered the draft response "kindergarten stuff – not worthy of the United States," and went on to ask why "do we have to be so gratuitously snotty?"[252]

Shulman's criticisms went beyond tone, however. One of the reasons for his disapproval of the draft was a genuine appreciation of the Soviets' concern. Shulman dismissed the draft's suggestion of hidden political agendas behind Brezhnev's message as insensible, asking rhetorically (or perhaps openly) whether or not the U.S. would be similarly concerned had such an incident occurred in the USSR. Moreover, he added, "[f]alse alerts of this kind are <u>not</u> a rare occurrence. There is a complacency about handling them that disturbs me."[253] It is unclear whether Vance ever read this memorandum. There is a line drawn over the text, and during a meeting five days later, on November 21, Vance approved a version of the draft response based on the one coming out of the DoD. This may have been by accident. The same day, Shulman wrote another memo suggesting Vance had "probably inadvertently" been working from the DoD draft that "[he], Reggie, and at least some of the NSC staff feel is gratuitously insulting and inappropriate for the Carter/Brezhnev channel."[254] Whatever Vance felt about the DoD draft, that ended up becoming the basis for the response that was sent to the USSR.

[251] Excerpt from State Department Memorandum to Secretary of State with Attached Memo "Late Supplement to VBB [Vance, Brown, Brzezinski] Item on Brezhnev Oral Message on False Alert," Undated.
[252] Marshal Shulman, Memorandum to Secretary of State Cyrus Vance, November 16, 1979.
[253] Shulman to Vance, November 16, 1979, emphasis in original.
[254] Marshal Shulman, Memorandum to Secretary of State Cyrus Vance, November 21, 1979

The DoD draft's suggestion that the Soviet's concern was obfuscating a political agenda seems to have been meant at least somewhat seriously. At the center of this particular point was the ongoing debate over the intermediate-range ballistic missiles to be deployed in Europe. A week after Brown, Brzezinski and Vance had met to discuss the response to Brezhnev, a cable addressing the false alarm was sent from the State Department to the U.S. mission to NATO to answer potential concerns from allies. The cable described the Brezhnev message and how it was interpreted, as well as talking points in response to possible Soviet exploitation of the incident. The talking points were essentially the same as the ones the Pentagon had already given to the press. Indeed, the message to NATO is replete with assurances and strong language, stating, for instance, that "[t]he test data was almost immediately recognized as spurious" and that "[a]ll command levels demonstrated entirely proper responsibility in handling the data."[255] However, the cable did contain an error, stating that the interceptors that were launched in response to the alarm had been launched due to an alert before the one in question.[256] This may have been a simple misunderstanding, but it may also point to a concerted U.S. effort to make the incident seem less severe than it was, which is certainly plausible given the language of the cable. It is unclear how the false alarm was perceived in Europe, though there are some indications it caused concern. Arthur Ochs Sulzberger Jr., writing for the New York Times, reported that British legislators had made an outcry but mentions no one by name, nor refers to anything else.[257] Moreover, the State Department cable to the U.S. mission to NATO mentioned in passing that some of this information had been passed by the Department of Defense to the Netherlands Attaché on November 14, because the Netherlands Defense Ministry expected query in parliament the day after.[258]

On December 3, the US delivered its response to the Soviets. The response was delivered by Robert Louis Barry, later US ambassador to Bulgaria and Indonesia, but at the time of the false alarm, he was an official at the Bureau of European Affairs at the State Department. Barry delivered the message to Aleksandr Bessmertnykh, another future ambassador who at the time served as Minister Counselor at the Soviet Embassy in Washington. Neither Barry nor

[255] U.S. State Department to U.S. Mission to the North Atlantic Treaty Organization, "TNF: Soviets and the False Missile Alert," cable 307013, November 28, 1979, The National Security Archive.
[256] State Department cable 307013 to the U.S. Mission to the North Atlantic Treaty Organization, "TNF: Soviets and the False Missile Alert," November 28, 1979
[257] Sulzberger Jr., "Error Alerts U.S. Forces To a False Missile Attack."
[258] U.S. State Department to U.S. Mission to the North Atlantic Treaty Organization, "TNF: Soviets and the False Missile Alert," November 28, 1979.

Bessmertnykh seem to have been top-level officials at the time, which is consistent with the content of the message Barry delivered. The message was slightly different from the first draft suggestions, but none of the criticism the State Department had expressed made its way into the message. The message still said that the Soviet message contained assertions based on inaccurate press reports, which was therefore "[u]nacceptable to the United States Government," and still accused Brezhnev of exploiting the incident for political purposes and propaganda.[259] Last, it said that US strategic offensive forces were not placed on a higher alertness level and that the incident had, in fact, demonstrated that U.S. nuclear forces were under control.[260]

Unsurprisingly, Moscow remained dissatisfied with the dismissive U.S. attitude to the incident. In the last part of the diplomatic exchange, in a "non-paper" delivered to the State Department, Moscow reiterated its concern over the false alarm, insisting that the message from Brezhnev had only been the product of "[a] profound and natural concern" and that they had no intention of politicizing the issue.[261] Whatever the Soviet intentions were, and they do not seem to have raised the issue again, neither publicly nor privately, the false alarm did not influence the vote on the deployment of the new Pershing II and the GLCM missiles, which were approved by NATO on December 12.[262]

The June 3 and June 6 Computer Chip failures

Although the approval of the Pershing II and the GLCM was perhaps a rare victory for Carter, the period after the November 9 alarm would be even more difficult for his administration. On December 24, 1979, the Soviet Union entered Afghanistan, marking the definitive end of détente. As such, it also marked a turning point in the Carter administration's foreign policy. Carter, whom many saw as being caught in the middle of the tug-of-war between Brzezinski and Vance, now wholeheartedly embraced Cold War rhetoric, calling the Soviet invasion "the

[259] "State Department Cable 312357 to U.S. Embassy Moscow, 'U.S. Oral Message on Purported Alert of American Strategic Forces,' December 4, 1979," accessed November 6, 2021, https://nsarchive2.gwu.edu/nukevault/ebb371/docs/doc%208%2012-4-79.pdf.
[260] State Department Cable 312357 to U.S. Embassy Moscow, "U.S. Oral Message on Purported Alert of American Strategic Forces," December 4, 1979
[261] State Department cable 326348 to U.S. Embassy Moscow, "Supplementary Soviet Statement on U.S. Strategic Alert," December 19, 1979
[262] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chapter 6.

