TO DETECT, TO DETER, TO DEFEND:

THE DISTANT EARLY WARNING (DEW) LINE AND EARLY COLD WAR DEFENSE POLICY, 1953-1957

by

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B.A., Truman State University, 1991
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AN ABSTRACT OF A DISSERTATION

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Abstract

The Distant Early Warning (DEW) Line, a key program under President Dwight D. Eisenhower's "New Look" policy, prepared the United States defense posture for "the long haul" in the Cold War. Eisenhower wanted to prevent the escalation of military costs while still providing an adequate defense. Eisenhower emphasized a retaliatory capability *and* improved continental defenses, the so-called "sword and shield," which are key features of the New Look. The DEW Line would prove to be a vital component of both. Whereas the initial emphasis of the DEW Line was to warn against attack providing for both active and passive defense measures, soon there was a definite "counter-offensive" role for the DEW Line as well—the protection of the primary retaliatory capability of the United States: the Strategic Air Command (SAC).

The place of the DEW Line in the history of the Cold War has been an underappreciated topic. With the exception of the scholarship from the 1950s and early 1960s, only recently have continental defense and particularly the DEW Line been removed from the shadows of other Cold War events, strategies, and military programs. This doctoral thesis is an account of the DEW Line's conception, implementation, and position in Eisenhower's New Look and deterrent strategy. The DEW Line proved to be a cardinal feature of Eisenhower's New Look strategy: it strengthened overall U.S. defenses and defense posture as the one element of U.S. defense policy ("New Look") that improved and connected both the active and passive measures of continental defense by providing early warning against manned bombers flying over the polar region; it bolstered the deterrent value of SAC; and it was instrumental in developing closer

peacetime military cooperation between the United States and Canada. In fact, U.S.-Canadian diplomacy during the 1950s offers an important case study in "superpower-middle power" interaction. However, despite the asymmetry in their relationship, U.S.-Canadian defense policies proved to be analogous. All of these objectives could not have been accomplished without the technological and logistical abilities necessary to construct successfully the DEW Line.

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Dedication

To my loving family: Nikki, Heidi, and Ellie

Preface

Though they were elated by their recent victory in World War II, in the early years of the Cold War the American people nevertheless had a sense of foreboding. The United States had relied heavily on industrial output and technological superiority for its victory. But these impressive technological and industrial feats proved to be a double-edged sword, as they made for a more complicated post-war world. Atomic bombs and the intercontinental bombers to deliver them had been monopolies held by the United States. The Soviet Union would soon acquire these advanced weapons and aircraft, making the United States tremendously vulnerable. The United States could be immediately threatened by a nation on the other side of the globe, without the time to build up the military. In the past the United States had had the luxury of maintaining a small military when not engaged in active hostilities.

The Allied coalition was breaking apart even before the end of World War II. The Soviet Union, which from the beginning had been distrustful of the Western nations, had ideas divergent from the Allies on the configuration of the post-war world. Opposing views on such issues as the composition of governments of the eastern European countries and the occupations of Germany, Berlin and Austria made for growing tensions and mistrust.

Since the success of the Bolshevik Revolution in 1917, Marxism had no longer been a theory but had been put into practice. And keeping with tenets of Marxism, the Soviet government in 1919 founded the Third International (Comintern) for the purpose of placing the socialist movements of Europe under the direction of Moscow. This was a vehicle for the Soviets to export revolution abroad and replace capitalism around the world with the Bolshevik model of socialism (communism). To the United States, communism was not only anathema to its core values but was a threat to its very existence. The long-time animosity between the capitalist West and communist Russia was only heightened by the contrast in their respective economic philosophies.

With the end of the Second World War, the Soviet Union was positioned to use its status as one of the two most powerful nations on earth to further the expansion of communism, particularly central and Western Europe, but also to parts of Asia, especially China. The Soviet Union now had the military might to back communist expansion. In the 1940s and 1950s, many in the United States (including the government) believed that communism was a monolithic entity, firmly controlled by Moscow. We now know this was not the case at all. But in examining events around the world of the 1940s and 1950s with this perception, one can see that the United States had reason to feel threatened or at least concerned about the advance of communism. Some events were in fact controlled from Moscow, other incidents were only encouraged by the Soviet Union, while still others happened independently. The Berlin Crisis of 1948 as well as Soviet detonation of an atomic device the following year happened against the backdrop of Moscow's growing hold over the Eastern European nations. Mao's communist Chinese victory in 1949 was not controlled by Moscow but did bring another victory for communism. Counter to the popular argument, six hundred million Chinese were not "won" by the Soviet Union. Nonetheless, these communist advances were a cause for concern.

When scrutinized through the theory of monolithic communism, world events in the early 1950s continued to be problematic for the United States. This era saw self-determination and nationalism asserted in the colonial world. In the bi-polar competition between the U.S. and the USSR, any nationalistic movement was inherently dangerous. A movement by a country out of one bloc into the other's sphere of influence could be interpreted as a defeat, potentially weakening the coalition from which the country left. In June 1950, North Korea invaded South Korea across the 38th parallel. In 1954, the Viet Minh's victory over the French at Dien Bien Phu shocked the Western nations and was construed by U.S. policy makers as a victory for Moscow. These occurrences of the 1940s and 1950s, if imagined with Moscow as puppet master, were interpreted by the public and government officials as major victories for the Soviet Union. As such, these "victories" were losses for or at least weakened the position of the United States.

In order to prevent the spread of Soviet influence, if not domination, in the immediate post-World War II era, the Truman Administration settled on the strategy of containment.[1] If the Western nations could keep it from expanding, the theory went, the Soviet Union would eventually collapse. If communism (the Soviet Union) was allowed to expand, then nation after nation would fall, leaving America more vulnerable, both economically and militarily, to the Soviet Union.[2]

Hiroshima and Nagasaki catapulted the United States into super-power status. For the immediate future, the United States would have an atomic monopoly, but even the most optimistic of individuals realized that this domination would not last forever. Instead of providing jubilation or at least a comfortable belief in U.S. superiority, images of a future war in which atomic weapons would be used were already being disseminated by mainstream media among the population and were ingrained into the American psyche. In a popular *Life* magazine article of November 1945, readers were confronted with stark imagery of atomic projectiles detonating on various U.S. cities, accompanying and detailing General H. H. (Hap) Arnold's description of a scenario for a future atomic war.[3]

With the end of World War II, the potential vulnerability of the United States had drastically changed. During the war there were German U-boat attacks along the eastern seaboard as well as a fear of long-range (heavy) bombers attacking such places as New York City. While Germany did not have that capability in World War II, it did get Americans to rethink their position (and growing vulnerability) in the world. It would not be long until the Soviet Union would have the capability of striking the American homeland. When the Soviets detonated their first atomic device in 1949, they had the means, albeit limited, to deliver an atomic weapon on the United States. America's age of invulnerability had ended.

Americans also had to reconceptualize their view of the world. A common map for depicting the world is a Mercator map. This map configures the world into a West-East orientation, often overemphasizing the continents in the northern hemisphere. A Mercator map made in the United States would be centered on the 90th west meridian, placing the North American continent in the center. This depiction of the world confirmed the earlier image of geographic centrality: the North American land mass surrounded by two great oceans and an impenetrable polar ice cap to the north. But with the growing threat of airpower, a map truer to strategic reality was a northern polar projection map. This type of map emphasizes the proximity of the North American and Asian land masses by centering the map on the North Pole. A Polar projection map helped Americans to visualize their true military situation and became a "necessity for a strategic understanding of current affairs."[4] Because of the ever-improving technology of air power, now the most likely routes of an air attack would be across this once militarily impenetrable area.

The increasing vulnerability of the United States homeland, America's growing military commitments around the world, and the evolving threats to U.S. security had brought about a transformation in American defense policy by 1951. These dangerous realities began to alter America's commitment to defense, especially continental defense. Reflected in the shift in U.S. defense policy was the size of the American military. Even though there was a substantial reduction in force with the ending of World War II, from a wartime high of 12,123,455 to 1,582,000 in 1947, the latter figure is still around 1.1 million higher than the size of the armed forces in the year preceding U.S. entry into the war and over 1.3 million larger than their smallest size during the interwar years.[5]

Even though the tradition American defense cycle had been broken and the United States was keeping more of its citizens in uniform even in times of peace, the increased number of soldiers still proved inadequate for the growing Cold War. The equipment and training levels of troops were woefully lacking in the immediate postwar years; the usual cycle of military unpreparedness appeared to be reemerging. In the past, the United States allowed its military to fall into a woefully inadequate state during peacetime. When the United States found itself having to prosecute a war, especially against a power of similar strength, the pitiable state of its military forces became obvious. Some elements of the U.S. armed forces did not succumb to this distressing progression, however.

The air arm was the branch of the armed services given a greater priority. On 21 March 1946, the United States Army Air Forces created three combat air commands: the Strategic Air Command (SAC), the Tactical Air Command (TAC), and the Air Defense Command (ADC).[6] The following year, President Harry S. Truman approved the National Security Act of 1947, which gave the Air Force independent standing from the U.S. Army. The United States could not deter war by matching the Soviet Union soldier for soldier. Instead the United States had to rely on technological superiority. America's lead in atomic armaments and the means by which to deliver these weapons proved a significant advantage. United States defense policy elevated the Air Force as the key to deterrence.

To discourage further the Soviet Union from expanding westward into central and western Europe, the U.S. combined its nuclear deterrent with the collective security offered by North Atlantic Treaty Organization (NATO), formed in 1949. According to the North Atlantic Treaty, the primary responsibility of NATO was to "safeguard the freedom" and provide for the security of its member countries.[7] Article Five provided the backbone or enforcement mechanism for the Treaty:

> The Parties agree that an armed attack against one or more of them in Europe or North America shall be considered an attack against them all and consequently they agree that, if such an armed attack occurs, each of them, in exercise of the right of individual or collective self-defence recognised by Article 51 of the Charter of the United Nations, will assist the Party or Parties so attacked by taking forthwith, individually and in concert with the other Parties, such action as it deems necessary, including the use of armed force, to restore and maintain the security of the North Atlantic area.[8]

The combined deterrent value of atomic weapons and collective security was supposed to keep the Soviet Union's dominance confined to Eastern Europe. The Soviet detonation of an atomic device in 1949 coupled with the onset of the Korean War in 1950 caused greater concerns for U.S. security. The erstwhile American atomic monopoly was now broken. Although the Soviet Union had limited means in 1949 to deliver atomic weapons onto U.S. soil, it was only a matter of time before the Soviets could launch a devastating atomic attack. Great speculation and study by military and non-military experts were focused on predicting the day when the Soviets would develop that capability. Under President Truman, U.S. policy marked 1955 as the year of maximum danger, the period in which the Soviet Union would be able to launch a crippling attack on the United States.[9] If United States air defenses were not improved, the whole American deterrence policy would be at risk.

The next incident suggesting that U.S. security planning was in need of reformulation was the North Korean "sneak attack" against South Korea on 25 June 1950. When war came, it was not in Europe as many strategists had been predicting, but instead on a peninsula in East Asia. The invasion and the war that resulted were responsible for further examination of U.S. defense policy.

American forces in 1950 were spread thinly in Europe, Asia, and in the continental United States. While a large part of the U.S. armed forces were in Europe, the numbers alone were not adequate to prevent a Soviet conquest of Western Europe. U.S. forces in the Pacific were primarily located in Japan and on various islands of strategic importance in the western Pacific such as Okinawa and the Philippines. These forces, along with those in South Korea, were not on a wartime footing. U.S. commanders in the Far East were not anticipating an attack of this magnitude, though some advisors had suggested the possibility. Prior to the attack, U.S. troops were not at an optimum level of training and readiness. Adding to this problem, U.S. weapons and equipment were World War II vintage and not in optimal condition.

Although this sneak attack occurred on the other side of the Pacific Ocean, a familiar chord resounded in American government, military, and public circles. The North Korean attack evoked images of Pearl Harbor, not too many years removed, where the United States had been caught unprepared. If the invasion of South Korea surprised U.S. officials, what other nasty surprises might there be in the future? Luckily, the United States was able to survive both the Pearl Harbor and Korean attacks, since neither struck at the center of American strength, namely, the continental United States. But another, more deadly threat to the United States was looming on the horizon, both figuratively and literally. A surprise air attack by a bomber force carrying atomic weapons could be devastating, especially with no warning and few reliable means of defense. The Korean War, coupled with the growing threat of atomic attack by the Soviet Union, initiated a radical change in U.S. defense policy.

It was at this point (1950-1952) that the United States began launching an enormous military build-up. Many government and military leaders feared the North Korean invasion might lure U.S. forces from Europe, leaving that continent more vulnerable to a Soviet offensive. Some military strategists even believed that this was the true purpose of the North Korean invasion.

During the military buildup and the growing sense of vulnerability in the early 1950s, there was a developing concern for continental defense among the policy makers in the Unites States, from the president through the ranks of military leadership down to national security-conscious scientists. At the very least, continental defense measures served to protect SAC, the strategic air arm of the U.S. military and the primary deterrent to Soviet attack. American postwar policies and prestige relied almost exclusively on its atomic superiority, whether it was the atomic monopoly enjoyed from 1945 to August 1949 or the quantitative advantage in atomic weapons and delivery means during the early 1950s. Civilian and military policymakers, including General Curtis LeMay, had to ensure the protection of the primary deterrent force. They believed that the survivability of SAC bombers alone provided the ultimate check to a Soviet attack against the American continent. If American offensive capability could survive an attack and still be able to launch a devastating second-strike against the Soviet Union, this might prevent the Soviets from even attempting an initial strike. Thus the Soviets would risk near total destruction even if they struck first.

Making this scenario even more problematical, however, was the Soviet acquisition of a thermonuclear capability in the shadow of the U.S. detonation of such a weapon. Where the explosive yield of atomic bombs was in the kiloton range, the destructive power of thermonuclear weapons needed to be measured in megatons. Now a single hydrogen weapon, if delivered on an urban target, could destroy the entire city. With the development of thermonuclear weapons, it was even more critical that SAC bases and other military or civilian targets be better defended or at least prepared. A critical element of this improved defense would be earlier warning of any Soviet nuclear attack.

In December 1952, the Truman Administration advocated greater continental defense measures and approved the construction of a distant early warning radar system, less than a year before the Soviets developed thermonuclear capability. As Truman's Administration determined 1955 was "the year of maximum danger," the projected completion date for an early warning system was 31 December 1955, "with as much of the system as possible to be in operation by December 31, 1954."[10] The further away from the continental United States the radar, the greater the warning time. A chain of radar stations along the Arctic Circle could provide anywhere from two to six hours of warning, depending on whether the Soviet bombers had turbo-prop or jet engines. A major problem for the immediate construction of a distant early warning line was that Truman's Democratic administration would be replaced by the Republican Eisenhower the following month. The new administration might give new priorities to defense programs.

Eisenhower chose to rethink the whole issue surrounding continental defense by instigating further studies, using men and committees of his choosing, instead of relying on recommendations by committees of the Truman administration. Even more importantly, Eisenhower considered defense and the American economy as inseparable entities. In numerous statements before and after his election, Eisenhower made it clear that one of his major goals was to cut back defense spending, along with attaining a sound, growing U.S. economy. Administration policy was clearly outlined in National Security Council statements detailing these courses of action. The first section of both NSC-159/4 (September 1953) and NSC-5408 (February 1954) is titled "Interrelation of Continental Defense to Other Elements Constituting National Security," and the first paragraph is as follows:

> The survival of the free world depends upon the United States maintaining: (a) sufficient strength, military and non-military, to deter general war, to prevent or counter aggression, and to win a general war if it is forces upon us; and (b) a sound, strong economy, capable of supporting such strength over the long pull and of rapidly and effectively changing to full mobilization.[11]

The central thesis of Eisenhower's policies during his first years in office resounded: a healthy economy is the foundation of overall strength. There would be no use creating such an armed state if it would threaten the soundness of the economy along with the American way of life. If taxes and government spending were to be increased to a point the economy could not support, then what is being defended would be lost. Eisenhower would thoroughly scrutinize military force requirements and defense programs during his first years as president.

Eisenhower was not interested in the immediate construction of the DEW Line. He did not feel the same sense of urgency about the Arctic warning line as Truman did. Many questions would have to be answered before his administration would approve such a complicated and expensive undertaking. The DEW Line was put on hold until further continental defense studies could be conducted. These studies, along with the proven technological feasibility of Arctic radar stations and the Soviet detonation of a thermonuclear weapon in August 1953, reemphasized the vulnerability of the United States and convinced Eisenhower and others of the necessity of the DEW Line.