greatest threat to peace since World War II."[263] To Carter, however, the greatest disappointment was the withdrawal of the SALT II arms control agreement, which had been signed in June 1979, from senate consideration.[264] For the first time since the 1960s, the White House again proposed increased defense spending, and Carter both approved of the MX-missile, a frightening new ICBM capable of mounting 10 MIRV warheads, as well as initiating the B-2 Stealth bomber project.[265] Although he regained some trust in his ability to conduct foreign policy, Carter was still faced with crisis after crisis in the upcoming election year. On April 24, 1980, Carter attempted a rescue of the hostages in Iran by the US Navy, which failed spectacularly. To make matters worse, Secretary of State Cyrus Vance resigned over the issue.[266]

A little over a month later, in the middle of the night on June 3, another false alarm occurred. At the Strategic Air Command command post and the National Military Command Center, the warning displays that reported the NORAD missile data indicated that a major Soviet attack was underway.[267] While this alert did not evoke the same alertness measures as the one in November 1979, some measures were taken this time too. As had happened on November 9, a threat assessment conference was called, and aircraft crews around the country were ordered to start their engines. Launch control officers at Minuteman missile bases were told to be ready for launch orders. Unlike on November 9, the President's National Emergency Airborne Command Post (NEACP) was not launched (though it did get ready for takeoff), but the Pacific Command's Airborne Command Post (codenamed Blue Eagle) was.[268] Just as on November 9, the threat assessment conference was closed when the National Military Command Center was able to establish direct contact with the warning sensors, which were operating and had not registered any attack. This meant that, once again, the fault originated within the NORAD computer system.[269]

[263] Garthoff, *Détente and Confrontation*, 994.
[264] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 6.
[265] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War, chapter 6*.
[266] Lewis, "Zbigniew Brzezinski, National Security Adviser to Jimmy Carter, Dies at 89."
[267] Sagan, *The Limits of Safety*, 231.
[268] Sagan, *The Limits of Safety*, 231.
[269] Sagan, *The Limits of Safety*, 231.

Robert Gates, later Director of Central Intelligence under President George H.W. Bush and Secretary of Defense under George W. Bush and Barack Obama, gave a much more dramatic account of the incident June 3 incident. According to Gates, William Odom, Brzezinski's military advisor, called Brzezinski at 3 a.m. with that the Soviet Union had launched about 220 missiles towards the United States. In response, Brzezinski told him to make sure that the alarm was real before Brzezinski would call the President. A few minutes later, Odom called back, this time not only confirming that the attack was real but that instead of 220 missiles, there were over 2200 missiles on the way to the U.S. Brzezinski chose not to wake up his wife, figuring that everyone would be dead in half an hour. A few moments before Brzezinski was going to call the President, Odom called back a third time. This time, he could gladly notify Brzezinski that the alarm was false.[270] This account must be taken with a grain of salt. First, Gates claimed that the false alarm which had prompted Odom to call Brzezinski was caused by an exercise tape being loaded into the live computer system. In reality, the exercise tape incident occurred much later in the morning, at around 10 a.m. The only false alarm which occurred during the middle of the night was the one on June 3, and that was due to a faulty computer chip. A recently declassified notecard Odom wrote as he was monitoring the alert does not show any indication of having called Brzezinski either.[271]

Carter was notified of the incident the same day by Zbigniew Brzezinski. This may have been the first time Carter seriously considered the issue of false alarms. In his diary, he makes a brief mention of it, only saying that "we need to find out how to prevent this from occurring in the future."[272] Carter received further information from the Pentagon two days later, on June 5, which explained what had happened and that the incident was under investigation. Naturally, Carter wondered what had caused the alarm and if any corrective action was being taken.[273] NORAD was unable to find out what had happened until the day after, on June 6. On June 6, as NORAD was attempting to duplicate the error on June 3, yet another false alarm occurred, of the same type as the one three days prior. Once again, the warning display at Strategic Air Command, National Military Command Center, and at the Alternate National Military

[270] Robert M. Gates, *From the Shadows: The Ultimate Insider's Story of Five Presidents and How they Won the Cold War* (New York: Simon & Schuster, 1996), 114-115.
[271] William Odom, notecard, June 3, 1980.
[272] Jimmy Carter, *White House Diary*, 1st ed (New York: Farrar, Straus and Giroux, 2010), 434.
[273] Zbigniew Brzezinski to Secretary of Defense, enclosing "Fact Sheet", June 5, 1980, with annotations by President Carter.

Command Center indicated a barrage of ICBMs towards the United States.[274] This time, NORAD operators seem to have suspected an error from the outset. Unlike the previous false alarm, no threat assessment conference was called, although a missile display conference, which was to determine if a threat assessment conference was necessary, was called.[275] SAC also alerted their aircraft crews to start their engines and get ready for takeoff.[276] After a few minutes, the alarm was recognized as false.[277]

The day after the false alarm on June 6, Carter received a report by Secretary of Defense Harold Brown, who laid out what had happened. He explained that the alarms had been identified as originating in a faulty computer chip, both on June 3 and June 6. He also mentions another such alarm occurring some days before, on May 28, although this lasted only for a few seconds and was immediately recognized as an anomaly. He further described the measures being taken to avoid similar incidents in the future, yet still remarked that he considered the situation to be "very serious." Although he was confident that such false alarms would not result in the accidental launch of an ICBM, he did bring up another point of concern, namely that repeated false alarms could result in a real one being ignored.[278]

Once again, the false alarms resulted in numerous press reports and inquiries.[279] Well aware of this, Secretary of Defense Harold Brown sent Carter a memo with a list of talking points to bring up in response to questions from the media.[280] Brown suggested toning down the issue, emphasizing that no irreversible actions were taken and that the alertness level reached during the alarms was far below that in the 50s and 60s when SAC had a continuously airborne force on alert.[281] This is, of course, in stark contrast to Brown's earlier correspondence to Carter, in

[274] Gary Hart and Barry M. Goldwater, "Recent False Alerts from the Nation's Missile Attack Warning System" (Washington: U.S. Government Printing Office, October 9, 1980), 7, https://catalog.hathitrust.org/Record/101835561.
[275] Sagan, *The Limits of Safety*, 232.
[276] Sagan, *The Limits of Safety*, 232.
[277] Hart and Goldwater, "Recent False Alerts," 7.
[278] Harold Brown to Jimmy Carter, "False Missile Alert," Memorandum for the President, June 7, 1980, The National Security Archive.
[279] Halloran, "Computer Error Falsely Indicates A Soviet Attack; Alert to Military Is Second in Last Seven Months 'Weren't Close to World War III' Steps in the Alert"; Burt, "False Nuclear Alarms Spur Urgent Effort to Find Flaws."
[280] Harold Brown to Jimmy Carter, "False Missile Alert," Memorandum for the President, June 13, 1980, The National Security Archive.
[281] Brown to Carter.

which he considered the situation to be "very serious."[282] It is also not very surprising, given Brown's admonition that they be "brutally honest internally," but to avoid publicity on the issue.[283] The Soviet Embassy again asked about the recent false alarms, and internally may have suggested that the US was orchestrating the events to lure the Soviets into a false sense of security.[284] In spite of this, the USSR dropped the matter rather quickly.

Internal records suggest that these alarms aroused greater interest than the one on November 9. In a memorandum to Carter on July 12, Brown summarized the false alarms again and explained what caused them.[285] He also informed Carter about a few remedial measures that were being taken to avoid similar incidents in the future. What these measures were is somewhat difficult to discern because key parts of the document are redacted, but the parts that are not redacted indicate that the measures included frequent testing and the use of a backup system.[286] Brown further notified Carter on the public interest the incident had sparked. Brown informed Carter that interest from Congress had been high and that the administration continued to receive many letters from members of Congress. To his pleasure, Brown noted that they seemed to have been satisfied by the responses they received.[287] Brown also recounted the interest from the press, noting that while the newspapers reporting on the incidents had stuck to the talking points he had outlined previously, TV companies were airing programs trying to "sensationalize" the incidents. In addition to this, he claimed that the administration was still receiving many requests for interviews, even a month after the false alarms had occurred.[288] Last, Brown pointed out that even if the cause of the false alarms on June 3 and June 6 was now identified, they had to be prepared that a different type of malfunction may cause another false alarm in the future. As such, they had to rely on the human element of their missile attack warning systems.[289]

[282] Brown to Carter, "False Missile Alert," June 7, 1980.
[283] Brown to Carter.
[284] Robert Michael Gates, *From the Shadows: The Ultimate Insider's Story of Five Presidents and How They Won the Cold War* (New York, NY: Simon & Schuster, 1996), 114.
[285] Harold Brown to Jimmy Carter, "False Alerts," Memorandum for the President, July 12, The National Security Archive.
[286] Brown to Carter, "False Alerts," July 12.
[287] Brown to Carter, "False Alerts," July 12.
[288] Brown to Carter.
[289] Brown to Carter.

It appears, then, that all three false warnings were identified to be false very early, and that the risk of an accidental launch of an ICBM was minimal. Furthermore, it appears, despite the efforts to tone down the issue externally, that both the Carter administration as well as NORAD were troubled by the false warnings. In response to the first incident, on November 9, NORAD set up an Operations Review Board to investigate what had happened, and a separate test facility was constructed so that the live system would not have to be used.[290] The June 3 and June 6 incidents seem to have elicited a somewhat stronger response. If Robert Gates' account holds true, that would certainly make sense. As Brown noted to Carter, remedial measures were being taken to address these incidents as well.[291] One could argue that these incidents demonstrate that launch on warning was feasible and safe. Even in the face of false alarms, which was the chief concern with launch on warning, only precautionary and reversible measures were taken. Furthermore, they were taken seriously by NORAD and the Carter administration, who acted to prevent similar occurrences in the future. This suggests that Brown's faith in the human element was well-founded and that fears over false alarms were overblown. Indeed, according to General James Hartinger, Commander in Chief at NORAD, over 150 million messages were transmitted on the new communications system in the three years after the fixes were made, and not a single error occurred.[292]

Freak error or organizational failure?

A closer examination of the incidents, however, paints a very different picture. Scott Sagan, one of the world's leading scholars on nuclear weapons, argues in his 1991 book *The Limits of Safety: Organizations, Accidents, and Nuclear Weapons* that these false alarms were the result of systemic failures, not technical malfunctions or human error.[293] Sagan's argument centers on three issues: First, the error on November 9 occurred while the NORAD was in the process of installing an upgraded computer to improve the reliability of the early warning system.[294] This upgraded computer system had to go through a long period of testing and programming, and this had to be done while the computer was connected to the live early warning network. The same computer that was crucial for NORAD to perform its basic mission of interpreting

[290] "Excerpts of History of ADCOM/ADC, 1 January-31 December 1979," 79; Comptroller General, "NORAD's Missile Warning System: What Went Wrong?," Report to the Chairman, Committee on Government Operations, House of Representatives (General Accounting Office, May 15, 1981), 13.
[291] Brown to Carter, "False Alerts," July 12.
[292] Sagan, *The Limits of Safety*, 233.
[293] Sagan, *The Limits of Safety*, 228–49.
[294] Sagan, *The Limits of Safety*, 238.

and transmitting warnings of a nuclear attack was thus also being tested and programmed, at the same time as it was being used to accomplish that mission.[295] This was recognized as a potential problem as early as 1974, but a request for an isolated means to perform testing was "denied because of lack of funds."[296]

Sagan considers this denial of funds evidence of systemic failure for another reason, too. In October 1962, at the height of the Cuban missile crisis, an eerily similar false alarm occurred. Just like the one on November 9, the false alarm in 1962 occurred due to an exercise tape being transferred onto the live system.[297] It is difficult to determine why the memory of the 1962 false alarm did not raise enough concern to approve funding for a separate testing facility. Whatever the cause, Sagan argues, this points to a failure on the part of NORAD to fix serious problems in the early warning system properly.[298]