An early warning line, the studies concluded, would provide increased warning time to evacuate people to better protected areas. More importantly, increased warning would better prepare the air defenses and SAC to meet the threat of a surprise attack. The DEW Line, coupled with the other radar systems, would help to provide the “warning element” in a defense-in-depth strategy, allowing interceptor forces to meet the incoming bombers further away from the target sites. SAC would also have more time for its strategic bombers to take off and be out of harm’s way. With the proposed DEW Line, SAC could avoid spending extraordinary sums to build shelters to protect its fleets of bombers.

Eisenhower officially approved the construction of the DEW Line in November 1954. In a little over two and a half years, this Arctic warning line of radars was completed and operational (31 July 1957).

The DEW Line’s significance in Cold War history during the 1950s has been undervalued. The DEW Line was central to continental defense during the Cold War, and its original purpose, that of providing warning, is still a relevant element to defense in the 21st century as the U.S. military faces new threats. The DEW Line was a key component of President Eisenhower’s defensive strategy, the New Look. The DEW Line had a dual function. Not only did it appreciably enhance continental defenses, by providing the necessary early warning for other air defense elements to respond, but it considerably strengthened the U.S. strategy of deterrence by helping to protect SAC. Improved continental defenses and a powerful, protected nuclear retaliatory force were two of the cardinal features of the New Look, the DEW Line played a significant function in both of these capacities.

The place of the DEW Line in the military history of the Cold War has traditionally been a neglected topic, or at best only tangentially discussed. With the exception of the scholarship from the 1950s and early 1960s, only recently have continental defense and particularly the DEW Line been removed from the shadows of other Cold War events, strategies, and military programs. The controversy surrounding the DEW Line was as great as any debate over military policy or programs in the United States during the first decade and a half of the Cold War. Unfortunately, outside of a few retrospective articles where analysis is minimal and a couple of theses at the Master's level, the DEW Line has often been dismissed as inconsequential or it has just been at overlooked, or worse, just plain ignored.

The DEW Line was intended to warn against nuclear attack by manned, long-range bombers on the continental United States. This threat by the Soviet Union as the *principal* means of delivering such weapons lasted for only a relatively brief period (the 1950s), as Intercontinental Ballistic Missiles (ICBMs) or Sea-Launched Ballistic Missiles (SLBMs) soon became the primary Soviet threat. Because of this change of delivery platforms, some military and civilian observers even said the DEW Line, not equipped to detect missiles, was obsolete as soon as it became operational. This does not do justice to the DEW Line because it does not take into account the bigger picture, the DEW Line's role within developing U.S. deterrence strategy, an essential feature of Eisenhower's New Look policy.

First, Eisenhower sought economically efficient means to trim military costs while still maintaining proper protection against enemies. It is a testament to the growing importance of continental defense that during the years from 1953-1957 as the overall military budget was reduced, continental defense programs experienced an increase in funding. One component of his overall strategy was to minimize manpower requirements, a sure way to reduce expenses. To help compensate for decreasing the size of the armed forces after the military manpower buildup during the Korean War, the President wanted to make "maximum use of science and technology." The DEW Line was an example of using the most current science and technology to reduce the personnel needed to operate the radar chain without compromising its function.

Second, emphasizing science and technology also brought people from outside of military circles into the debate on continental defense. Because of the growing complexity and technological nature of modern warfare, military scientists no longer held the monopoly on expertise in defense matters. More and more civilian scientists were participating in defense endeavors and studies. Because of the blurring boundaries of the military and civilian spheres, civilian advisers played an increasingly influential role in the Eisenhower Administration. Also, civilian theorists began to contribute to the debates on military strategy. The debate on continental defense and military policy occurred in an unprecedented public forum, outside of the military and governmental circles, which had not been typical of the Truman presidency. This allowed the public of both the United States and Canada to follow to some extent the continental defense debate. While it is difficult to measure the effects of public opinion, if any, on the outcome, the public became more aware of defense issues. At the least, Americans and Canadians recognized that their governments were attempting to do something for defense in the frighteningly unfamiliar territory of the nuclear age.

Third, Eisenhower wanted to emphasize a retaliatory capability *and* improved continental defenses, the so-called "sword and shield." The DEW Line would prove to be a vital component of both. Whereas the initial emphasis of the DEW Line was to warn against attack for both active and passive defense measures, soon there was a definite "offensive" role for the DEW Line as well; or, at least, the protection of the primary offensive capability of the United States, the Strategic Air Command (SAC). There was opposition to the DEW Line within the Department of Defense (primarily the Air Force, but the U.S. Navy and U.S. Army had their reasons as well). Military opponents of the DEW Line perceived this continental defense endeavor as consuming funds that would have better been spent on the more dependable offensive capabilities of the military, in particular SAC. The results of placing defense dollars into SAC were more quantifiable then the indefinite outcome of the funding of unproven, complex defense measures. If there were limited financial resources then the viability of SAC should not be compromised by its underfunding. The opposition to the DEW Line did not abate until it was realized that the Arctic warning line would not compete with SAC for essential appropriations. Both would receive the financial support necessary and did not have to compete for, or split, a smaller budget. The DEW Line also made unnecessary the building of expensive defense shelters to protect the bombers of SAC; instead, warning would suffice.

Cold War scholars have often dismissed the DEW Line's connection with deterrence. Instead, the DEW Line was a key component of the strategy of deterrence. By offering greater protection to SAC bombers and assistance to airborne interceptors of attacking bombers, the DEW Line threatened the enemy with the possibility of substantial U.S. retaliatory capacity. Thus, the DEW Line contributed a significant stabilizing element to deterrent strategy. It also allowed the United States the luxury to implement a no-first-strike policy.

The DEW Line also played a key role in forming a formal alliance with Canada, the North American Air Defense Command (NORAD). Although there were Canadian suspicions about U.S. intentions and legitimate concerns over sovereignty issues in the Arctic, the defense alliance was made more likely because of the growing complexity of the defense network and the cordiality of the discussions of continental defense concerns between the two nations. The combination of the DEW Line and the other warning lines with NORAD was critical in creating a new system of continental defense. NORAD, a joint Canadian and U.S. endeavor, was illustrative of a new form of American diplomacy, one of the first actual examples of *peacetime* cooperative defense.

All of this would not have been possible without the physical ability to construct a radar warning chain in the North American Arctic. This rested on the feasibility of operating equipment and housing personnel in some of the most inhospitable conditions on earth.

Eisenhower officially approved the construction of the DEW Line in November 1954. In a little over two and a half years (31 July 1957), this Arctic warning line of radars was completed and operational. The DEW Line strengthened overall U.S. defenses and defense posture. It is the one element of the "New Look" defense policy that connected the active and passive measures of continental defense, protected the deterrent value of SAC, and aided in the formation of a formal United States-Canadian agreement, the North American Air Defense Command (NORAD). NORAD established a joint command structure for operation control of the continental air defenses. The initial threat facing the North American continent was manned Soviet bombers.[12] These results could not have been attained without the technological and logistical abilities to construct the DEW Line. This doctoral thesis is an account of the DEW Line's conception, implementation, and ultimate position in Eisenhower's New Look and deterrent strategy. It will closely examine the challenges of developing fifty-seven radar sites north of the Arctic Circle along the northern coast of the North American continent, and the internal debates, the international negotiations, and logistical obstacles that were surmounted to move a navy, army and air force to the cold-weather theater of operation to create the first line of defense from a Soviet air attack.

The DEW Line proved to be a cardinal feature of Eisenhower's New Look strategy: it strengthened overall U.S. defenses and defense posture as the one element of U.S. defense policy ("New Look") that improved and connected both the active and passive measures of continental defense by providing early warning against manned bombers flying over the polar region; it bolstered the deterrent value of SAC; and it was instrumental in developing closer peacetime military cooperation between the United States and Canada. In fact, U.S.-Canadian diplomacy during the 1950s offers an important case study in "superpower-middle power" interaction. However, despite the asymmetry in their relationship, U.S.-Canadian defense policies proved to be analogous. All of these objectives could not have been accomplished without the technological and logistical abilities necessary to construct successfully the DEW Line.

[1] The revisionist (New Left) camp would argue that it the United States played a more antagonistic role in bringing about the Cold War than the more traditionalist view, which placed greater blame on the Soviet Union. The United States realized that many of the principles of the Atlantic Charter would not be achieved in the post-WWII world, along with "open trade" for American goods in world markets. Instead the United States sought to use its atomic monopoly to intimidate the Soviet Union and in turn expand capitalism at the expense of the Soviet Union. The first works of the revisionist school of U.S. foreign relation was William Appleman Williams's *The Tragedy of American Diplomacy* (1959).

[2] In conjunction with the theory of containment, though formulated many years later, is the Domino Theory. The Domino Theory states that if one nation falls to communism, than adjacent nations are more likely to be unable to resist becoming communist.

[3] "The 36-Hour War: Arnold Report Hints at the Catastrophe of the Next Great Conflict" *Life* 19 no. 21 (November 19, 1945), 27-34.

[4] Danzer, Gerald A. *Discovering World History through Maps and Views.* 2nd Edition (New York: Harper Collins Publishers, 1996), p R29.

[5] www.sjprep.org/tclifford/USweb/MILITARYSIZE.html source (*Historical Statistics of the United States*).

[6] *History of the Strategic Air Command* from http://www.strategic-air-command.com/history/history-02.htm

[7] Opening statement (preamble) of North Atlantic Treaty, http://www.nato.int/docu/basictxt/treaty.htm#FN1. See also North Atlantic Treaty Organisation, *The North Atlantic Treaty Organisation: Facts and Figures* (Brussels: NATO Information Service, 1989), 11 and 323. The original member states included Belgium, Canada, Denmark, France, Iceland, Italy, Luxembourg, Netherlands, Norway, Portugal, United Kingdom, and the United States.

[8] "North Atlantic Treaty" from http://www.nato.int/docu/basictxt/treaty.htm#FN1

[9] "NSC 68: United States Objectives and Programs for National Security (April 14, 1950)" in Ernest R. May, ed., *American Cold War Strategy: Interpreting NSC 68* (Boston: Bedford Books of St. Martin's Press, 1993), 23-80.

[10] "NSC 139: Statement of an Early Warning System" in William Z. Slany, ed., *Foreign Relations of the United States, 1952-1954. Volume VI: Western Europe and Canada. Part 2* (Washington, DC: United States Government Printing Office, 1986), 2063.

[11] "NSC 159/4: Statement of Policy by the National Security Council: Continental Defense" and "NSC 5408: Draft Statement of Policy Proposed by the National Security Council: Continental Defense" in William Z. Slany, ed., *Foreign Relations of the United States, 1952-1954. Volume II: National Security Affairs. Part 1* (Washington, DC: United States Government Printing Office, 1984), 477 and 611.

[12] "About NORAD" from http://www.norad.mil/about/index.html

CHAPTER 1 - Historiography of the DEW Line

The Distant Early Warning (DEW) Line, though often neglected by historians, has a vital place in the history of the United States. The historical literature on the DEW Line, especially in the United States, is meager compared with the literature about other topics of the Cold War. In Cold War historiography, continental defense is often ignored in favor of the Korean War, the nuclear striking or retaliatory capability of the Strategic Air Command (SAC), nuclear proliferation in general, the origins of the Vietnamese Conflict, and the Cuban Missile Crisis of 1962, just to name a few. Some aspects of continental defense have been thoroughly analyzed, including the more active measures of defending the United States such as surface-to-air missile defenses, the development and utilization of jet-interceptors, the role and fallacy of certain civil defense measures and the development of inter-continental ballistic missiles (ICBMs). But the radar defense networks, particularly the DEW Line, have often been overlooked or given only simple treatment.

One example of the latter is found in an otherwise excellent general U.S. military history, Allan R. Millett and Peter Maslowski's *For the Common Defense: A Military History of the United States of America* (1994):

> In 1951 the Air Force created Air Defense Command to develop an integrated system of interceptors, antiaircraft artillery and missiles, and radar warning. After much internal debate and scientific analysis, Truman in 1952 ordered the Air force to construct a distant early warning (DEW) radar line across the top of the North American continent.[1]

These sentences and a statement about the DEW Line's function to protect SAC bombers and bases are the only reference to the DEW Line. More typical is the following sentence from Charles R. Morris', *Iron Destinies, Lost Opportunities: The Arms Race between the U.S.A. and* *the U.S.S.R., 1945*-1987 (1988), looking at the Cold War military relations between the United States and the Soviet Union: "The SAGE [Semi-automated Ground Environment] and DEW-line string of radar and sensing devices stretched across the Arctic (relieving the Defense Department's mid-fifties corps of late-night sky-watchers)."[2] Many historical works on the Cold War do not even mention the DEW Line.

The secondary literature on other elements of continental defense and U.S. military policy of the 1950s places the DEW Line into better context. One book that specifically deals with the DEW Line was published in 1957, the same year the DEW Line went into operation. *DEW Line: Distant Early Warning: The Miracle of America's First Line of Defense* by Richard Morenus (1957) is more of a celebratory work on the accomplishment of building a radar chain above the Arctic Circle. The book is useful as a chronological record of the DEW Line's development and as a source of some pertinent information on the siting, building, and logistics of the radar stations. But it is not a scholarly work. It lacks documentation, has nothing on the debates over the conception of the DEW Line, and does not place the DEW Line in the context of the other components of continental defense.

Another source published near the time the DEW Line went into operation is a *National Geographic* article by Howard La Fay, "DEW Line, Sentry of the Far North" (July 1958). A particular strength of the article is its exposition of the construction and logistical elements of the DEW Line. Again, like Morenus's work, it borders on hagiography. No sources are given, and the significance of the DEW Line's place in Cold War history is not discussed.

The secondary literature is stronger in the realm of governmental publications and studies. The first of these is *A History of the DEW Line, 1946-1964*, by Thomas W. Ray (1965). It was prepared for the Air Defense Command (ADC) as an official Air Force publication. The report is only sixty-four pages in length but offers some good insights into the chronology of the DEW Line from the earlier radar coverage preceding the DEW Line to the controversies and approval to its construction. By no means complete, Ray's work provides an excellent starting point for study of the DEW Line and is one of the only works in which the DEW Line is the primary focus.

While C. L. Grant's *The Development of Continental Air Defense to 1 September 1954* (undated[1]) stops before the construction phase of the DEW Line, the book does provide a section devoted to its background, military and civilian studies advocating such a concept, and its approval. The strength of this publication is placing the DEW Line into the greater framework of continental air defense. Ray and Grant's works are dated, and not much space is devoted to actual historical analysis of the DEW Line.

Two Air Force publications of more recent vintage are Kenneth Schaffel's *The Emerging Shield: The Air Force and the Evolution of Continental Air Defense, 1945-1960* (1991) and David F. Winkler's *Searching the Skies: The Legacy of the United States Cold War Defense Radar Program* (1997). In the latter work only a few pages in chapter one, "The Evolution of Air Defense (1918-1959)," are specifically devoted to the concept of an Arctic radar system. The strength of the work is its discussion of the technology and the specific equipment used on the DEW Line. He also places the DEW Line into the historical framework of U.S. continental radar endeavors.

Schaffel's work is the most ambitious of the government publications and, as his title suggests, charts the evolution of continental air defense in the formative years, 1945-1960. While Schaffel discusses the DEW Line, the context of the DEW Line's implementation is the book's strength. *The Emerging Shield* does a commendable job of discussing the development of U.S. air defense from its inception to 1960, focusing on continental defense measures against the predominant threat of the manned bomber. The DEW Line is discussed in the context of other air defense measures of the era. Schaffel acknowledges that the United States proceeded to build up its continental defenses despite the nation's emphasis on "deterrence and a retaliatory force primed to assume the offensive." Schaffel's underlying theme is that, while the United States developed its continental defense forces including improved early warning, the USAF "consistently held true to the belief that 'the best defense is a good offense.'"[3]

Two master's theses discuss the DEW Line. Michael Williams Evans's "The Establishment of the Distant Early Warning Line, 1952-1957: A Study of Continental Defense Policymaking" (1995), as the title indicates, has the DEW Line as its primary focus. Evans's work is predominantly a policy study. He examines policy formulation and carries his thesis over up to the implementation stage of the DEW Line. Evans supports the proposition that elements within the Department of Defense hindered continental defense or, at the very least, did not assign it as high a priority as it merited. He focuses heavily on the American role in the creation of the DEW Line, and, when discussing Canada, he does not appreciate the complexity of the United States-Canadian defense relationship. He states that that the policies met "with little Canadian interference, largely because American and Canadian interests were so complementary."[4] While partly true, this interpretation does not do justice to the complexity of the defense relationship.