The second part of Sagan's argument deals with the alertness measures that were taken during the alarm, that is, the launching of interceptor aircraft. Sagan argues that, in reality, a launch of interceptor aircraft was much more serious than what Pentagon made it out to be.[299] Based on the press reports, the launch of interceptor aircraft was a preliminary measure, and emphasis was put on the fact that no strategic forces were launched, meaning heavy bombers, submarine-launched ballistic missiles, and ICBMs.[300] However, Sagan argues, the internal history tells quite a different story. This was the first time interceptor aircraft were launched in response to a false alarm.[301] By itself, that suggests that the false alarm was more serious than what was reported. After all, false alarms had occurred in the past. Furthermore, and more damning, the launch of interceptor aircraft was the result of a series of communication errors.[302] The message the U.S. sent to its NATO allies claimed that the aircraft had been launched because of a prior alert, and that "all command levels demonstrated entirely proper responsibility in handling the

[295] Sagan, *The Limits of Safety*, 238.
[296] NORAD HQ, Message to Assistant Secretary of Defense C3 and Joint Chiefs of Staff, December 20, 1979
[297] Sagan, *The Limits of Safety*, 130–31.
[298] Sagan, *The Limits of Safety*, 239.
[299] Sagan, *The Limits of Safety*, 240.
[300] Sulzberger Jr., "Error Alerts U.S. Forces To a False Missile Attack."
[301] Sagan, *The Limits of Safety*, 240.
[302] Sagan, *The Limits of Safety*, 241.

data."[303] This was highly misleading, if not flatly false, Sagan argues. According to Sagan, all of the interceptor aircraft were launched due to communication or procedural errors. NORAD had not ordered aircraft to launch but to *prepare* for launch.[304] In one instance, the officer in charge misunderstood the orders. In another instance, aircraft were launched because another office had not heard the entire message.[305] Such problems, Sagan argues, are not unknown in the aircraft industry. In the commercial airlines industry, certain phrases are avoided when orders are given. This is because sometimes, messages are misunderstood or are only partially transmitted.[306] A phrase such as "prepare to launch aircraft" can thus easily become "launch aircraft" if the first two words are not transmitted. The same, of course, goes for a phrase such as "prepare to launch missiles."

Sagan argues that this point is serious enough to question the ability of NORAD to handle false alarms properly. And while this problem was recognized after the November 9 alarm, it was only partially fixed. Indeed, Sagan argues, the June 3 and June 6 alarms underscores the communication and messaging problems at NORAD.[307] While these did not result in the launch of interceptor aircraft, the errors themselves were similar to the flawed command phrasing which caused the interceptor launch on November 9. After all, what occurred was what amounted to a typo in the field that reported the number of missiles headed towards the U.S. Normally, this message would read 0000, but, as described above, in June 1980, it falsely reported that 220, then 2200 missiles were incoming.

The third factor in Sagan's argument is the activities of the Airborne Command Posts.[308] Why was the National Emergency Airborne Command Post (NEACP) launched on November 9? Sagan argues that, once again, what came out of the Pentagon and the Carter administration was highly misleading. Under normal circumstances, it would take about nine minutes to start the engines and launch the NEACP. The alarm, Pentagon claimed, was identified as false within six minutes. This, Sagan argues, clearly indicates that the NEACP was launched after

[303] U.S. State Department to U.S. Mission to the North Atlantic Treaty Organization, "TNF: Soviets and the False Missile Alert," November 28, 1979, 3.
[304] Sagan, *The Limits of Safety*, 241.
[305] Sagan, *The Limits of Safety*, 242.
[306] Sagan, *The Limits of Safety*, 241–42.
[307] Sagan, *The Limits of Safety*, 242–43.
[308] Sagan, *The Limits of Safety*, 243–46.

the warning was identified as false by NORAD.[309] Recently declassified documents slightly alter this impression. According to the internal history of the events, the alarm was recognized to be false after *eight* minutes, not six, as was initially reported.[310] One might speculate, then, that the NEACP may have already been accelerating down the runway when the alarm was identified as false. If that was indeed the case, the NEACP may have been forced to takeoff before it could land again. To be sure, the NEACP is a large jet aircraft, much like a commercial aircraft, which presumably has to ascend after reaching a certain speed on the runway.

That does not, however, suffice to discount Sagan's argument. In fact, an unidentified defense department official shared Sagan's impression.[311] Whatever the cause may have been on November 9, another airborne command post was launched during the June 3 false alarm. This time, it was the Pacific Airborne Command Post, codenamed Blue Eagle, that took off. In that instance, the Blue Eagle took off two minutes after the alarm had been declared false.[312] Once again, Sagan argues, this suggests a serious communications error, although he concedes that this is speculative. He does, however, contend that this explanation is much more plausible than the alternative, that the Blue Eagle was intended to be launched after an alarm had been identified as false.[313]

Theoretical perspectives

Note that Sagan does not discuss these false alarms specifically in the context of launch on warning. Instead, Sagan approaches these false alarms from an organization theory perspective. His argument is part of a larger book that seeks to determine which organization theory fits best with the U.S. nuclear weapons infrastructure. He compares two contrasting theories, what he calls "high reliability theory" and "normal accidents theory."[314] According to high reliability theory, there are four prerequisites to safety in managing hazardous technology: First, organization leaders and political elites have safety and reliability as an overarching concern with dangerous technologies. Second, and perhaps most importantly, is redundancy.

[309] Sagan, *The Limits of Safety*, 243.
[310] "Excerpts of History of ADCOM/ADC, 1 January-31 December 1979," 77.
[311] Thaxton, "Nuclear False Alarm Gives a Grim Warning."
[312] Sagan, *The Limits of Safety*, 245.
[313] Sagan, *The Limits of Safety*, 246.
[314] Sagan, *The Limits of Safety*, 5.

Redundancy permits failure in one part of a system without the entire system collapsing as a result. There are two parts to redundancy, duplication (several units performing the same function) and overlap (several units have some common functions). Furthermore, redundancy can operate on both a human and a technical level. This is the case when intercontinental ballistic missiles are to be launched: two control officers are required to verify the order to launch, and two keys are needed to enable the missile to launch. These keys both have to be turned more or less simultaneously, and their locks are placed far enough apart to prevent a single officer from turning both keys simultaneously. The third factor cited by high-reliability theorists is decentralization, culture, and continuity. The purpose of decentralization is to ensure quick and appropriate response by the people closest to the problems at hand. Culture refers to the proper training and socialization of personnel into a culture of reliability that permits decentralization. Continuity refers to continuous operations and personnel training meant to prevent the carelessness and relaxation that may come from repetitiveness, stability, and routine. Last, organizational learning is a continuous process of improving and adjusting routines and protocols through trial and error.[315]

The second, normal accidents theory, offers a rather pessimistic prediction of how likely accidents are to occur and how disastrous they become when they do occur. According to this school of thought, accidents in institutions handling hazardous technologies may be rare, but are still inevitable. This school of thought has a different view of organizations, regarding them as best fitting the description of "organized anarchies."[316] According to this model, organized anarchies have three general properties: First, instead of having clear objectives which are widely agreed upon, they operate instead as more political institutions. That is, their goals go beyond merely safety or production or whatever the professed motives may be, and instead pursue narrow self-interested goals such as their own survival and security. Moreover, there may be internal differences in preference for how the organization should operate. Second, the normal accidents theorists claim that such organizations and their operating mode are poorly understood even by their participants. This is especially pertinent with regards to technology. Operators at a missile facility may not have intimate knowledge of early warning systems, much less access to them. Third, the consequences of actions in such organizations are obscure, and therefore not always picked up on and may soon be forgotten. Last, the personnel group

[315] Sagan, *The Limits of Safety*, 14-28.
[316] Sagan, *The Limits of Safety*, 29.

partaking in such organizations is fluid. People come and go, and their characteristics are different; some are biased, some pay attention, others do not, others still may be uninformed, uninterested, or even obstructive. [317]

Sagan further describes two structural traits that make organizations dealing with dangerous technologies prone to accident, regardless of the level of priority placed on safety: "interactive complexity" and "tight coupling."[318] Interactive complexity is a measure of how parts and units of an organization interact. A system high in interactive complexity will have interactions that are characterized by "unfamiliar sequences, unplanned and unexpected sequences, and either not visible or not immediately comprehensible."[319] Such a system is likely to suffer unexpected and bizarre interactions between the different components in the system. These interactions are often not anticipated by the creators of the system and seldom recognized by its operators. They are also likely to suffer common-mode failures, which is when one critical unit that shares a common feature with another critical unit undergoes failure, causing all units to fail.

The second structural trait, tightly coupled systems, is marked by four characteristics: First, the more tightly coupled a system is, the more time-dependent processes it has. Interactions occur quickly, and delays and extensions are difficult or impossible. Second, there is little flexibility in the system's procedure to produce an outcome. These outcomes can only be produced in a very limited number of ways, and the necessary steps to produce the desired outcome have to be taken in sequence. Third, there is little slack. This is related to the second characteristic but refers more to the precision requirements in the production of the outcome. Unless the process is done correctly from start to finish and the particular quantities used in the production are precise, the production will have to be started over. Last and perhaps most relevant for this particular thesis, safety devices and redundancies are restricted to those planned specifically for the system at hand.[320] The first three characteristics, by definition, preclude a measured and careful response to an eventual failure, thus necessitating pre-planned safety measures. There is thus little room for improvisation should a failure occur.

[317] Sagan, *The Limits of Safety*, 28-45.
[318] Sagan, *The Limits of Safety*, *32*–36.
[319] Sagan, *The Limits of Safety*, 32.
[320] Sagan, *The Limits of Safety*, 34.

Various systems vary in how tightly coupled and how high in interactive complexity they are. One system may be very high in interactive complexity yet loosely coupled. Similarly, a system may be tightly coupled but not have very complex interactions. However, as Sagan explains, it is when a system has both of these traits that there is cause for concern. In a system high in interactive complexity, common-mode failures are inevitable, and if the system is also tightly coupled, it will be difficult to prevent these failures from escalating to catastrophic proportions. Furthermore, although such failures may be rare, that is hardly comforting when the failure involves highly dangerous technologies.[321]

This thesis does not seek to evaluate which of these theories is best equipped to explain the launch on warning strategy or the false alarms. They do, however, serve as useful analytical tools and feature interesting general perspectives on the overall reliability of complex systems such as the U.S. nuclear arsenal. They are also relevant for two more reasons. First, a proper evaluation of Sagan's argument on the false alarms requires awareness of the theoretical lenses he employs. Second, the false alarms in 1979 and 1980 are among the main events which led Sagan to conclude that normal accidents theory offers the more realistic predictions about nuclear weapons arsenals.[322] When discussing the false alarms, Sagan does so with the intention of investigating whether the U.S. nuclear weapons infrastructure was capable of learning from past mistakes.[323] While we may take note of his conclusion that the U.S. nuclear weapons infrastructure was *not* capable of adequately learning from its mistakes, we may apply some concepts from the schools of thought to better understand the launch on warning strategy, as well as the false alarms. In this sense, the following is an extension of Sagan's argument to the broader complex of launch on warning and false alarms.

Conclusion

[321] Sagan, *The Limits of Safety*, 35-36.
[322] Sagan, *The Limits of Safety*, 251.
[323] Sagan, *The Limits of Safety*, *246*–49.

What general conclusions should be drawn, then, about the launch on warning strategy and the false alarms in 1979 and 1980? First, it is clear that, despite whatever misgivings political leaders may have had about launch on warning, ICBMs were developed in a way that clearly suggested a preference for launch on warning. Despite the strong objection to this strategy by McNamara and others, ICBMs were still being deployed in a way that made them especially vulnerable. At the beginning of the missile age, ICBMs had an advantage over SLBMs in accuracy, but this advantage diminished over time. Nevertheless, not only were ICBMs continuously deployed even as this advantage waned, but new ICBMs were developed, too. This, in turn, suggests a clear preference for launch on warning, or even preemption, as opposed to retaliation after ride-out.