Another master's thesis, "As Practicable: Canada-United States Continental Air Defense Cooperation, 1953-1954" (2005), by Alexander W. G. Herd, does not focus on the DEW Line specifically. But Herd does devote a chapter to its formulation through the efforts of both

Canada and the United States. While Evans focuses on the American aspect of the formulation of continental defense policy, Herd emphasizes the Canadian side in the planning for the continental defense of North America. Herd contends that Canada did not passively submit to the will of its powerful southern neighbor but took an active role in shaping continental defense during the critical years of 1953-1954.[5]

While in some ways similar, Canadian and U.S. strategies were not without their differences. Each nation had its own priorities, and each nation acted in its own self-interest. Since Herd's thesis analyzes primarily the years 1953-1954 and focuses on the cooperative nature in forming continental defense strategy, the periods surrounding these years are not as thoroughly covered.

It would be remiss to not mention *No Boundaries Upstairs: Canada, the United States, and the Origins of North American Air Defense, 1945-1958* (1987) by Joseph T. Jockel. His thorough examination of the evolution of the defense relationship between the United States and Canada concludes that there was post-war cooperation in air defense efforts, culminating in the creation of the North American Air Defense Command (NORAD). He offers one of the most comprehensive examinations of continental air defenses, including specifically the early warning radar lines' contribution to the developing defense relationship. While examining policy and the conceptual framework for the DEW Line's creation, Jockel does not examine the actual implementation of the line, nor does he examine, in any significant detail, the policy process within the United States that led to the approval of the DEW Line.

All of the above works contribute to the understanding of certain aspects of the DEW Line. None, however, examine the DEW Line *in toto*. Only by studying the DEW Line completely, from its genesis through the debate surrounding the DEW Line's place in the continental defense system to its implementation, can readers appreciate the significance of this bilateral endeavor.

This doctoral thesis contends that the DEW Line played a central role in U.S. military policy during the turbulent period of the early Cold War. This dissertation contributes to the historiography of U.S. Cold War strategy by placing the DEW Line in its rightful position at the center of many critical defense programs and developments. The DEW Line strengthened overall continental defenses, bolstering a key feature of Eisenhower's New Look strategy. At the same time, the DEW Line fortified the U.S. strategy of deterrence by providing the necessary protection to SAC. Many historians have dismissed or ignored the DEW Line's relationship with deterrence.

The DEW Line was a defense program that contributed significantly to these two main features of the New Look. It not only provided a critical function in creating the "sword and shield" of Eisenhower's defense strategy, the DEW Line was *the* defense program in which these policies become interconnected. At a time when the administration looked to reduce defense spending, the DEW Line not only received the President's authorization, but the appropriations necessary for its immediate construction. Many other defense programs did not survive under the scrutiny imposed by the New Look's tighter budgets.

The historical literature reflects the New Look's focus on reducing manpower and placing a greater emphasis on science and new technology. Many authors, however, neglect the DEW Line while examining these issues. This dissertation will illustrate the way in which the DEW Line is a perfect case study of how the administration implemented these concerns. In fact, the DEW Line would not have been possible without cutting-edge technology that allowed the Arctic radar chain to be not only scientifically feasible- but economically practical by reducing manpower requirements for its operation.

The dissertation also adds to the Cold War literature that analyzes the increasing impact that science and technology had on military policy. The DEW Line is an excellent case study of how military professionals lost their monopoly on strategic doctrine due to the growing complexity and technological attributes of warfare. Civilian scientists and civilian strategists made increasing contributions to planning and developing defense theory. The erasing of boundaries between the military and civilian spheres did not end here, however. The DEW Line was manned primarily by civilians, placing non-military personnel at the front-line of defense.

The DEW Line in combination with the other radar warning lines and cooperation in other defense matters laid the foundation for the creation of a new command structure necessary to organize continental defense efforts, the North American Air Defense Command (NORAD). The organization is illustrative, partly as a result of the joint-diplomacy necessary for approving the DEW Line, of a new form of American diplomacy: peacetime cooperative defense between a superpower and a middle power.

This doctoral thesis closely examines the unprecedented challenges of developing the radar chain within the Arctic Circle along the northern coast of the North American continent, the international negotiations along with the decision-making process within the United States, the role of the DEW Line in the continental defense system and its contribution to the U.S. deterrent strategy, the formation of U.S.-Canadian cooperative peacetime defense efforts, and, finally, the extraordinary logistic effort required to build and operate the first line of defense against a Soviet air attack. The DEW Line improved all components of the continental defense system. This dissertation illustrates how the DEW Line was central to all of these developments, thus elevating the status of the DEW Line in overall U.S. strategic theory, in general, and continental defense, in particular, during the early Cold War.

[1]Allan R. Millett and Peter Maslowski. *For the Common Defense: A Military History of the United States of America*. (New York: The Free Press, 1994), 518.

[2]Charles R. Morris. *Iron Destinies, Lost Opportunities: The Arms Race between the U.S.A. and the U.S.S.R., 1945-1987* (New York: Harper & Row, Publishers, 1988), 129.

[3]Kenneth Schaffel. *The Emerging Shield: The Air Force and the Evolution of Continental Air Defense, 1945-1960* (Washington, D.C.: Office of Air Force History, 1991): ix and vii-viii.

[4]Michael William Evans, "The Establishment of the Distant Early Warning Line, 1952-1957: A Study of Continental Defense Policymaking" (M.A. Thesis, Bowling Green State University, 1995), 112.

[5]Herd, Alexander W. G. "As Practicable: Canada-United States Continental Air Cooperation, 1953-1954." (Master's thesis, Kansas State University, 2005).

CHAPTER 2 - Strategic Bombing: The Developing Threat

The appearance of aircraft in the armed forces of the world brought a new dimension to warfare along with original, distinctive concerns. World War I offered a preview of the role that air power would play in future wars. Strategic bombing appeared during the war, but the restricted range and bomb load of these early aircraft limited their significance and effectiveness. A definition of strategic bombing from Neville Jones is

> a direct attack against the most important elements of an enemy's war-making capacity, for example, his industries, communications, and the morale of his civilian population, as opposed to the units and equipment of his armed forces. The object of such bombing, which is the product of an age in which the distinction between soldier and civilian has disappeared, is to undermine the enemy's war effort.[1]

As aircraft design continued to improve during the inter-war years, air power became a more critical component of nations' armed forces. With increased ranges and bomb-load capacity, aircraft could take their destructive payload past the front lines to strike deeper into enemy territory. Strategic bombing thus became a justifiable concern for those responsible for establishing suitable air defenses. In future wars, cities were likely to incur damage, since they housed a nation's industrial, economic and political infrastructure. Since damage to both military and civilian targets appeared likely, implementing some form of defense became vital. The development of atomic bombs in the United States and the Soviet Union exacerbated the destructive potential of strategic bombing and made establishing defensive measures even more essential. One element of improved defense measures would be early warning. The more forewarning provided, the better chances were that all the components of air defense could more successfully perform their missions.

In the decade following World War II, the United States came to realize its growing vulnerability against atomic bomb-laden aircraft. The nation had to significantly improve its continental defense efforts, which included providing as much early warning as possible.

Before examining the development of U.S. defense policy, we must analyze the development of strategic air doctrine to understand the circumstances confronted by the United States after World War II. Those involved in formulating airpower theory came from a wide variety of backgrounds. From military professionals to scientists and civilian academics, they emerged as strategists in the nuclear age.

The first major airpower theorist to appear in the aftermath of World War I was Italian Army officer General Giulio Douhet, often taken as being the father of strategic air power. He recognized that bombers would play a significant role in future war. He was the first to systematically analyz the basic concepts of airpower and place them into a theory. His most significant contribution, though, is his body of work on the future military employment of aircraft. Although there is continuing debate over his influence on strategic air doctrine, especially in Great Britain and the United States, the essence of his ideas can be seen in other strategic air power devotees.[2]

World War II tested the early airpower theories that had formed during the interwar years and found many to be wanting. Airpower theorists often overestimated the results that aircraft might achieve, or worse, their hypothesis that strategic bombing alone might bring about the enemy's defeat were thoroughly refuted. Douhet was not the only proponent of airpower to believe that bombing urban populations would have a catastrophic impact.[3] Douhet, writing in the immediate aftermath of the bloodiest war in recorded human history, observed that in order for militaries to exist, all parts of society had to be mobilized. He concluded that civilians were legitimate targets. In *The Command of the Air*, Douhet states:

> The prevailing forms of social organization have given war a character of national totality – that is, the entire population and all the resources of a nation are sucked into the maw of war. And, since society is now definitely evolving along this line, it is within the power of human foresight to see now that future wars will be total in character and scope.[4]

The airplane would now allow an attacker direct access to the population and industrial centers of a nation. Before aircraft, the civilian population was vulnerable only when the frontline forces collapsed. With the arrival of airplanes, "*it is possible* to go far behind the fortified lines of defense without first breaking through them."[5] Father of the Royal Air Force (RAF), Chief of the Air Staff, and the highest ranking officer in the RAF, Marshal of the RAF Hugh Trenchard's airpower philosophy was the same, "[I]t is not necessary, for an air force, in order to defeat the enemy nation, to defeat its armed forces first. Airpower can dispense with that intermediate step."[6]

With aircraft design and capabilities improving, strategic bombing became a justifiable concern for defense planners. Military installations and personnel, along with cities and civilians, were legitimate targets for strategic bombing. In order to prevent or at least minimize this destruction, erecting a defense to strategic bombing was desirable.

Douhet imagined no significant changes to land warfare that would break the superiority of the defense. Likewise he saw no countering capability to offensive airpower. Ground forces, Douhet envisioned, would hold back the enemy allowing time for airpower to be launched against civilian and production targets and can strike at the center of enemy strength: the air bases.[7] Destroying the offensive airpower of the enemy would weaken his only ability to inflict massive damage in the interior. Since there would be perpetual stalemate on the front lines, the belligerent without an air force (or with a severely weakened one) would be forced to sue for peace.

Airpower theory in the nuclear era emphasized the superiority of the offensive, echoing the interwar suppositions of Douhet. Strategists and military planners came to believe that any sort of defense against bombers carrying atomic weapons would not only fail but would prove to be a waste of resources. It is not that the bomber was invulnerable to air defenses as proven by the results of the Battle of Britain and the Combined Bomber Offensive against Germany, it is just that the defenses needed to be almost perfect to protect a nation against nuclear weapons. It seemed as though Douhet's position as prophet was resurrected with the advent of atomic weapons. In the early Cold War, overcoming these entrenched beliefs while not impossible, would prove to be exceptionally difficult for advocates of defensive measures. USAF proved very leery of any unproven defense program that would take potential funding away from the Strategic Air Command (SAC).

General William "Billy" Mitchell, holding ideas similar to Douhet's, though with insights unique to American circumstances, became the United States' first airpower theorist. Mitchell advocated autonomy for the air force, freeing the air service to perform such activities as strategic bombing independently from army and navy control. He supported employing air power in an offensive capacity but also envisioned airpower as the key to defending the United States.[8] Mitchell offered two particularly astute observations regarding future national security concerns for America as a result of continued technical improvements to aircraft. The first was that America would become more vulnerable as aircraft abilities improved. Mitchell, in arguing for defensive air power, overstated the true nature of U.S. isolation. The United States, in fact, had in the past been vulnerable to attack, as seen in the American Revolution and the War of

1812. Mitchell used this perceived notion of isolation as a straw man to awaken the military establishment out of complacency and support his notion of air power. In 1925, Mitchell stated that "the former isolation of the United States is a thing of the past . . . The coming of aircraft has greatly modified this isolation on account of the great range and speed which these agents of communications are developing."[9] Perhaps Mitchell overestimated the speed with which these developments would occur, but within twenty-five years, his statement would hold true. In the early Cold War, those who were familiar with Mitchell's theories were not surprised over America's new sense of insecurity.

Another important observation by Mitchell was the future importance of Arctic air routes. Mitchell noted that the distance between the main industrial and population centers of North America and Asia is shorter when Arctic, or trans-polar, routes are taken into account. The perception of the distance between these regions on the more common Mercator projection maps is skewed, giving the impression of greater distance between the northern continents. The Mercator map, designed to emphasize sea lanes, gives the impression that only east and west flight paths would connect the continents; the trans-polar route is not explicitly seen on such a map. Mitchell believed that future aircraft with improved capabilities would be able to fly over the polar ice cap. Although the capability did not yet exist when Mitchell made his remarks, by the Second World War these paths were under greater scrutiny and soon would be feasible. When a potential enemy acquired the ability to utilize the polar air route, the United States would be more vulnerable than in the past. The United States must be prepared for this threat.[10]

It is when the Soviet Union acquired nuclear weapons along with the means of delivery that the United States became increasingly vulnerable. As stated above, it is not that the United States was never vulnerable throughout its history, but with the arrival of the nuclear-capable intercontinental bomber, never before has a militarily and economically powerful nation been so susceptible to immediate destruction. Military planners and civilian policy-makers had to come to grips with this reality and factor this vulnerability into their equations for creating practical defense strategy.

Figure 2.1 An Arctic projection map (http:www.web.scavengers.net)

Common to early theorists was the belief that airpower would be an efficient or inexpensive means for conducting war, and Mitchell was no exception. The benefits of air power include the ability to strike directly at the heart of the enemy's nation (industrial, population, and/or political centers) while avoiding large-scale land battles. The interwar theorists, affected by the horrendous casualties of World War I, wanted a way to avoid this senseless waste of manpower. Air power, in theory, would preclude the necessity of these battles. Instead a smaller force could be employed in a holding action, enough to prevent a breakthrough, allowing time for one's bombers to reach the enemy's cities, thus bringing about a speedier conclusion to future wars. No longer would armies face each other over a period of months or years, inflicting millions of casualties, *a la* the experience of the First World War. Since large land battles would no longer be necessary, the size of surface forces could be greatly reduced.

Mitchell, though, is better known for advocating the capabilities of the bomber in a defensive role.[11] In July 1921, he "proved" his theory in a demonstration in which Air Service bombers sank the German battleship *Ostfriesland*. Perhaps air power would supplant naval power as the first line of defense. This view did not fully take root in U.S. airpower theory; instead the bomber's offensive abilities were developed by the leaders of the Army Air Corps. However, this concept of air power as the primary defense was further support for those, like Mitchell, who advocated a separate, independent air force.[12] He believed that an independent air force would be essential to future aerial operations.

Independent and equal standing for a nation's air force was another commonly held tenet of interwar airpower theorists. The Royal Air Force (RAF) attained independent status during World War I, but British interwar theorists needed a unique mission for their air force in order to justify and sustain its autonomy after the war. British airpower theorists who influenced American theory included Captain Basil Henry (B. H.) Liddell Hart and Hugh Trenchard.

Liddell Hart became a military theorist/writer after a thirteen-year career in the British Army. For a brief period, he flirted with the idea of strategic bombing. According to Michael Sherry, B. H. Liddell Hart believed that "strategic air power was the only solution to the grisly indecisiveness of ground warfare."[13] Liddell Hart attempted to incorporate strategic bombing into his "indirect approach" style of warfare, which emphasizes avoiding the enemy's strengths, exploiting the enemy's weaknesses and attacking the enemy's morale. Between the years 1925 and 1931, Liddell Hart, like the previous theorists, attempted to find ways to use military force more efficiently than the trench-style, attrition warfare of the First World War.