A charitable interpretation would say that the pursuit of a launch on warning *capability* does not constitute an actual adoption of the strategy. While this is true, this interpretation has some weaknesses. First, it is reasonable to assume that U.S. leaders, military or civilian, would not have preferred that the ICBMs be destroyed on the ground. If this is true, then it is also reasonable to assume that the quick launch capability was being pursued because either launch on warning or preemption were the intended strategies. Of these, for reasons discussed above, launch on warning is the most likely candidate. Secondly, given that the capability exists, any president would be under enormous pressure to use it on warning. Under such circumstances, a president would have had to argue that the U.S. ought to wait and see if the attack is real. If the attack was indeed real, the president would have been left with a much smaller force with which to retaliate and would surely face strong criticism on the domestic front. Third, in the event of a breakdown of command and control, the authority to launch a retaliatory strike would have passed down the chain of command. Had that happened, it is more likely that a retaliatory strike would have been launched on warning.[324]

The question of whether a launch on warning was even possible is another one, and difficult to answer. There is ample evidence on the ability for Minuteman ICBMs to be launched quickly, and there were well-planned and presumably well-tested procedures on how a launch on warning would be carried out. There are some indications, however, that launch on warning

[324] Kaplan, *The Bomb: Presidents, Generals, and the Secret History of Nuclear War*, chap. 6. Kaplan does not go into detail on launch on warning, but states that most air force generals would have launched on warning.

might have been difficult to achieve in some circumstances. During the June 3 alarm, there was considerable delay between the time the first false warnings appeared and the time it took before NORAD operators were able to declare the alarm as false. Based on an internal timeline of the event, the delays seem to have been caused by attempts to assess the data and obtain further confirmation that the alarm was indeed false.[325] Had the attack been real, there likely would not have been time to notify the president, for the president to make a decision, and then to retaliate.

Applying normal accidents theory would likely yield a highly critical assessment of launch on warning. Launch on warning depended on a highly complex system of radars, satellites, computers, and people. This system, the command and control system, would likely be considered to be extremely high in interactive complexity by any standard. Launch on warning was also a very tightly coupled strategy. It imposed extreme demands on accuracy in very short time spans. Although a false alarm has not resulted in a launch of an ICBM, such a situation would be consistent with one of normal accidents theory's predictions: when accidents do occur in systems that are both high in interactive complexity and tightly coupled, those accidents tend to be catastrophic.

In response to this, one may argue that the empirical record, in fact, more closely fits the predictions derived from high reliability theory. There has, of course, never been an accidental nuclear war, and not even an accidental nuclear detonation. The accidents that have occurred, though serious, did not pose a great threat of accidental nuclear war. Numerous safety measurements, such as redundancy, are integral parts of the nuclear weapon systems that ensure they are not used inadvertently. Moreover, after the accidents that did occur, such as the false alarms in 1979 and 1980, remedial steps were taken to ensure that they did not happen again. From those events, the U.S. nuclear weapon systems and command and control structure were able to be corrected. In that sense, these accidents represented a process of trial and error by which the U.S. nuclear weapons arsenal and command and control system became increasingly safe and reliable.

[325] Captain Victor Budura, "Talking Paper on 3/6 June False Indications," July 21, 1980, The National Security Archive.

Theoretical questions aside, how do the false alarms in 1979 and 1980 fit with the history of launch on warning? A number of events surrounding the false alarms in 1979 and 1980 would suggest that concerns over false alarms in relation to launch on warning were not only warranted, but underestimated. The false alarm in 1979 resulted in a nuclear alert and the launching of interceptors and the National Emergency Airborne Command Post. As Sagan demonstrates, the launch of interceptors and NEACP occurred not as precautionary measures, which the Carter administration and the Pentagon claimed, but due to communication failures. Furthermore, NORAD was unable to properly identify what exactly had caused the alarm for several months. Lieutenant General James Hartinger, Commander-in-chief at NORAD, described in a letter to Air Force Chief of Staff General Lew Allen that the training tape had been "inexplicably" transferred onto the main display and that "the precise mode of failure could not be replicated."[326] It was thus misleading when Hartinger, in a Congressional hearing, deemed the failure "[a] 100-percent personnel error."[327] The remedial actions also seem to have been inadequate. While a new computer was acquired for testing and backup communication channels were installed, these were unable to prevent other types of errors in the future, such as those that occurred in June 1980.

The dismissive attitude the Carter administration showed in response to the incident appears to have been based on overconfidence. Although concern was expressed inside the White House, primarily by Marshal Shulman, these concerns were not reflected in the statements the Carter administration gave to the press. Nor were they reflected in the response to Brezhnev's message to Carter. While there are some immediate explanations for this reaction, they do not suffice to explain the lack of serious consideration given to launch on warning in the aftermath of the incident. The Carter administration's attempts to deflect attention away from the false alarm and towards the Iran hostage crisis was likely a reflection of what most occupied the Carter administration. Another likely reason is that the Carter administration generally, and NORAD specifically, would not wish to appear incompetent or unable to handle the risks associated with launch on warning. This may, however, also have blinded them to the larger problems associated with launch on warning. All of these factors suggest a lacking appreciation of the

[326] James Hartinger to Lew Allen, March 14, 1980, The National Security Archive.
[327] Sagan, *The Limits of Safety*, 238.

risks involved in such accidents. At best, concerns over false alarms were undervalued, at worst dismissed or ignored.

The very short time the operators at NORAD had to identify the alarm as false is another indication of how dangerous this alarm was. As they themselves later admitted, the President would have been notified had the alarm lasted another minute. What would Carter have done under such circumstances? There are no records of Carter himself speaking on the issue, but there are a few pointers. According to Blair, when the Carter administration revised the general nuclear war plans, Harold Brown ordered the inclusion of a strike option specifically designed to be executed promptly.[328] This iteration of the general nuclear war plan, the SIOP, was approved in October 1980.[329] The clearest indication, however, that the Carter administration would indeed launch on warning, came from Brzezinski. In 1994, Brzezinski said that Carter "accept[ed] the idea that if there was a Soviet first strike, the United States would respond without waiting to absorb the impact of the first strike under all circumstances."[330] This is a very clear indication that had the alarms in 1979 and 1980 not been identified as false, Carter might well have launched a "retaliatory" strike. It is also a very clear indication that these false alarms did not arouse enough concern to seriously question the soundness of relying on launch on warning.

Had the alarm in 1979 occurred a little over a month later, during the Soviet invasion of Afghanistan, things might have turned out worse. As Blair argued, preconceptions about how likely the Soviet Union was to attack would have greatly influenced the reaction to tactical alarms (warnings from satellites and radar). The Soviet invasion of Afghanistan, though probably not the greatest threat to peace since World War II as Carter claimed, nevertheless might have produced tension at NORAD. Indeed, according to Blair, there was unusual activity in Soviet nuclear forces during the invasion of Afghanistan.[331]

[328] Blair, *The Logic of Accidental Nuclear War*, 186–87.
[329] Njølstad, *In Search of Superiority: US Nuclear Policy in the Cold War*, 131.
[330] The Carter-Brezhnev Project, "SALT II and the Growth of Mistrust" (Georgia, U.S., 1994), 47.
[331] Blair, *The Logic of Accidental Nuclear War*, 180.

The reaction to the alarms in 1980 was generally consistent with those following the false alarm in 1979. Once again, the Carter administration tried to tone down the severity of the alarm. While the alarms in June 1980 certainly appear to have been less severe than the one in 1979, the Pentagon nevertheless seems to have understated its severity publicly. If indeed Brzezinski was called by Odom in the middle of the night and was about to call President Carter, the alarm on June 3 did indeed pose a great threat of accidental nuclear war. According to Blair, the director responsible for handling the alarm was fired the day after. This, too, indicates that the alarm was more serious than what Pentagon and the Carter administration expressed publicly.

There are other indications that launch on warning was not considered to pose a serious risk. According to Blair, in the early to mid-1980s, NORAD changed the rules for what they would consider sufficient warning.[332] Before, NORAD required definitive evidence of nuclear explosions in surprise attack scenarios to issue an alarm with a high degree of confidence. However, this was obviously in conflict with the requirements of launch on warning. Therefore, no evidence of a nuclear explosion was required for NORAD to issue a report of an attack with high confidence, even under normal peacetime conditions. NORAD changed its requirements during crises, too. Previously, NORAD would have needed a combination of strategic warning (a prior indication that an attack was about to be launched) and tactical warning from two different sensors. Thus, in a crisis such as the Cuban missile crisis, two independent tactical warnings would be enough to order a retaliation. By the mid-1980s, Blair claimed, this was revised so that tactical warning from only one sensor would be enough.[333] Furthermore, Blair claimed, at some point in the 1980s, NORAD would consider the loss of a tactical warning sensor to constitute a tactical warning. In essence, Blair argued, this resulted in such a heavy emphasis on strategic warning so as to blur the distinction between preemption and launch on warning.[334]

Last, it seems that Shulman's remark that such false alarms were not rare holds true. According to a congressional report on the false alarms in June, missile display conferences occurred 1544 times in 1979.[335] According to the report, these were routine events and did not constitute false

[332] Blair, *The Logic of Accidental Nuclear War*, 192–93.
[333] Blair, *The Logic of Accidental Nuclear War*, 192–93.
[334] Blair, *The Logic of Accidental Nuclear War*, 193.
[335] Hart and Goldwater, "Recent False Alerts," 4.

alarms. More concerning, however, is that threat assessment conferences, the type of conference called during the false alarms in 1979 and 1980, were called 78 times in 1979. In the first half of 1980, there were 2159 missile display conferences and 69 threat assessment conferences.[336] According to Blair's model, the fact that these threat assessment conferences did not escalate further is in no small part because of the general presumption of peace. Had one of these conferences been called while a strategic warning existed, things may well have gone further.

In conclusion, it seems that it is appropriate to interpret the false alarms in 1979 and 1980 as clear failures of NORAD to prevent false alarms from escalating. The immediate reaction of the Carter administration to the false alarms in 1979 and 1980 was likely inadequate. This would also appear to be consistent with the more pessimistic schools of thought on how organizations handle dangerous technologies. Furthermore, it also appears that these false alarms had little to no effect on the general inclination towards launch on warning. Launch on warning, on the contrary, seems to have become a *more* ingrained part of U.S. nuclear strategy.

These are important issues that have received relatively little attention in the scholarly literature. Blair attributed this to a popular perception that retaliation after ride-out would be the response to an attack by the Soviet Union.[337] According to Blair, this perception came to be due to McNamara's use of "assured destruction" rhetoric doctrine in the 1960s. That doctrine, however, as described in chapter 2, did not represent the actual war plan. Whatever the cause for the sparse attention devoted to launch on warning and false alarms, these events continue to hold relevance for the present. There is an ongoing debate in the U.S. on the development of a new ICBM.[338] That debate would benefit from an increased understanding of the risks associated with launch on warning and false alarms.

[336] Hart and Goldwater, 4.
[337] Blair, *The Logic of Accidental Nuclear War*, 175.
[338] "Why Is America Getting a New $100 Billion Nuclear Weapon?," *Bulletin of the Atomic Scientists* (blog), February 8, 2021, https://thebulletin.org/2021/02/why-is-america-getting-a-new-100-billion-nuclear-weapon/.

Chapter 5 – Summary

After World War II, the U.S. was in a unique position of power. With the Great Depression in its wake, the United States had avoided war on its homeland and enjoyed a monopoly on the nuclear bomb. The wartime alliance between the U.S., the USSR, and the U.K. had been fragile even before the war quit, however, and immediate post-war conflicts of interest laid the foundation for the period of tension that was soon to follow. In 1948, U.S. President Harry Truman proclaimed the Truman doctrine, whereby the U.S. would intervene in countries where communist takeovers were threatening.[339] A year later, in 1949, the Soviet Union broke the U.S. nuclear monopoly. In trying to make sense of what the nuclear era meant for warfare and diplomacy, Bernard Brodie made his career. Assuming that nuclear weapons would be used against cities, – they would be too powerful and too scarce to be worth using on anything else – Brodie came to the conclusion that nuclear weapons could only serve to deter war. Actually fighting a nuclear war would be close to suicidal.