With strategic bombing he found a potential instrument for avoiding direct confrontation with the military strength of an enemy, the ground forces. Liddell Hart believed that "aircraft enables us to *jump over* the army which shields the enemy government, industry and people, and *so strike direct and immediately at the seat of the opposing will and policy*."[14] Liddell Hart advocated a Douhetian concept that air power directed against urban locations would cause the defeat of an enemy. Thus, a long, costly war (both in manpower and money) would be avoided, by destroying enemy morale and the will to continue fighting. Indeed, England might not have to commit land forces on the continent in future wars. Air power, then, would dominate future war.[15]

Liddell Hart, like Douhet, Mitchell, Trenchard, and others, believed that airpower would be effective in destroying enemy morale. By attempting to forge airpower theories into some kind of panacea for avoiding the destructiveness that the next war would surely produce, these theorists overemphasized the dominance of air power. Instead, World War II civilian populations turned out to be at the mercy of continual bombardment (whether specifically targeted or not), and strategic bombing did not have the anticipated effect on morale, yet, it still managed to cause many deaths. Strategic bombing lost its allure of making warfare more decisive, thus shorter in duration. Perhaps Liddell Hart gradually comprehended that strategic airpower might devolve into terror bombing, in which civilians would be the primary target. Here is where he had growing moral qualms over strategic bombing. Historian Brian Bond argues that a major reason that Liddell Hart disassociated himself from the theory that he once espoused was that strategic "bombing theory conflicted with Liddell Hart's humanitarian instincts and overriding concern that future warfare should be limited."[16] Liddell Hart believed that the air power component of the indirect approach did little to rein in the awful characteristics of modern war and that war might not be "limited" with the explosives or incendiaries of the day. He noted in the early 1930s that "It seems a fairly safe calculation that the tonnage of high-explosive bombs required to destroy any large city far exceeds the capacity of any country's existing bombers."[17]

In the early to mid-1930s, he stopped advocating the use of strategic bombing. Liddell Hart moved away from strategic bombing for a number of reasons. As stated above, he came to believe that warfare was likely to become more unlimited in its form, resulting in greater devastation and more civilian casualties. He questioned the ability of the bombers of the 1930s to bring about a quick victory. Coupled with his humanitarian concerns about strategic bombing, Liddell Hart came to realize that in a future war Great Britain would be in a particularly vulnerable position, especially if its enemy was Germany. If strategic bombing continued to be emphasized, Germany then might adopt a similar practice, and it would be Great Britain reeling from air attacks at the beginning of the war. The primary reason is that geographically, the capital and major industrial regions of England are closer to German territory than Berlin is to Great Britain's borders. Thus, the limited radius of operation of 1930s aircraft would give Germany a distinct advantage in a war of strategic bombing.[18] Instead of supporting the idea that Britain's primary air power effort should be on strategic bombing, Liddell Hart advocated that fighter defenses should be given first priority, demoting the status of the bomber force.[19]

Even Stanley Baldwin, a three-time prime minister of Great Britain (1923-1924, 1924-1929, 1935-1937), recognized the reality of the situation when he advocated at the Geneva Disarmament Conference in 1932 that strategic bombing be abolished. While having humanitarian concerns with this form of warfare, strategic issues were also relevant to Baldwin's thinking. Great Britain would potentially find increased security if such practices were excluded from the war plans of all nations.[20]

A postulate of Liddell Hart (and Mitchell) was the potential use of airpower as either a coercive implement in foreign relations or as a deterrent. They believed that it could "ward off attack, secure victory without unleashing its fury, and even help establish world dominion."[21] Liddell Hart in *Paris, or the Future of War* stated: "where air equality existed between rival nations, and each was industrially and politically vulnerable, it is possible that either would hesitate to employ air attack for fear of instant retaliation."[22] This very astute observation became prophetic with the greater destructive power of nuclear weapons and advanced bomber designs. Deterrence, while speculated upon during the early years of air power, would become the underlying strategy employed by the United States throughout the Cold War.

Air Marshal Hugh Trenchard is referred to by some as "the father of the RAF." He was head of the Royal Flying Corps in 1915 and Chief of Air Staff of the RAF between 1919 and 1927. His familiarity with airplanes, and his experience acquired from World War I left him with the following impressions. First, the offensive power of aircraft was superior to its defensive capabilities, thus, the bomber would get through. Second, bombing had both a physical and a psychological effect on the population; Trenchard believed that its effect on morale was more detrimental than the physical damage inflicted. Third, air superiority is crucial for the success of any mission.[23] Under Trenchard, strategic bombing was one of the duties relegated to the military doctrine of the RAF, and strategic bombing also took root among the young officers in the U.S. Army Air Service and its successor, the Air Corps.[24]

One final observation of Trenchard concerned defending against the bomber. As mentioned above, he believed that in air war the offense was superior to the defense. Trenchard conceded "that some form of defense (interceptors and antiaircraft guns) could be useful 'for the morale of our own people' . . . 'Nothing is more annoying than to be attacked by a weapon which you have no means of hitting back at.'"[25] If an actual defense against the bomber is unlikely, something still has to be done to assuage the fears and hopelessness of the population—even if it is only a psychological opiate. This concept of the futility of defense against offensive air power, is an argument strikingly similar to the 1950s debates over the effectiveness of continental air defense against nuclear-equipped bombers.

World War II was the "proving ground" for the airpower theories of the interwar years. Many of the theories were put to the test and came up remarkably short. Some theories were totally inaccurate because of unforeseen technological developments. Strategic bombing was not a more efficient way of conducting warfare. First, because of the inaccuracy of bombing and the relatively small TNT payloads, bombing missions often completely missed the target or did not do the damage necessary to destroy or significantly paralyze the objective. More times than not the targets selected were not in any way damaged or destroyed. Only in a few specific cases, where certain vulnerable industries such as the petroleum facilities of Germany were attacked under optimal conditions, was there a considerable effect on the war-making capacity of the nation. The resources spent on the strategic air campaign might have been used differently, bringing about more effective results.

Second, the belief that civilian morale would collapse under strategic bombardment was utter nonsense. Repeatedly, civilians in European cities were subjected to the most horrific air attacks, only to continue with their daily lives, if not emerging from the air assaults with even more resolve. What was not seen was a civilian population rising up against their government and forcing them to sue for peace or somehow end the war. During and after the Battle of Britain (Summer-Fall 1940) and the subsequent “Blitzes,” Londoners’ morale and fortitude actually solidified, increasing the determination of the inhabitants.[26]

Perhaps the most notable of the erroneous interwar airpower theories centers on the offensive nature of airpower and the invulnerability of the bomber. World War II made clear that the bomber was not invincible and that there were defenses against these weapons. Antiaircraft artillery firing flak at incoming formations of bombers inflicted a number of casualties, becoming more effective with increased concentration of these weapons. Wartime experience proved that the bomber was in fact vulnerable and brought the pre-war assumptions of the superiority of the bomber to an end. The improving technologies of fighter planes—higher climb rates, more maneuverability, more firepower, and faster speeds—proved extremely lethal against the once invulnerable bomber. Bombers were not able to protect themselves, either independently or in formation, against enemy fighters. Making this clear beyond doubt were the Allied bomber raids deep into German territory, such as against industries in Regensburg and Schweinfurt. The Allied bombers were unescorted, making them particularly vulnerable to *Luftwaffe* fighters. The attrition rates incurred by the Allied bomber armada surpassed the sustainable rate. U.S. Army Air Forces leaders, including its Commanding General Henry H. “Hap” Arnold; General Ira C. Eaker, Commander of the Eighth Air Force; General Frank “Monk” O’Driscall Hunter, head of the Eighth Air Force Fighter Command; and civilian leaders, such as Robert A. Lovett, Assistant Secretary for War for Air under Secretary of War Henry L. Stimson, advocated that a greater focus needed to be placed on acquiring suitable fighter escorts for these bombers on future missions.[27]

Another technological improvement with tremendous ramifications was radar. Radar took many advantages away from offensive airpower by providing warning and informing on the direction of the bombers' approach. At the beginning of the war, radar was in still in its formative stage, with all its inherent problems of a new, sophisticated technology. Adding to the frustration was unreliable equipment, plus, operators who were not fully experienced with the nuances of the new apparatus. Despite these drawbacks, radar proved invaluable to the British during the Battle of Britain in the summer and fall of 1940. It provided the defenders the opportunity to marshal their limited defensive airpower forces and direct them specifically at the attackers; thus, fewer defenders could be used more effectively. Without radar it would have been more difficult, if not impossible, for the British to be able to assemble their limited forces over all targets which might have been attacked by the *Luftwaffe*. The enormous, three-dimensional nature of the atmosphere that attacking aircraft could use to their advantage was no longer an insurmountable problem for the defense. The United States lagged behind Great Britain in radar development and its application during the early years of the war.

While much of the interwar prophesizing about air power was proven inaccurate by the experience of the war, a gleaming, aluminum skinned four-engine aircraft in a single mission on 6 August 1945 afforded the opportunity for an entirely new doctrine of air warfare and strategic bombing to develop. The *Enola Gay*, on a solitary undertaking, dropped a single atomic bomb on the Japanese city of Hiroshima. "Little Boy," as the uranium 235 bomb was nicknamed, delivered a TNT equivalent of 12.5 kilotons, thoroughly destroying five square miles of the city. The event was repeated on 9 August 1945, when a plutonium-239 "Fat Man" bomb exploded over Nagasaki with a TNT equivalency of 22.5 kilotons of TNT.[28] Suddenly, a single bomber could devastate a city, apparently validating part of Douhet's theory. According to Bernard

Brodie, the primary proponent of the theory of deterrence, the Second World War proved Douhet "wrong on almost every important point he made."[29] But nuclear weapons salvaged some of Douhet's more general strategic bombing theories. These new weapons potentially brought decisiveness to warfare, and wars might be of a shorter duration. "One cornerstone in Douhet's philosophy," states Brodie, "was his assumption of a very high yield of destructive effects from a small weight of bombs . . . but the fission bomb came along to rescue Douhet from that error."[30] While there were still problems with certain of Douhet's beliefs, nuclear weapons did allow strategic air power to overcome some of the deficiencies it experienced during World War II.

Many of the characteristics zealously attributed to air power before the war came to fruition thanks to atomic weapons. Handicapping strategic bombing through World War II were the relatively small bomb loads (total explosive power) carried by bombers, the inaccuracy of dropping high-explosive "dumb" bombs from thousands of feet in the air, and the vulnerability of the bomber. While the bomber was still vulnerable, fewer bombers, now armed with atomic weapons, needed to survive the defenses to inflict catastrophic damage. These three problems, "solved" by atomic weapons, again gave strategic bombing the offensive advantage.

The explosive punch of atomic weapons provided the destructive power needed to annihilate targets, while also partly solving the inaccuracy issue. Even with the higher destructive capacity of atomic weapons, accuracy rates would still need to improve from those reported during World War II in order for the bombs to achieve maximum efficiency. Conventional weapons need to directly hit the target to be truly effective, atomic weapons can still destroy the target if detonated nearby. With the evolution from fission to fusion bombs, strike forces could afford even less precision. A hydrogen bomb, even failing to hit the intended target directly would still have the destructiveness to cause other significant problems in the vicinity of the blast, whereas a high-explosive conventional bomb was relatively harmless on anything except a near miss.

The theory of deterrence would become the primary national security strategy of the nuclear age. "Deterrence," according to political scientist and specialist in international relations Glenn H. Snyder, "means discouraging the enemy from taking military action by posing for him a prospect of cost and risk outweighing his prospective gain."[31] Preventing the escalation of war in which nuclear weapons might be used, became of paramount importance during the Cold War. Snyder continues by stating that "deterrence works on the enemy's *intentions,* [while] defense means reducing [one's] own prospective costs and risks in the event that deterrence fails. . . Defense reduces the enemy's c*apability* to damage or deprive." [emphasis in original][32] While nuclear weapons, the strength of the armed forces, as well as economic sanctions all are possible deterrents, it is capacity of the armed forces to inflict damage that provides the actual defense.

Bernard Brodie was among the first strategists to grasp the importance of deterrence in the nuclear age, and his significance to U.S. nuclear strategy is seen by scholars of deterrence, such as Barry H. Steiner, heralding him as the "American Clausewitz." Brodie realized that strategy in the nuclear age must break with the past, since nuclear weapons brought an entirely new, devastating force to warfare. He recognized that "the atomic bomb is not just another and more destructive weapon to be added to an already long list. It is something which threatens to make the rest of the list relatively unimportant."[33] Writing in late 1945 in the wake of the bombings of Hiroshima and Nagasaki, Brodie in *The Absolute Weapon* asserted,

> The first and most vital step in any American security program for the age of atomic bombs is to take measures to guarantee to ourselves in case of attack the possibility of retaliation in kind. The writer in making that statement is not for the moment concerned about who will *win* the next war in which atomic bombs are used. 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 no other useful purpose.[34]

What made Brodie unique was his ability to ascertain the significance of nuclear weapons and their relation to war before others comprehended just how much they changed the nature of general warfare. According to political scientist and Brodie biographer Barry H. Steiner, Brodie's "definition of his subject widened to take account of the possibility of using weapons as a means to keep the peace, his focus narrowed to concentrate on the newer weapons assigned such burdensome duty, and his thinking beyond conventional strategic categories positioned him apart from those complacent about prior wartime experience."[35] Brodie, in fact, disapproved of the antiquated "preatomic thinking" of those who still conceived and planned strategy by minimizing the impact atomic bombs had on strategy and warfare. According to historian Gregg Herken, Brodie recognized the potential, utter destructiveness of atomic warfare and believed that "the solution . . . to the problems created by the bomb was to replace the traditional military aim of defeating an enemy once war occurred with the goal of preventing his attack in the first place."[36] In fact, while working in 1950 as Special Assistant to the Air Force Chief of Staff Hoyt S. Vandenberg, Brodie came to realize that "victory" in atomic warfare was dubious at best.[37] When both sides acquired atomic bombs, "victory," in any previously accepted meaning of the term, might not be easily definable— or, it may not even be possible. With the emergence of the Super, or hydrogen bomb, Brodie's deterrent strategy assumed an even greater significance. Perhaps deterrence is the only strategy that can be successful in the nuclear age.

Brodie understood that atomic weapons not only completely revolutionized strategy, but blurred the distinction between military and foreign policy. Because of the uncertainties and unforeseen circumstances of the atomic age, military strategy in the United States was no longer a subject monopolized by military or former military men. Since World War II, Steiner states that "military strategy and policy have been far more studied, examined, and debated in public than ever before."[38] Brodie was among this new group of civilian strategists, who had more of an academic (science or social science) background, rather than professional military training. In fact one of Brodie's major accomplishments in the years after World War II, argues Steiner, "was to legitimate the study of military strategy for civilians lacking a military background."[39] The DEW Line debate would provide evidence of this. Those who participated in the debate, both within the government and in public forums, increasingly came from an academic rather than a military background.

With the advent of the thermonuclear age, Brodie became even more pessimistic about the perspective of unrestricted nuclear war. The destructive power of fusion weapons was one thousand times more than fission weapons. Now entire cities could be wiped out with one bomb. One of Brodie's RAND colleagues stated that "he had indeed chosen the right title in *The Absolute Weapon*—but that he had written the book about the wrong bomb.[40] Brodie acknowledged the significance of the hydrogen bomb for future strategy. In an article in *Harper's*, Brodie wrote that the Super "brings us a long way from the subtleties of a Clausewitz, a Jomini, or a Mahan . . . . It brings us even a long way from Douhet, the prophetic theorist of strategic air power. It brings us, in short, to the end of strategy as we have known it."[41]

Brodie realized that in the thermonuclear age just having retaliatory forces was no longer good enough to maintain peace, but those retaliatory forces must be protected. In his seminal work, *Strategy in the Missile Age*, Brodie states:

> It seems inescapable that the first and most basic principle of action for the United States in the thermonuclear age is the following: a great nation which has foresworn preventative war *must* devote much of its military energies to cutting down drastically the advantage that the enemy can derive from hitting first by surprise attack. This entails doing a number or things, but it means above all guaranteeing through

> various forms of protection the survival of the retaliatory force under attack.[42]

Brodie discusses improving elements of what would later be categorized as continental defense measures. He advocates improving both active and passive defense measures, but considers "warning [as] the key to the entire defense problem."[43] He continues:

> [I]f we could count *with high confidence* on having two or three hours' warning of an impending strategic attack, and if the enemy knew that we had that confidence and that it was justified, we should practically have eliminated the possibility that he would attack . . . the enemy would have to reckon with a retaliation so powerful . . . as to be utterly unacceptable as the price of an attack on us. The expectation of retaliation would therefore surely restrain his hand, and "strategic deterrence" would be operating with nearly perfect efficiency and reliability.
>
> This point highlights two basic principles about defense in general, and about warning in particular. First, whatever else it may be possible or desirable to defend, it is absolutely essential to defend our retaliatory force, or a substantial portion of it. *Known ability to defend our retaliatory force constitutes the only unilaterally attainable situation that provides potentially a perfect defense of our home land. Conversely, a conspicuous inability or unreadiness to defend our retaliatory force must tend to provoke the opponent to destroy it; in other words, it tempts him to an aggression he might not otherwise contemplate.* How can he permit our SAC to live and constantly threaten his existence, if he believes he can destroy it with impunity?
>
> Second, if there must be a choice, a *reliable and unequivocal warning* measured in hours, or even quarter-hours, is far more valuable than an equivocal indication received much earlier. The longer-term warning is what we tend to expect from secret or "strategic" intelligence. We cannot rely upon it to trigger offensive action when trouble is brewing unless we are ready to act on indicators that are fairly ambiguous and therefore likely to be misleading.[44] [emphasis in original]

Despite his concern for warning, he is not specific in what measure should have been taken. While the DEW Line fulfilled his two-to three-hour time requirement, he states that despite the cost of constructing and operating the early warning system, "the result is far from foolproof." Some of the problems of radar Brodie envisions are they can be confused, prone to electronic jamming and vulnerable to treating decoys as legitimate threats "dilute[ing] defensive action."[45] Brodie, like other critics of the DEW Line, questions its effectiveness when dealing with Intercontinental Ballistic Missiles (ICBMs), submarine-launched missiles, and low-altitude flying objects.[46] It is unfair to criticise the DEW Line on capabilities that were not even programmed into its operation. While these were in fact limitations, the DEW Line's primary purpose was to provide warning against manned bombers approaching the United States via Arctic or sub-Arctic attack routes. Notwithstanding Brodie's questioning of DEW Line effectiveness, nothing else the United States employed better implemented Brodie's need for unequivocal tactical warning.

In spite of Bernard Brodie's deterrent theory, some strategists did not see atomic bombs as fundamentally altering warfare. A postwar "cult of the offensive" reemerged that emphasized the striking power of bombers. The reacquired "invincibility" of the bomber appeared in the aftermath of World War II, especially when atomic weapons became more plentiful. Although the single bomber was still vulnerable to defensive measures, a certain percentage of bombers would get through. Where a medium to high attrition rate might seriously impair a strategic operation using high-explosive conventional bombs, a handful of atomic weapons finding their targets might have overwhelming consequences.

In the late 1940s and into the 1950s, the offensive was again dominant as indicated by military doctrine and the majority of emerging theorists. How to best counter such an attack was soon being debated, as was the feasibility of any defense at all. Many believed that defensive measures would be devised over time. A month after World War II ended, President Harry S Truman opined that "every new weapon will eventually bring some counter defense to it,"[47] a view also held by Admiral Chester Nimitz.

Vannevar Bush also became an apostle for the possibility of defense against the bomber. Bush began his career as a professor of electrical engineering and became the dean of engineering and vice-president of MIT in 1932. In 1940, President Franklin D. Roosevelt appointed him chairman of National Defense Research Committee (NDRC) and he became director of the Office of Scientific Research and Development (OSRD) when that organization incorporated the NDRC into its purview. Bush stayed in government service throughout Truman's administration drafting governmental policy concerning scientific issues. During the Truman Administration he helped establish both the Atomic Energy Commission (AEC) in 1946 and the National Science Foundation (NSF) in 1950.[48]

Bush claimed that the superiority of the defense secured a victory for the British in the Battle of Britain. He attributed their success to two key items: interceptor planes and early warning from radar.[49] Bush equated strategic bombing and conventional weapons with strategic bombing and atomic weapons. Bush claimed that strategic bombing is an important element in modern war and:

> With the atomic bomb available it takes on new aspects, which we must consider. But bombing as we have known it . . . may indeed be obsolescent. The day may be approaching rapidly if it is not already close upon us, when great fleets of bombers, at high altitude, carrying conventional bombs against a prepared adversary, are not warranted or justifiable undertaking in war.[50]

He later continued:

> we have less reason to be terrified by the thought of the A-bomb delivered by fleets of bombers . . . the specter of great fleets of bombers, substantially immune to methods of defense, destroying great cities at will by atomic bombs is a specter only. There is a defense against the atomic bomb. It is the same sort of defense used against any other type of bomb. Against a fully prepared enemy, with plenty of early warning, interception radar on ground and in the air, and the best pursuit ships, it would appear still to be vulnerable.[51]

Bush argued that bomber formations carrying atomic weapons offered no more challenge to the defense than those carrying conventional weapons. While the bomb load might be more deadly, the delivery method is prone to the same vulnerabilities. Perhaps he minimized the destructive capacity of even a handful of atomic weapons delivered on critical targets. Not just any defensive measures would suffice though; he emphasized the need for defenses using the most modern technology.[52]

John Slessor, who served on the staff of Trenchard during the 1920s, instructed at the British Army Staff College and attained the rank of Air Chief Marshal in the RAF. During World War II he became Assistant Chief of the Air Staff in 1942 and in 1944 he attained the position of Commander-in-Chief RAF Mediterranean and Middle East. From 1950 to 1952 Slessor was Chief of the Air Staff.[53] He supported the mainstream theory on the supremacy of the bomber, although with certain reservations. Although he expounded on the virtues of airpower during the interwar years, it is his postwar work that is pertinent. Some of his thinking appeared in book form and in American journals during the early 1950s. Slessor's views were fairly consistent with developing developing airpower theory in the United States.

Slessor believed in the supremacy of the bomber force, especially those carrying atomic weapons. Acknowledging the usefulness of radar, he argued that if the United States wanted to provide itself with adequate defenses, either enough jet interceptors or radar coverage, an enormous amount of resources would have to be spent in order to shield such a vast area. He called it "quite impractical" to "provide defence everywhere."[54] He astutely added, though, that some defense was essential if only to benefit the psyche of the population, who would languish in utter hopelessness if their government made no effort to provide safety. Slessor stated, "it will always be a difficult task for any government to strike a happy mean in this respect and find the balance between the political and psychological factor and the military factor in the economics of air defence."[55] Defensive measures consist of "a reasonable measure of protection (including civil defense) against air attack at home."[56]

Slessor was a strong advocate of the deterrent value of the counteroffensive. He was a little more moderate than other counteroffensive theorists, though. While stating that primary reliance needed to be put on strategic counterforce capabilities (intercontinental bombers), he warned that other means of defense could not be ignored, "on land, at sea or in the air." He added that it would be "ludicrous" to "ignore" possible defenses either at home or on the sea,[57] which would provide important deterrent value along with the bomber counteroffensive.

Slessor supported the purpose of SAC and emphasized the need for constant alertness; it must be able to launch a number of planes on a retaliatory strike in minutes. The planes and crews must be kept at the "highest pitch of efficiency and readiness."[58] Slessor's strategy was to pull no punches. If Great Britain or the United States were attacked, presumably by the Soviet Union, then there would be no sacred or forbidden targets for the counteroffensive. At the heart of Slessor's theory is the idea that:

> attack is the soul of defence. . . And if [atomic war] is forced upon us, we must be able instantly to deliver a crushing counterattack upon aggression at its source – not merely at its airfields, its launching sites and submarine bases or its armies in the field, but at the heart of the aggressor country. There will be the battlefield, if battlefield there must be.[59]

The last of the air power theorists to discuss is Alexander de Seversky. Born in Russia and a fighter pilot during the First World War, he emigrated to the United States, where he became an inventor, an aircraft designer, and a promoter for airpower. Although his career spans the Second World War, this section will focus on his postwar theories. Seversky, like Bush and Slessor, had the benefit of incorporating into his writing current technologies and recent experience: nuclear weapons, radar, and the lessons learned from World War II.

Seversky, writing in the early 1950s, believed that the contemporary problems confronting the nation were worse than at any previous period. In 1952, he emphasized that United States isolation, and thus invulnerability, was a delusion and that, if war began, "America, its cities, industries, communications, and population will be the main targets." He continued in more polemic prose, stating that the next war would be "a struggle between two worlds, two ideologies, with absolute victory as the only conceivable goal, no matter how frightful the cost."[60] Nothing less than American survival was at stake.

The United States must maintain a strong military posture in order to act as deterrent. Not surprisingly, it would be the Air Force that would offer the primary deterrence. Having the ability to deliver atomic weapons, airpower had become "the dominant medium." Seversky continued:

> Therein lies America's opportunity and mankind's best hope for another long period of pacific and constructive effort. If we reduce to an absolute minimum our military investment on land and water, and concentrate our available resources, the development of an indubitably superior Air Force-in-being is within our grasp.[61]

The key to a contemporary air force, if it was to be effective, was that it be "in-being" and ready for immediate action.[62] With modern, atomic warfare, there was no time to build up forces, as had been common in America's past wars. Thus, strategic counteroffensive air forces must be kept on a continuous war footing, including training, numbers, and readiness.

Of course, this view found few friends in the military outside of the Air Force. During the war Seversky had been an advocate of the development of what he termed "inter-hemispheric" bombers, later dubbed "intercontinental." He argued that this would give the United States a tremendous advantage in the international community and that even "the mere *threat* of American airpower would be enough to keep the peace."[63]

In 1942, this was definitely an early call for air power as a deterrent, one that would be answered with the arrival of atomic weapons.

In the early 1950s Seversky argued that in order to keep the peace, the United States must maintain military forces that "leave no doubt to our military supremacy."[64] Appealing to logic and reason and presenting a proto-New Look strategy, de Seversky stated:

> Common sense therefore demands that we channel our main sources and intellectual energies into invincible air power of inter-hemispheric dimensions. As I have repeatedly underlined, we cannot achieve this while maintaining land and sea forces on the traditional scale. Secondary and irrelevant weapons and forces must be held to realistic minimum, while the requisite air force-in-being is given the magnitude for all-out combat and all-out victory.
>
> Let us not be diverted from the main tasks of aerial preparedness by outcries about defense ascendancy or offensive doom.[65]

De Seversky did see a role for defensive measures against Soviet bombers. He recognized that building a "radar screen" to help protect the United States, while expensive, would only take a small percentage of the defense budget. He added that an increased defensive ability, including warning radar stations, would strengthen the deterrent facet of American defense:

> Where the offensive potentials of opposed nations are roughly in balance, the relative defensive potentials become decisive. Which is a formal way of saying that when the capacity to "dish it out" is equal, the nation best equipped to "take it" holds the upper hand.[66]

Finally, Seversky, during the mid 1940s, in the finest tradition of airpower theorists, promoted the independent nature of the military's air arm, the one commonality among this group. Seversky emphasized an autonomous air force because of its fundamental difference from the other services, both in composition and missions. An independent air force would be "commanded by airmen who understood its unique qualities . . . to operate routinely as a strategic weapon."[67] One person who recognized this fact, not only as a disciple of General Billy

Mitchell but from his experience of commanding the Army Air Forces in World War II, was General of the Army Henry H. "Hap" Arnold.

The experience of the Army Air Corps during World War II demonstrated to many that the United States should give an equal, independent standing to its air arm. Following World War II, General Arnold reinforced this sentiment in his "Final Report to the Secretary of War." His view was that because of the characteristics of modern war in order to protect America best:

> Air superiority accordingly is the first essential for effective offense as well as defense. A modern, *autonomous*, and thoroughly trained Air Force in being at all times will not alone be sufficient, but without it there can be no national security.[68] [emphasis added]

Arnold's paragraph, written in November 1945, essentially lays out U.S. airpower policy goals over the next decades. Like Douhet, William "Billy" Mitchell and other airpower specialists, Arnold supported an independent air force. He emphasized that the primary importance of an air force is not only defending the nation but providing the military's principal offensive capability. To accomplish this task, the air force must be kept in a perpetual state of readiness and have up-to-date technology. Although this modern air force would be expensive to create and maintain, air advocates asserted that it would be cheaper that the alternative— sizable, conventional ground forces. Here in a nutshell is the 1950s USAF: an independent standing since 1947, SAC as the military's main strategic offensive element, and a claim to the lion's share of the defense budget to go along with its primary position among the services.

The Japanese surprise attack on Pearl Harbor brought the American people out of their complacency about their nation's perceived immunity against attack. After Pearl Harbor the American people were left with a sense of vulnerability, a feeling that Americans had not experienced for generations. This occurrence, coupled with airpower's capability to strike quickly and with little warning, led American strategists to anticipate and envision that a future war was likely to begin with a "sneak attack." Arnold recognized this in 1945: "[a] future attack on the United States may well be without warning."[69] The President's Advisory Commission on Universal Military Training reemphasized Arnold's warning in 1947 and agreed that the next general war would begin with "atomic sneak attacks against the United States," but there was little chance for a war in the near future, since the United States had an atomic monopoly. For a maximum of ten years, the United States would be safe from an atomic attack, but the Commission warned, "[W]e cannot safely assume that we will have sole possession of atomic explosives beyond 1951." By no later than 1955, experts predicted, the Soviet Union would have the potential of delivering a devastating surprise attack, since their atomic bomb stockpile would have reached a sufficient quantity.[70] In August 1949 and four years later in 1953, the Soviets detonated first an atomic and later a thermonuclear bomb, respectively. The American public, along with military and government officials, on hearing of these explosions became more concerned with the growing threat of a devastating surprise attack—and their increasing vulnerability.

The aspirations of the prewar air strategists and the contemporary officers of the Army Air Forces were realized with the formation of an independent Air Force under the National Security Act of 1947, signed by President Harry S. Truman on July 26. This act created the Departments of the Army, Navy, and Air Force on 17 September, all under the auspices of the Department of Defense. Reasons for the change included the experience from World War II demonstrating the growing strategic importance of the Army Air Force; the advocacy of airmen, such as Hap Arnold, and politicians for an independent structure to carry out airpower's assignments; and the continuing dependence on airpower as the primary offensive capability of the U.S. military

W. Stuart Symington, who became the first Secretary of the Air Force on 18 September 1947, was a proponent of the growing strategic importance of the United States Air Force. In the following statement, he revealed the primacy of the military's air arm:

> In this day when a powerful counterattack is America's only real answer to aggression, there can be no question that we need the world's first Air Force. It is only through the global, flashing mobility of the Air Force that we can hold our counterattack poised . . . we feel, with deep conviction, that the destiny of the United States rests on the continued development of our Air Force.[71]

Historian Stephen MacFarland provides four reasons for Air Force becoming the primary component of the military:

> 1) Developing technology made the United States vulnerable to aerial attack . . . making aerial defense the top priority. . .
> 2) The nature of the only apparent threat to American security also required the Air Force to have first priority . . .
> 3) The atomic bomb revolutionized America's military strategy, elevating the Air Force to first priority and forcing new roles and missions on the military services . . .
> 4) The Air Force had to be a force in being because aviation technology was complicated and expensive, requiring long production lead times.[72]

These reasons formulated by MacFarland do an admirable job providing a theoretical framework explaining why eventually it would be the Air Force that was bestowed with the largest funding among the services. This would not be the case, however, until the outbreak of the Korean War. The surprise attack in South Korea caused military appropriations to skyrocket.

The leaders of the Army Air Forces, recognizing the "strategic" use of airpower as a special entity, created the Strategic Air Command (SAC) on 21 March 1946. They continued this separate division of U.S. strategic airpower after the creation of the USAF. SAC's primary mission was deterrence, but deterrence with quite a legitimate, atomic, counteroffensive wallop.

Although he was the third commander of SAC, General Curtis LeMay acquired the sobriquet "Father of the Strategic Air Command," serving as its commander from October 1948 to June 1957. By serving in this capacity for an unusually long time (beyond the typical three- or four-year tour), LeMay thoroughly imprinted SAC for years to come.[73] Under LeMay, SAC greatly expanded, obtained the most advanced aircraft to conduct its mission, and made way for the ICBM. His statement, "[W]e are at war NOW,"[74] signified that SAC must be kept at war readiness, because of its potential vulnerability and need to be able to act immediately, even though the nation might be at peace.