By the time Eisenhower had come into office, the Cold War was in full swing. To make matters worse for Eisenhower, it seemed as if the communists were winning. In China, the communists had won the civil war, and the Korean war was at its height. Faced with communist victories in Asia, Soviet superiority in conventional forces in Europe, and a swelling defense budget, Eisenhower saw the nuclear bomb as the solution. The U.S. was still miles ahead of the Soviet Union in terms of the number of nuclear weapons in their arsenal, and the nuclear strategy at the time called for using nuclear weapons at the outset of a Soviet invasion. A few days before Eisenhower's election, the U.S. exploded their first thermonuclear weapon, codenamed Ivy Mike. Thermonuclear weapons, or hydrogen bombs, made regular fission bombs seem like firecrackers. Ivy Mike had exploded with a power equivalent to 10,4 million tons of TNT and destroyed the island of Elugelap, where it was detonated. By comparison, the bomb that destroyed Hiroshima exploded with a force of 15 thousand tons of TNT, 700 times less powerful.

[339] Jeremi Suri, *American Foreign Relations since 1898: A Documentary Reader*, Uncovering the Past (Chichester, West Sussex ; Malden, MA: Wiley-Blackwell, 2010), 90–93.

Hydrogen bombs were not only frighteningly powerful, they were also much more efficient. For one, the material needed to make them was much more readily available than the relatively rare materials needed to make fission bombs. Secondly, they could be made smaller and lighter while still being enormously destructive. This permitted them to be fitted onto intercontinental ballistic missiles, capable of striking targets thousands of kilometers away in a matter of minutes. With this, the specter of nuclear war was ever-present.

As hydrogen bombs were being developed, so was nuclear strategy. Brodie's assumptions about nuclear weapons were by then at the very least outdated; bomb-making material was now easily available, and with an ever-expanding nuclear arsenal, some strategists started to reconsider how nuclear weapons would actually be used. In this endeavor, Albert Wohlstetter at RAND was the main protagonist. Starting out on what he considered a boring study on the use of overseas airbases, Wohlstetter discovered that SAC aircraft, equipped with nuclear weapons and stationed at foreign airbases, were severely vulnerable to attack. This concept of vulnerability would become the main justification for the perpetually growing U.S. nuclear arsenal, new weapons systems, and nuclear strategy in general.

These two developments, ICBMs and vulnerability, created the necessary conditions for the adoption of a launch-on-warning strategy. The launch-on-warning strategy entailed launching ICBMs on tactical warning of a Soviet attack before the Soviet missiles actually hit. Ideally, this would cause the Soviets to have wasted a big part of their nuclear arsenals on empty siloes in sparsely populated areas. It is also worth noting Bruce Blair's arguments on launch on warning. According to him, launch on warning was essentially a compromise between two unattractive opposites: preemption and retaliation after ride-out. Even though this strategy made more sense to U.S. nuclear strategists than both preemption and retaliation after ride-out, it remained an imperfect compromise. The most obvious weakness was the danger that a false alarm might cause a "retaliatory" strike, causing a nuclear war by accident.

Though both civilian and military officials have been reluctant to either confirm or deny the existence of a launch-on-warning strategy, the documentary record nevertheless reveals a great deal. Whether the U.S. would really employ the launch-on-warning strategy would ultimately

remain the President's choice. Naturally, most presidents hoped never to face such a choice, and there is no indication that any of them did. Still, the capacity to use the strategy was undoubtedly developed. It is difficult to determine at what point SAC felt that the capacity was cemented, but it was likely a continually evolving process.

That process was itself a part of the development and deployment of ICBMs. From the very beginning, ICBM vulnerability was a major concern. To alleviate this, a capacity for quick launch was continuously worked on. A few factors suggest that this capacity was reached sometime in the late 1960s or early 1970s. First, the volume of primary sources on launch on warning is much greater starting in 1969. It is not implausible that this was related to the general modernization of the U.S. nuclear arsenal. Secondly, as the Soviet Union was approaching the U.S. in terms of quality and number of ICBMs, the perceived need for launch on warning in the U.S. increased. Simply put, the Soviet Union's first-strike capability increased, and with ABM-systems banned by the ABM-treaty, launch on warning may have been viewed as the most sensible recourse.

By the time Carter had become president, there was no doubt. The command and control system responsible for transmitting warning information and orders to retaliate was by this point sophisticated enough to theoretically permit for a launch-on-warning. In 1979, this issue came to the public mind when on November 9, a false alarm occurred at the NORAD headquarters. For a few frightening minutes, the United States prepared for nuclear war. Twelve fighter jets were launched, launch control officers at missile sites stood by for orders to strike, and the National Emergency Airborne Command Post was launched, though without the president on board.

Although the event sparked concern both among the public, internally in the Carter administration, as well as in the Soviet Union, the Pentagon and the Carter administration did as best as they could to tone down the incident. There was absolutely no danger of a nuclear launch, they claimed, because human safeguards would stand in the way. They did not accomplish calming down everyone. In response to Leonid Brezhnev's concern, the Carter administration sent a letter that Marshall Shulman would call "gratuitously snotty." Moreover,

Shulman noted that such false alarms happened often, and to his disturbance, they were not taken seriously.

The response to the incident was inadequate, and neither the military establishment nor the Carter administration seemed to grasp the severity of the issue. The remarkable lack of concern on the part of the Carter administration may, of course, be at least partly explained by the Iran hostage crisis, which had broken out a few days before. Another explanation is that the Pentagon implemented reforms aimed at preventing such a false alarm from reoccurring. That effort was only partially successful. On June 3, 1980, another false alarm occurred. Although the alertness measures taken at this time were not as drastic as the ones in November, they were still remarkable enough to elicit yet another round of controversy surrounding false alarms. This time, it also caught the attention of the president. What these false alarms also did, though no one seemed to realize it at the time, was to call into question the feasibility of launch-on-warning. During the alarm on June 3, operators at NORAD were unable to determine whether the alarm was real or not in a timespan that would have permitted for launch on warning, had the alarms not been false.

Whether launch on warning was feasible or not, it remained an integral part of U.S. nuclear strategy. As noted in the congressional report written in the aftermath of the false alarms, "[false alarms] will occur and we must rely on the collective judgment of the people manning the system to recognize and deal correctly with false alarms."[340] How prudent that reliance is, however, is called into question by the broader history of launch on warning and false alarms.

[340] Hart and Goldwater, "Recent False Alerts," 13.

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