As a deterrent force, SAC's main threat was as the offensive striking arm of the United States military. The most destructive weapons in the U.S. arsenal were atomic bombs until the mid-1950s and thermonuclear, or hydrogen, bombs thereafter. From the mid-1940s throughout most of the following decade, the only practical delivery method for atomic weapons was airplanes large enough to carry these sizable weapons. The United States spent considerable funding and time in research and development to improve its delivery platforms. The first intercontinental bomber was the B-36, named the "Peacemaker." The B-36 was to serve as the major deterrent to the Soviets, and in 1951, the bomber became fully operational. Only 388 were ever built and served the United States well during the 1950s, but the "Peacemaker" never experienced battle.[75]

The B-47 "Stratojet" was the first jet bomber in the arsenal of the USAF. Although classified as a medium bomber, it could still carry out strategic missions from forward bases. Over 2,000 of these bombers were built by Boeing. The large number of these jet bombers all but made up for their small payload. By 1956, SAC had about 1,300 B-47s under its command.[76]

The eight-engine B-52 "Stratofortress," first deployed in 1955, eventually replaced the B-36 as SAC's primary heavy bomber. Its maximum speed was still sub-sonic, but over 200 miles per hour faster than the turbo-propped B-36.[77] The B-52 also had an extended service life thanks to numerous upgrades, overhauls, and improved weapon systems; as of 2008 it was still part of the U.S. arsenal.

At the heart of U.S. strategy in the 1940s and 1950s was the concept of deterrence. The United States hoped that the Soviet Union would realize that any aggressive or threatening action undertaken would have the potential of unleashing an all-out American atomic retaliation. From 1945 to 1949, the United States had an atomic monopoly, making the Soviet Union's position particularly vulnerable. An entirely different situation developed when the Soviet Union acquired its own atomic arsenal. Just having nuclear weapons was no longer sufficient to prevent an attack. With the atomic monopoly broken, the United States had to alter its strategy of deterrence.

First, the United States lost some of its ability to influence or restrain Soviet policy. The Soviet Union, upon obtaining the atomic bomb, might not be as intimidated as it once had been. The United States had to find some other way to restrain Soviet actions. Nuclear deterrence became more complicated, multi-faceted strategy when the nuclear situation become a duopoly.

A proper deterrence when both powers had an atomic capability, then, was the ability to survive the enemy's first strike (more than likely as a surprise attack) and still be able "to strike back at the enemy's cities with an effect serious enough to outweigh whatever values the Soviets hoped to gain by attacking."[78] Reemphasizing the role of the atomic bomb-carrying bomber, in September 1947, General George C. Kenney, the commander of SAC, stated, "as the initial blow will come from the air and be delivered by air power . . . the answer must be for us to maintain our air power strong enough to deter any possible enemy from attacking us."[79] Even before the USSR's acquisition of the atomic bomb, Kenney foresaw the need for the U.S. counteroffensive abilities to act as a deterrent.

A deterrent strategy based on the capacity of the United States to deliver atomic weapons on the Soviet Union solved many of the problems confronting American defense in the postwar world. Deterrence proved more palatable than launching a preemptive strike when a Soviet attack seemed to be imminent. Americans would not have accepted a repugnant and distasteful strategy that would cast the United States into the role of aggressor.

The other strategy that the United States could have followed in the early Cold War was maintaining an immense conventional military presence in Europe to counter any potential Soviet offensive against the West. The problem there was both economic and political. The funding of such a strategy would be terribly expensive and would put a lot of American soldiers in harm's way. Traditionally, the United States in peacetime did not favor the retention of a large army. Public opinion would likely be willing to support a large military during peacetime and have it stationed far away from America's shores.[80]

Both of these unsatisfactory alternatives, along with the more cost-effective aspect of strategic airpower, made the policy of deterrence acceptable to both the military and the public. The military was allowed to downsize as it traditionally had done at the end of wars, but growing U.S. commitments abroad kept the number of military personnel above 1,445,900. To put this in perspective, U.S. military personnel between the two world wars had fallen to 243,845.[81] The larger numbers of the American military in the early Cold War, almost six times higher than after the last war, reflected a growing worldwide commitment for U.S. forces. No longer would U.S. troops be stationed only in the Western hemisphere or in American, or former American, colonies. Although the Army and Navy were discouraged by their shrinking budgets, it was the Air Force and the offensive mindset of strategic airpower that prevailed.

By the 1950s the only legitimate threat to the continental United States was from the air. The U.S. Navy, the strongest in the world, allowed America to have command of the seas and protected the oceans that had isolated the United States during its early history. Any naval attack by an unfriendly power would meet with assured destruction. Therefore, a prospective attack would have to come from the air, over the Arctic. The polar air routes are the shortest routes between North America and Eurasia, thus giving priority to the Air Force as "the first line of defense." The defense envisioned by the designers of airpower strategy was deterrence, the threat of launching a fleet of atomic-armed bombers against the Soviet Union.[82]

Thus, firmly entrenched in U.S. military doctrine was the belief in the superiority of the bomber, especially the bomber armed with atomic weapons. Powerful elements within the Air Force, the civilian leadership (Air Force Secretary Thomas Finletter and Air Force Under-Secretary James H. Douglas, Jr.) and the Air Staff (led by Chief of Staff Hoyt S. Vandenberg) argued that since there was no real defense against the bomber, then military appropriations should "go to the deterrent," emphasizing the role that SAC would play under the belief "defense through offense."[83] These Air Force strategists put more emphasis on offensive preparations (particularly SAC) for national security; throughout the rest of the 1940s and into the 1950s, very little of the defense budget was spent on purely defensive measures. These American national security planners thus came to "adopt security strategies based on deterrence rather than defense."[84] It is this view that remained prevalent into the Eisenhower Administration, besides some lip-service paid to continental defense in the later stages of Truman's last term.

There were two major reasons the United States was more concerned with its security after World War II than after World War I. The first was technology. Aircraft capabilities, while not yet truly intercontinental, continued to improve. Long-range bombers with bases closer to the United States, or after attaining intercontinental ability dramatically altered traditional beliefs about United States security. The Japanese had proven that a country with such military technology could launch a surprise attack against the United States.

Another reason was the rise of the totalitarian state with the ability and ambition to override the long-established balance of power politics in Europe and extend its influence and domination without the customary checks placed on its actions. Nazi Germany had fit this description. It had the power to challenge directly America's relative isolation. Modern technology in the form of transportation and communication, along with twentieth-century forms of social control, had made it at least possible, if improbable, to threaten the United States. According to historian Craig Campbell, "Nazi Germany was a regime capable not merely invading the North American continent and governing it remotely . . . but actually dominating it directly in the totalitarian manner available to twentieth-century superpowers."[85] Plans of bombers left on the drawing boards of German aircraft designers (found after the war) indicated that they were working on the development of a bomber with the capacity to cross the Atlantic and attack New York City.

After World War II another equally dangerous, totalitarian state existed with the technological capacity to threaten U.S. security: the Soviet Union. Soviet domination of much of Eastern Europe together with large, standing military forces presented not only a threat to Western Europe but also to the United States. To meet this threat the United States followed two main courses of action. The first was to adopt the strategy of containment, by which the United

States and its allies aimed to prevent the Soviet Union in particular, and communism in general, from expanding into new areas, especially strategically important regions. The second course of action was to attain military pre-eminence over the Soviet Union, at first by having an atomic monopoly and later, after the Soviet acquisition of nuclear weapons, to maintain numerical superiority. This was crucial not only to enforce the containment doctrine but to protect the United States against direct Soviet aggression.[86] These were primary elements of U.S. strategy for much of the early Cold War. Jolted by the Soviet acquisition of atomic weapons and numbers of long-range bombers, the United States' worst fears came true: a hostile nation with atomic capacity and the means with which to deliver those weapons on the United States.

In 1950 the National Security Council (created by the National Security Act of 1947) along with the Departments of State and Defense undertook a serious reappraisal of American national security in light of the changing world situation. Coming out of this re-evaluation of American security was NSC-68, a policy paper proposing how the United States could strengthen its position around the world and provide greater security for the continental United States. Although the National Security Council (NSC)[2] was a presidential advising body for matters concerning national security, Truman did not extensively rely on this body until nearly three years into its existence. Not only did the NSC acquire greater significance with the outbreak of the Korean War, but its national security policy paper presented in April 1950 also gained stature.

NSC-68 contained numerous suppositions about the world military situation in the coming years, along with a number of steps that the United States needed to implement if it was to remain in a dominant position in the world. Although not all of NSC-68's programs were

[2] The National Security Act (1947) created the National Security Council.

immediately implemented, the Korean War, beginning in June 1950, led some to be put into practice, while others were put into operation later in the decade.

The authors of NSC-68, including Paul H. Nitze who was the Director of the Policy Planning Staff (PPS) for the State Department, saw the Soviet Union as hostile to the free world, alleging that it sought "to impose its absolute authority over the rest of the world."[87] Later in NSC-68, the PPS agreed with the supposition of NSC-20/4 (approved by Truman on 24 November 1948) that "the gravest threat to the security of the United States within the foreseeable future stems from the hostile designs and formidable power of the USSR, and from the nature of the Soviet system."[88] Soviet hostility to the free world and particularly against the United States is emphasized again and again throughout the document.

A major assumption in NSC-68 was that the Soviet Union was attempting to dominate Europe and Asia and that the only bulwark against this dominance was the United States. NSC-68 stated in the section titled "The Fundamental Design of the Kremlin" that:

> Soviet efforts are now directed toward the domination of the Eurasian land mass. The United States, as the principal center of power in the non-Soviet world and the bulwark of opposition to Soviet expansion, is the principal enemy whose integrity and vitality must be subverted or destroyed by one means or another if the Kremlin is to achieve its fundamental design.[89]

With this assumption that the Soviet Union must eventually deal with the United States in order to carry out its plan of spreading communism, the United States would become the object of increasing Soviet pressures. If a war between these two antagonists were to break out in the immediate future, the United States could expect the Soviet Union to "attack selected targets with atomic weapons . . . [including] targets in Alaska, Canada, and the United States."[90] By mid-1954 "a critical date for the United States," NSC-68 estimated, the Soviets could have 200 atomic weapons. This would be enough weapons to overwhelm the United States with atomic weapons, while still having others to use elsewhere, or to hold in reserve. Upon attaining this key number, the Soviets would then have a good chance of striking the United States in a surprise attack with 100 atomic bombs, which "would seriously damage the country."[91]

These attacks would be disastrous if no preparations had been made to oppose a surprise assault, the creators of NSC-68 warned that "effective opposition to this Soviet capability will require among other measures greatly increased *air warning systems*, air defenses, and vigorous development and implementation of a civilian defense program."[92] [emphasis added] This was the first indication that the Truman administration would have to address more completely this aspect of continental defense, although in the preceding years certain radar systems in the United States had been established or begun by the military. These systems tended to be more limited in scope than the plan envisioned by NSC-68, only providing radar coverage over particular targets and regions. The authors of NSC-68 initiated an interest in a more comprehensive system for early warning.

Truman approved NSC-68 in April 1950, but the military took no immediate action. There were more studies at all governmental and military levels, but they worked out nothing of substance before North Korea launched an attack on South Korea on 25 June 1950, completely shocking the United States. Before the North Korean invasion, Secretary of State Dean Acheson did not include South Korea among the countries that the United States would protect against communist incursions. In January 1950, in what was dubbed his "perimeter" speech, Acheson spoke before the National Press Club. In his speech, Acheson delineated regions of the western Pacific that the United States would defend if attacked by a hostile power. Included in the defense perimeter the Philippines, Okinawa, Japan, and the Aleutians, which taken together formed a defense line along the island chain "fringing the coast of Asia."[93] Presumably, Formosa (Taiwan) and South Korea were outside of the regions to be defended. Acheson's statement did not prove to be the policy followed by the current administration.

President Truman along with other policymakers deemed that South Korea *was* in the U.S. "sphere of action," countries in which the United States would become militarily involved because of their significance to U.S. security and strategy. With its inclusion into the U.S. national security defense sphere, South Korea must be prevented from falling into the hands of the communist bloc. A successful communist takeover might have dire consequences not only for the U.S. position in East Asia but for the world. With the specter of appeasement from Munich and the "fall" of China influencing his thinking, Truman affirmed that "if aggression is successful in Korea, we can expect it to spread through Asia and Europe to this hemisphere."[94]

The Korean War was the key event that moved the improved national security programs from theoretical discussion to implementation. It was not until the United States became directly involved in Korea that military spending greatly increased and the policies advocated in NSC-68 began to get the attention they deserved. Military spending increased from around $14.4 billion as projected by the FY 1950 defense budget to the Truman's administration last approved defense budget, which topped out at over $45 billion (FY 1954).[95] A feature of defense allocations after FY 1949, as reflected in FY 1953 and FY 1954 defense spending, was that the U.S. Air Force would get a larger percentage of the defense budget. In the FY 1949 budget, spending among the three services was roughly equal ($4.7 billion for the Air Force, $4.9 billion for the Navy, and $4.2 billion for the Army).[96]

The first budget (FY 1951) after the outbreak of the Korean War increased overall military spending from $13 billion to $47.8 billion. The U.S. Army still had the plurality of FY 1950's budget with 41 percent, the Air Force 33 percent, and the Navy 26 percent. The following year's appropriations found the USAF receiving 44 percent and the Army and Navy both getting 28 percent, a major shift in the military priorities of the nation.[97]

Further indicating a growing commitment on air power, the Air Force got $20.7 billion in FY 1953 defense allocations while the Army and Navy received $14.2 billion and $13.2 billion, respectively. The FY 1953 military budget under the Truman Administration, including the Supplemental Appropriations Act of Defense, totaled $46.9 billion. In this budget the USAF obtained $20.6 billion, the Army got $13.2 billion, and the Navy received $12.6 billion. The percentages among the services were roughly the same as the previous year's budget, although the U.S. Navy lost a little more than one percent of its allocation.[98]

The Air Force retained over forty percent of the defense budget for the projected FY 1954 defense budget: $16.7 billion for the Air Force, $12.1 billion for the Army and $11.3 billion for the Navy.[99] In the succeeding years' allocations, between FY 1954 and FY 1957, the Air Force averaged 47 percent of the annual defense budget, while the Navy received 29 percent and the Army 22 percent.[100] All these military budgets indicated the continuing if not expanding emphasis on air power and a new concern for continental defense measures, specifically under Eisenhower's New Look national security policy. The growing importance of NATO was also a key factor in being able to reduce U.S. manpower requirements. The other member nations of NATO would contribute more military manpower to the defense of Europe.

With the Korean War military buildup, the United States increased the size of its armed forces. By 1952, the number of military personnel was over 3.6 million, more than two million more than in 1948. Although this number later decreased under Eisenhower's New Look policy, the numbers did not fall below 2.4 million during the 1950s.[101] The increased numbers of military personnel after the Korean War indicated larger commitments of the U.S. military, both in North America and abroad.

Despite NSC-68's call for improved continental defense measures, the needs of the Korean War took precedence. Greater troop commitments in Europe were also a top priority for the Truman administration, for fear that the Korean action was just a diversion to allow Soviet tanks to head across central Europe while U.S. forces were entrenched on the other side of the continental landmass.

Since 1950, both countries had been developing an even more potent weapon. Atomic bombs were fission weapons, which have "an inherent upper limit to the explosive power." The explosive energy released by the atomic bombs is measured in kilotons, or thousands of tons, of TNT.[102] A fusion weapon, on he other hand, "combin[es] . . . [the] heavy isotopes of hydrogen into heavier helium atoms." This "hydrogen" or thermonuclear bomb can "produce explosions one thousand times more powerful than those from similar-sized atomic bombs, or a million times more powerful than conventional explosives."[103] Theoretically, there is no upper limit on the yield of a hydrogen bomb. Because of the substantial increase in explosive energy, hydrogen weapons are measured in megatons. Where an atomic bomb might destroy part of a city, a thermonuclear bomb could thoroughly eradicate the same city.

The technological jump from atomic to nuclear weapons produced a thousand-fold increase in explosive energy within an eight-year period. The increased pace of technological developments was a major factor in the formulation of strategy and the creation of weapon systems, both offensive and defensive. Richard Smoke states in *National Security and the Nuclear Dilemma* (1984) that the American public did not appreciate that the technological advancement "from fission to fusion bombs was at least as significant as the earlier step from the largest conventional bombs to fission,"[104] but the change was not lost on the scientific community and defense planners. These powerful new weapons posed new challenges to continental defense. Rather than providing the near-impossible leak-proof defense for the United States in the thermonuclear age, continental defense efforts, such as the DEW Line, served as vital components to deterrence. While improved continental defenses could prove useful, if not critical, for anything less than an all-out nuclear attack, it would be the deterrent value of the DEW Line that would assume greater significance.

By the time of the first Soviet detonation of a hydrogen bomb, the United States had a new president, with a new, although not completely different, set of defense priorities. Eisenhower, well known for his "New Look," touted a defense commitment promising in the words of his Secretary of Defense Charles E. Wilson, "more bang for the buck." In reality the New Look was a lot more complicated than that, while also not a complete break from his predecessor's policies.

Eisenhower was concerned about the increased military budget and large personnel requirements inherited from Truman, thanks mainly to the Korean War and partly to NCS-68. Eisenhower was especially concerned about the health of the American economy, believing that spending could not continue at that level without raising taxes. Eisenhower, instead, was interested in lowering the tax burden on Americans. He was concerned that military spending was too high and wanted to prevent America from becoming a garrison state, a condition which would see a reduction in the quality of American life.

Although many have asserted that the New Look was a significant departure from Truman's policy, in fact there are many similarities and only a few, though significant, differences. Four major characteristics, often emphasized as making up the critical elements of the New Look, had roots under the Truman Administration. The first was Eisenhower's commitment to the economic well-being of the nation. NSC 162/2 and later Basic National Security Policies under Eisenhower stated that the first priority was "to meet the Soviet threat to U.S. security . . . [but] in doing so, to avoid seriously weakening the U.S. economy or undermining our fundamental values and institutions."[105] These sentiments, located at the very beginning of the document, set the tone for Eisenhower's New Look. NSC-68 similarly stated that the Soviet Union needed to be weakened until it is "no longer a threat to the peace, national independence, and stability . . . [and] in pursuing these objectives, due care must be taken to avoid permanently impairing our economy and the fundamental values and institutions inherent to our way of life."[106] The other item to note is that the Korean War broke out soon after this document became the guidelines for national security under the Truman Administration and necessitated a massive military buildup. Thus, the fiscal responsibility aspect of NSC-68 never had a chance to be put into practice. After the truce that effectively ended the fighting of the Korean War, Eisenhower could implement a more fiscally conscious military budget.

Another policy found under the Truman administration that is part of the New Look was support of NATO and other allies. Only by increasing the size of NATO and emphasizing greater commitments by the other member nations, especially in manpower, would this western alliance gain the stature to deter expansion by the Soviet Union. The other effect of strengthening NATO would be to allow a reduction in the number of U.S. troops. If Eisenhower was to make good his promise of significantly lowering defense spending, a key factor would have to be reducing the size of the armed forces.

The reliance on America's lead in atomic weapons (atomic and nuclear under Eisenhower) to act as a deterrent against hostile or aggressive actions by the Soviet Union was another critical feature of the New Look, though here, too, there was a connection to the Truman Administration. Under Truman, atomic deterrence was actually an easier policy to which to adhere, and a less risky one, since until 1949 the United States was the sole possessor of atomic weapons. Even in the years following the loss of the atomic monopoly the Soviets did not have adequate means of delivering these weapons, while the United States had intercontinental and medium bombers stationed around the periphery of the Soviet Union able to deliver a portion of their more numerous atomic weapons. Eisenhower, too, was a strong advocate of nuclear deterrence and kept the emphasis on maintaining a numerical lead in nuclear weapons. Despite having nuclear supremacy, keeping these weapons protected in the event of a Soviet first-strike attack would be of paramount importance. Thus, a key component of U.S. deterrent strategy would be the DEW Line. Early warning would be critical in protecting the retaliatory nuclear-striking capability of SAC.

Finally, a hallmark of the New Look was a greater emphasis on air power, especially SAC, which provided the primary means of delivering the nuclear bombs. SAC was the most important element of U.S. deterrent policy. This reliance on air power had its genesis under Truman. During Truman's presidency, the United States increased the number of both intercontinental and medium bombers, and more modern turbo-prop and jet bombers either made their appearance or were planned under Truman. Further, as noted above, the Air Force in the last year of his administration received 44 percent of the military appropriations. Funding of both the Army and Navy was 16 percentage points behind the Air Force.[107] The budget allocation pattern continued under Eisenhower, but during certain years, the Air Force obtained an even larger percentage of the defense budget. Included under air power were improved air defense measures, another major feature of Eisenhower's New Look. These continental defense measures involved not only improved fighter/interceptor aircraft, but surface-to-air missile batteries and a more developed radar network, essential for detecting hostile aircraft. The DEW Line would provide the initial warning needed to detect, track, and intercept enemy aircraft.

One area where there was a difference between the two presidential administrations was the use of nuclear weapons, which might be attributed to the number of weapons available. In the first five years of Truman's Administration, atomic bombs were relatively few in number and extremely expensive. After 1950, more atomic weapons were making their way into the U.S. arsenal. With additional weapons and a more systematic way to manufacture them, the cost per weapon began to decline significantly. Encouraged by the less expensive, more numerous bombs, there was a difference between the administrations on the place of atomic weapons in U.S. strategy. For Truman, the use of atomic weapons in the event of war was laid out in NSC-68. The framers of NSC-68 stated:

> in the event we use atomic weapons either in retaliation for their prior use by the USSR or because there is no alternative method by which we can attain our objectives, it is imperative that the strategic and tactical targets against which they are used be appropriate and the manner in which they are used be consistent with those objectives.[108]

The policy for use of nuclear weapons under the Eisenhower-era NSC-162/2 Basic National Security Policy was a little more direct: "in the event of hostilities, the United States will consider nuclear weapons to be as available for use as other munitions."[109] According to the language, it would appear that Eisenhower was more willing at least to threaten the use of atomic weapons, if not resort to their utilization. Glenn H. Snyder believes that since many aspects of

Eisenhower's defense policy were rooted in the Truman Administration[3], U.S. defense policy was not significantly altered with the change of administrations. Snyder argues that,

> in terms of "action policy" – intentions regarding the use of forces – the change was somewhat sharper. The New Look included a determination to use nuclear weapons, especially nuclear air power, in a wider range of contingencies than those for which the previous admin istration had firmly planned. "Declaratory policy"' featured a much greater stress on threats of nuclear retaliation – massive or otherwise – to deter aggression.[110]

In fact, Eisenhower made nuclear weapons "an integral part of American defense."[111] This statement along with Snyder's analysis sums up the key difference in the role of atomic weapons between the two administrations.

The greater availability of nuclear weapons allowed Eisenhower to move towards a more nuclear-dependent military strategy. The mounting number of special weapons permitted a way for Eisenhower to solve the problem of a defense budget spiraling out of control and taking down the American economy in the process.[112] A heavier reliance on nuclear weapons and their delivery platforms was thus a key component in Eisenhower's defense and economic policies.

In a speech before the Council of Foreign Relations three months after NSC-162/2 was approved by the President, Secretary of State John Foster Dulles emphasized the administration's willingness to use nuclear weapons. Dulles's speech, according to historian Samuel F. Wells, Jr., inspired the labeling of the Eisenhower's nuclear policy as "massive retaliation":

> The combination of massive retaliation with the hope of an eventual triumph over communism satisfied all the requirements for a new Republican international policy. It exploited America's technological superiority and provided a basis for reduced federal spending; it had broad popular appeal; and it flowed from the strong belief of the president and his top advisers in the utility of nuclear weapons for both

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[3] For an article-length treatment of the continuity of Eisenhower's defense posture with that of Truman, see Donald J. Mrozek, "A New Look at 'Balanced Forces': Defense Continuities From Truman to Eisenhower" *Military Affairs* vol. 38 no. 4 (December 1974): 145-151.

deterrent and actual military missions.[113]

This refocusing of U.S. strategy not only continued but increased the Air Force's dominant position among the armed forces. The effect was to scale back the appropriations and personnel of the Army and Navy.

Eisenhower was interested in a lower, stable defense budget over the years, without any great peaks or valleys in spending. Instead of an all-out preparation for a year of maximum danger as Truman attempted, Eisenhower paced the U.S. economy for the "long-haul."[114] Although Eisenhower did not continue the defense budgets of the Korean War buildup (over $40 billion), neither did he retreat to the lower defense spending of the late 1940s (under $13 billion).[4] Cold War historian Charles R. Morris (1988) states "Eisenhower never placed sole reliance on nuclear weapons. His conventional force budgets were almost triple those of Truman's in the pre-Korean War years, and his military manpower goals were about twice as high."[115] America's national security could not survive in a world in which the United States no longer held the atomic monopoly and the conventional forces were of a minimal size with outmoded weapons.

An increased role of NATO was also an important feature of the New Look. To keep U.S. manpower requirements at a reasonable level, America's European allies must be willing make a greater commitment to their own defense (individually and collectively). The Eisenhower administration also pushed for West German membership into NATO over the reservations of France and other countries. With the members of NATO supplying larger numbers of ground forces, the United States, ultimately, would be able to cut back on the size of

[4] See Appendix A

its military personnel. A stronger posture by U.S. allies would allow Eisenhower to begin to reduce military spending by making reductions in military manpower.[5]

Another major part of the New Look, and a significant departure from the defense programs under Truman, was the increased measures and budgets for continental air defense, although certain aspects of them only slowly came into being. Continental air defense measures included both active and passive measures. Passive defenses included the non-combative elements, such as civil defense efforts or hardened bunkers for the protection of military assets. Active defense measures included all that is necessary for detecting, identifying, intercepting, and destroying enemy targets.   These included either visual or electronic (radar) measures for detection and identification, and the interception and destruction of enemy aircraft with fighters, missiles, or anti-aircraft artillery.[116] Early warning radar, especially the DEW Line, would be a critical component of an improved continental air defense. The DEW Line would prove particularly beneficial for detecting enemy aircraft at the earliest possible moment and providing aid for identifying and intercepting hostile aircraft.

Defensive weapons such as interceptors and anti-aircraft artillery and eventually SAMs (Surface-to-Air Missiles) came to have a dominant role in continental defense, while the non-weapons systems utilized for defense have been overlooked, or at best minimized, in the historiography of the Cold War. Eisenhower himself did not place a priority on early warning during the first eighteen months of his presidency. Although it took over nine months for Eisenhower to formulate policies for national security and defense (NSC-162/2), warning systems, particularly the DEW Line, were not approved until late 1954, despite the Soviet detonation of the hydrogen bomb in August 1953. Much discussion inside and outside of

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[5]See Appendix B for Department of Defense manpower statistics.

military circles surrounded the whole issue of the need for improved defenses, especially early warning measures. In order to be approved, these programs had to be proven feasible, be within the budgetary constraints of the New Look, and acquire the support of crucial elements within the government and military.

Some questions concerning continental defense efforts would have to be answered before the DEW Line could get the approval of the Eisenhower administration. Did early warning systems merit a place in a budget dominated by the offensive-minded retaliatory policy of the military strategists? With the Air Force, specifically SAC, getting a large portion of the budget, would there be enough support for the establishment of these mundane, defensive-oriented weapon systems, which tended to offset the prevailing counteroffensive theory? Subsequent chapters will explore this development as it pertains to the genesis, formulation, and implementation of the DEW Line.

The nature of the Soviet threat to the United States must also be examined. The Soviets did not incorporate strategic air power into their military thought until after World War II, much later than in Britain, the United States and Germany. By the end of World War II, Soviet air power still centered on tactical employment of aircraft, despite their construction of a heavy bomber force before the mid-1930s.[117] Historically, Soviet aircraft design and development had lagged behind that of the West, especially Germany, Great Britain, and the United States. During the Second World War, the Soviet Union had to focus on weapons that were more useful to its more traditional military doctrine because of its limited industrial capacity. The Soviet Union could not afford the luxury of producing large numbers of medium or long range bombers when resources and production capacity were limited. The Soviet Union needed other war materiel that was more critical to its defense – tanks, artillery, infantry equipment, etc. The

Soviets did everything in their power to produce these weapons, needed in large numbers, for the great land battles along the Eastern Front. The aircraft that the Soviets produced were primarily fighters and tactical bombers. Strategic, multi-engined bombers were not a large part of the Soviet arsenal, even when the war came to an end. Soviet strategic airpower, thus, was a post-war development. Before the war Soviet strategy did not make a distinction between tactical or strategic air power. As Air Vice-Marshal R. A. Mason and John W. R. Taylor argues in *Aircraft, Strategy and Operations of the Soviet Air Force,* "A 'strategic' attack was as often as not one carried out in the immediate rear of the enemy."[118]

An early Soviet aviation officer who foresaw a greater Soviet commitment to strategic bombing was Major General of Aviation Evgenni Ivanovich Tatarchenko. His emphasis on strategic bombing as a result of the recent technological developments (radar, atomic energy, jet-engines, and missiles) is found in a 1946 article "Some Problems of the Development of Air Power" in the Soviet military publication *Herald of the Air Fleet*. Tatarchenko believed that strategic air power would be given a more dominant mission in the future:

> [I]t has now become an indisputable fact that along with operational-tactical aviation, the main task of which consists of direct support to the operations of ground troops, there must also exist strategic aviation. It would appear that contemporary air forces are capable of deciding not only tactical, but also operational and strategic tasks, which no arm other than aviation can fulfill. Concerning the form of future war the following thoughts suggest themselves: in future engagements the place of application of the main force will be not so much the front as the rear of the enemy.[119]

Tatarchenko was not alone, as another Soviet airpower theorist, Major General Petr Dmitrievich Korkodinov, came to a similar, if not a more limited, conclusion. Korkodinov argued, citing the Allied strategic bombing of Germany, "that in some cases air or sea operations might have strategic significance," meaning "independent strategic operations."[120] These were the exceptions, though, in Soviet airpower theory in the immediate postwar years. There were still reservations about the role of strategic air operations wholly independent from combined-arms warfare. As Raymond Garthoff, expert on the Soviet military, states in his 1957/58 article "Air Power and Soviet Strategy," there was a growing acceptance for strategic air power "as a supplement to, or perhaps a new member of, the essentially ground-oriented combined-arms team."[121] Throughout the rest of the 1940s, the typical Soviet strategic airpower theory was illustrated in the writings of Colonel-General of Aviation Aleksei Vasilevich Nikitin writing in *Military Thought* (1949):

> Soviet military science holds alien any form of the one-sided theory, widely prevalent in the capitalist countries, which considers aviation as the most important factor of contemporary war, capable practically independently of deciding the outcome of war. Our military science recognizes that victory in modern war is achieved by the combined efforts of all forms and arms of the armed forces, that no arm can replace another, and that each of them must participate on the basis of able employment of all their characteristics and combat capabilities. On the basis of this deeply scientific principle, Soviet military science considers that the outcome of war under contemporary conditions is decided on the field of battle by means of the annihilation of the armed forces of the enemy, and that one of the most important tasks of aviation is active assistance to the ground and naval forces in all forms of combat activity. This definition of the fundamental mission of aviation is not contradicted by the need to employ part of its forces to strike the deep rear of the enemy, on his military-industrial targets, but our military science does not consider such blows and end in themselves, but only a helpful means of creating favorable conditions for the success of the combat operations of the ground and air forces.[122]

This view was in the mainstream despite the Soviet production of their first true intercontinental bomber, the Tu-4, later nicknamed "Bull" by NATO. The Tu-4 was a replica of the United States Boeing B-29 Superfortress. After bombing missions in Manchuria and Japan in 1944, three B-29s were forced to land in the Soviet Union (another crash-landed in Siberia on a different mission) and were subsequently impounded, later to be studied, dismantled, and reproduced by the Soviets.

By diverting a good amount of resources, the Soviets first flew the Tu-4 in 1947 (only three years after the "acquisition"), and the bomber became operational in 1949. Coincidentally, this was the same year that the Soviets exploded their first atomic bomb. Concern in Washington about the defense of the United States grew exponentially with these two essential ingredients, atomic bombs and a method for delivering them on the continental United States, which led to a reconceptualization of U.S. national defense policy: NSC-68.

By the mid-1950s the Soviets had built around two dozen bomber bases along the Arctic Circle across the northern periphery of the Soviet Union.[123] These air bases would have served as launching points for an attack against North America. Another mid-decade development was that other bombers had become available for the Soviet Long Range Air Force. In May 1954, both the medium-range, two-engine turbojet "Badger" (Tu-16) and the long-range, four-engine turbojet "Bison" (M-4) made their first public appearances. The following July, on Aviation Day, these jet bombers appeared in the skies in large numbers. The demonstration gave the appearance that the Soviets had undergone a crash program of bomber procurement. The "Bison" bombers flew by in particularly large numbers, though later speculation indicated that "it was the same squadron of Bisons . . . flying around in circles, reappearing every few minutes."[124] The new turbo-prop, multi-engine "Bear" bomber, the Soviets' first legitimate strategic bomber, also made its debut during the 1955 Aviation Day demonstration.[125]

Even though the Soviets' closing of the gap in nuclear weapon delivery platforms caused great concern for U.S. military planners, the United States continued to have a definite lead in strategic bombers. By the time these newer models of Soviet bombers were becoming operational, the United States had also already committed itself to improving its defenses, including construction of the DEW Line. The early warning provided by the Arctic radar chain would help to serve as a deterrent against a Soviet strategic attack by providing enough warning for the bombers of SAC to launch a devastating retaliatory attack against the Soviet homeland.

Despite the growing emphasis on developing a strategic air fleet, there were still reservations in the Soviet military hierarchy concerning the overall effectiveness of strategic bombing. According to an August 1955 *Red Star* (*Krasnaya Zvezda)* article, the main newspaper of the Soviet Army:

> The creation of atomic bombs has significantly increased the striking power of bombers . . . As a consequence, the significance of heavy bomber aviation with a large operational radius, as a means of air attack for the destruction of important strategic targets in the deep rear, has been raised.[126]

The anonymous author of the article, though, shied away from a total endorsement of strategic bombing and continued, "with the development of air science and technology, strategic bombers have become all the more powerful and effective a weapon of air attack. *However, the means of air defense have been perfected simultaneously*.[127] [emphasis added] Clearly, the necessity for defensive measures was still a concern to the Soviets as well.

Marshal Georgi Zhukov, along with Colonel-General Nikitin, was another high Soviet official warning against the over-valuing of strategic bombing. In 1955 he declared, "One must bear in mind that one cannot win a war with atomic bombs alone." He reinforced this opinion in 1957:

> In the postwar construction of the armed forces we are proceeding from the fact that victory in future war will be achieved only by the combined efforts of all arms of the armed forces and on the basis of their co-ordinated employment in war.[128]

Zhukov was unable to move away from many decades of combined arms dogma, which thoroughly permeated Soviet military doctrine and refused to place one service or part of a service in a predominant position. In an article in *Military Thought* in 1955, Major General Vasilii Efimovich Khlophov supported this contention: American strategic doctrine is "defective in its foundation . . . the theory of strategic air war, exaggerat[es] the potentialities of this one form of the armed forces."[129]

Strategic bombing did not seem to have top priority in Soviet defense strategy. Despite the American atomic threat and later thermonuclear weapons, the Soviet Union's primary concern was on the Eurasian continent. The Soviets' major emphasis was ground warfare in Europe or Asia, with the main potential theater being Europe. Combined arms warfare theory then continued its preeminence in the contemplation of a future war materializing to the west. But Soviet intercontinental bombers and nuclear weapons were not a threat that could be ignored. The United States must provide a defense, or at least a deterrent, against a Soviet nuclear attack.

Soviet strategists did not fully embrace strategic bombing in their overall national security policy. While long-range bombers formed a component of their military, Soviet military doctrines still emphasized the lessons learned from their World War II experience. According to airpower historian Edward J. Felker, "the formative impact of World War II led military doctrine to cast future war in the mold of that experience—protracted land warfare, with ground troops directly supported by tanks, artillery, and aircraft. Soviet leaders believed that surprise attack characterized this period."[130]

Perhaps the Soviets were "forced" into spending a large amount of resources on building a fleet of strategic bombers primarily as a deterrent to the United States. Soviet military specialist Michael McGwire argues that many of the Soviet actions and the doctrines behind them must be seen as responses to the perceived threat posed by American decisions."[131] Also, the only way to project Soviet power onto the North American continent from the late 1940s through the late 1950s was delivering the nuclear weapons by manned bombers. If the Soviets did not have the means of delivering nuclear weapons onto the continental United States, then without having a proper deterrent, the strategic initiative would pass to the United States, forcing Soviet policy to be at best reactive. The Soviets believed that they would then have the options of sitting back and watching their position deteriorate or threatening the United States by proxy with the launching of a massive ground offensive in Europe, with or without the use of nuclear weapons.

Soviet target analysis focused on destroying the military offensive capability of the United States, particularly the strategic air element: SAC bases and bases surrounding the Soviet Union. Raymond Garthoff, writing in 1957, stated, "[T]o destroy the key enemy weapons launched from another continent, it is necessary to have and to use an intercontinental capability."[132] Only by adopting this strategic element into their arsenal and strategy, albeit lukewarmly, could the Soviets hope to counter what they interpreted as aggressive posturing by the United States during the early Cold War period. Sometime around the time of Stalin's death, the Soviet Union deemphasized bomber development and refocused research and development resources on obtaining a missile force.[133] Manned bombers, though, still remained the primary means of delivering nuclear weapons onto the United States well into the 1960s. Having a defense against these attacks, or better, a combined effort of continental defense (including early warning provided by the DEW Line) and a protected fleet of SAC retaliatory bombers would deter the Soviets from carrying out such an attack.

The threat haunted the ranks of the U.S. military, government, and public was a surprise Soviet attack, but there was in the early 1950s an overestimate of the immediacy of that threat. Until 1954, the probability of the Soviets taking such an ill-conceived risk was minimal, as they were far behind in quantity of nuclear weapons and in bombers. Charles Morris in *Iron Destinies, Lost Opportunities* (1988) states that with the Soviet hydrogen bomb, "the country whipped itself into a near-hysteria over the one threat that the Soviet Union was *least* capable of mounting, a surprise nuclear attack on the American mainland."[134] Many of the bombers that were in their inventory only had a suicide, one-way mission capability. Using all of these aircraft and their limited number of atomic weapons would have depleted their strategic offense ability and left them exceptionally vulnerable to U.S. retaliation.[135]

Eisenhower also continuously reminded the National Security Council that instead of always thinking about what the Russians could do to us, "figure out what the Russians were thinking with regard to what the United States do to them. They must be scared as hell."[136] Eisenhower was not an extremist throughout most of his first two years as president when it came to worrying about a Soviet surprise attack. By the end of 1954, however, Eisenhower had changed his opinion and stated that a "'fear' . . . appeared for the first time in the United States, since it was no longer immune from attack." The same month he would give his approval for the construction of the DEW Line.[137] Why Eisenhower changed his mind and came to support air warning will be explored in the subsequent chapters.

[1]Neville Jones, *The Origins of Strategic Bombing* (London: William Kimber, 1973), 13.

[2]It is generally believed that Douhet works had some circulation in translation among the U.S. Air Service, but there is little evidence of this in Great Britain in the interwar years. Bernard Brodie in "Some Notes on the Evolution of Air Doctrine" *World Politics* VII no. 3 (April 1955): 350, states that in the 1930s, Douhet's translated work influenced the ideology of the U.S. Air Corps. Holding the same opinion is Robert Frank Futrell, *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force, 1907-1960.* Volume One. (Maxwell AFB AL: Air University Press, 1974; reprint, 1989), 39.

[3]It is interesting to note that the British, who were able to withstand the Battle of Britain and future aerial attacks, did not experience a collapse of morale, but believed that their bombing of German cities might have such an effect.

[4]Giulio Douhet, *The Command of the Air,* trans. Dino Ferrari (New York: Coward-McCann, Inc., 1942), 5-6; Lawrence Freedman, *The Evolution of Nuclear Strategy* (London: The Macmillan Press, LTD, 1989) also discusses the "civilian morale" issue.

[5]*Ibid*., 9.

[6]Quoted in George Quester, *Deterrence Before Hiroshima: The Influence of Airpower on Modern Strategy* (New York: John Wiley, 1966), 52.

[7]Warner, 490; and David MacIssac, "Voices from the Central Blue: The Air Power Theorists" in Peter Paret, ed. *Makers of Modern Strategy: From Machiavelli to the Nuclear Age* (Princeton NJ: Princeton University Press, 1986), 630.

[8]Mark A. Clodfelter, "Molding Airpower Convictions: Development and Legacy of William Mitchell's Strategic Thought" in Phillip S. Meilinger, *The Paths of Heaven: The Evolution of Airpower Theory* (Maxwell AFB AL: Air University Press, 1997), 79.

[9]William Mitchell, *Winged Defense: The Development and Possibilities of Modern Air Power—Economic and Military* (New York: G. P. Putnam's Sons, 1925), xiii; see also Clodfelter, 99.

[10]Warner, 500.

[11]Michael S. Sherry, *The Rise of American Airpower: The Creation of Armageddon* (New Haven: Yale University Press, 1987), 29.

[12]See Clodfelter, 99 and 102; and David R. Metz, *The Air Campaign: John Warden and the Classical Airpower Theorists* (Maxwell AFB AL: Air University Press, 1999), 35.

[13]Sherry, 24.

[14]quote from B. H. Liddell Hart, *Paris or the Future of War* in Sherry, 24.

[15]Mearsheimer, John J., *Liddell Hart and the Weight of History* (Ithaca, NY: Cornell University Press, 1988), 5 and 150; and Brian Bond, *Liddell Hart: A Study of His Military Thought* (London: Cassell and Company, 1977), 40.

[16]Bond, 43.

[17]Mearshimer, 90.

[18]*Ibid.*, 90-91.

[19]Robin Higham, *The Military Intellectual in Britain* (New Brunswick, NJ: Rutgers University Press, 1966), 193 and 247.

[20]Phillip S. Meilinger, "Trenchard, Slessor, and Royal Air Force Doctrine before World War II" in Phillip S. Meilinger, *The Paths of Heaven: The Evolution of Airpower Theory* (Maxwell AFB, Alabama: Air University Press, 1997), 57. Meilinger also refers the reader to Uri Bialer's *The Shadow of the Bomber: The Fear of Air Attack and British Politics, 1932-1939* (London: Royal Historical Society, 1980) to explore this issue further.

[21]Sherry, 56.

[22]Liddell Hart quote in Bond, 41.

[23]Metz, 22; and Meilinger, 51.

[24]See RAF Manual CD 22, *Operations*, July 1922, Public Records Office, Kew, England, file AIR 10/1197, 5; and RAF Manual AP 1300, *Royal Air Force War Manual*, July 1928, Public Records Office, Kew, England, file AIR 10/1910, chap. 7. The documents are discussed in Meilinger, 53-55, n31, and n34.

[25]*Ibid.,* 51-2. Trenchard quotes in Metz is from Hugh Trenchard, "Speech at Cambridge University," 29 April 1925, Trenchard Papers, RAF Hendon, Engalnd, file CII/3/177-227.

[26]Interestingly, British officials, recognizing that German bombardment was not significantly impacting the morale of its citizens, believed that Allied attacks on German urban centers would demoralize their German inhabitants. Either this was because of not being able to move away very quickly from a couple of decades of

indoctrinated airpower theory, or a belief that citizens of democracies were somehow more resilient, or a combination of the two.

[27] Harry R. Borowski, ed. *The Harmon Memorial Lectures in Military History, 1959-1987: A Collection of the First Thirty Harmon Lectures Given at the United States Air Force Academy* (Washington, DC: Office of Air Force History, 1988), 465.

[28]See the entrees "Hiroshima" and "Nagasaki" in I. C. B. Dear, ed., *The Oxford Companion to World War II* (New York: Oxford University Press, 1995), 530 and 773.

[29]Bernard Brodie, "Some Notes on the Evolution of Air Doctrine" *World Politics* VII no .3 (April 1955), 362.

[30]*Ibid.,* 366.

[31] Snyder, Glenn H. *Deterrence and Defense: Toward a Theory of National Security* (Princeton: Princeton University Press, 1961), 3.

[32]*Ibid.*

[33]Brodie quote from "The Atomic Bomb and American Security," unpublished mss., November 1, 1945, Yale Institute of International Studies in Gregg Herken, *Counsels of War* (New York: Alfred A. Knopf, 1985), 8.

[34]Brodie quote from *The Absolute Weapon: Atomic Power and World Order* (New York: Harcourt, Brace, 1946), 76 in Barry H. Steiner, B*ernard Brodie and the Foundations of American Nuclear Strategy* (Lawrence: University Press of Kansas, 1991), 28.

[35]*Ibid*., 6.

[36]Herken, 9.

[37]*Ibid*.

[38]Steiner, xiii.

[39]*Ibid.,* 7.

[40]Herken, 34.

[41]*Ibid.,* 38.

[42]Bernard Brodie, *Strategy in the Missile Age* (Princeton, NJ: Princeton University Press, 1965), 394.

[43]*Ibid*., 184.

[44]*Ibid*., 184-185.

[45]*Ibid*., 189.

[46] *Ibid., 189-190.*

[47]For Truman quote see Freedman, 30.

[48]http://history.sandiego.edu/gen/WW2timeline/vannevar3.html (Retrieved 12 September 2008)

[49]Vannevar Bush, *Modern Arms and Free Men: A Discussion of the Role of Science in Preserving Democracy* (New York: Simon and Schuster, 1949), 48.

[50]*Ibid*., 56.

[51]*bid.,* 101-102.

[52]*Ibid.,* 59.

[53] John Slessor biographical information found in http://www.rafweb.org/Biographies/Slessor.htm

[54]John Slessor, *Strategy for the West* (New York: William Morrow and Company, 1954), 118.

[55]*Ibid.,* 118.

[56]John Slessor, "Air Power and World Strategy" *Foreign Affairs* XXXIII no. 1 (October 1954), 53.

[57]*Ibid.*, 49 and 53.

[58]*Ibid.,* 47.

[59]Slessor, *Strategy for the West,* 121.

[60]Alexander P. de Seversky, *Air Power: Key to Survival* (London: Herbert Jenkins, 1952), 7.

[61]*Ibid.,* 23.

[62]*Ibid., 154.*

[63]Phillip S. Meilinger, "Proselytiser and Prophet: Alexander P. de Seversky and American Airpower" XVIII no.1 (March 1995), 18.

[64]Seversky, 18.

[65]*Ibid.,* 241.

[66]*Ibid.,* 153.

[67]Meilinger, 28.

[68]H. H. Arnold, "Final Report to the Secretary of Defense, November 1945" in *The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, Fleet Admiral Ernest J. King* (Philadelphia: J. B. Lippincott Company, 1947), 453. Italics added by author.

[69]*Ibid*., 452.

[70]Futrell, 222-223.

[71]Quote found in http://www.af.mil/history/40s/milestones/sept_17.shtml.

[72]Stephen L. McFarland, "The Air Force in the Cold War, 1945-1960: Birth of a New Defense Paradigm" *Airpower Journal* (Fall 1996), 1 in http://www.airpower.maxwell.af.mil/airchronicles/apj/mcfarlnd.html.

[73]Curtis LeMay will have the foresight to disperse SAC bombers and relocated its headquarters to Omaha, Nebraska, to provide it with greater protection.

[74]Encyclopedia entry on SAC in http://www.zianet.com/jpage/airforce/history/majcooms/sac.html.

[75]"B-36" in http://www.fas.org/nuke/guide/usa/bomber/B-36.htm.

[76]"B-47" in http://www.fas.org/nuke/guide/usa/bomber/B-47.htm.

[77]"B-52" in http://www.fas.org/nuke/guide/usa/bomber/B-52.htm.

[78]Glynn H. Snyder, *Deterrence and Defense: Toward a Theory of National Strategy* (Princeton, NJ: Princeton University Press, 1961), 54.

[79]George C. Kenny quote in Futrell, 223.

[80]Richard Smoke, *National Security and the Nuclear Dilemma* (Reading, MA: Addison-Wesley Publishing Company, 1984), 53-54.

[81]"Historical Statistics of the United States" in http://www.sjprep.org/tclifford/USweb/MILITARYSIZE.html.

[82]MacFarland, 3.

[83]*Ibid.*

[84]Karl P. Mueller, "Strategic Airpower and Nuclear Strategy: New Theory for a Not-Quite-So-New Apocalypse" in Phillip S. Meilinger, *The Paths of Heaven: The Evolution of Airpower Theory* (Maxwell AFB, Alabama: Air University Press, 1997), 293.

[85]Craig Campbell, *Destroying the Village: Eisenhower and Thermonuclear War* (New York: Columbia University Press, 1998), 2.

[86]*Ibid.,* 3-4.

[87]"NSC-68" in http://www.trumanlibrary.org/whistlestop/study_collections/korea/large/week2/nsc68_5.htm. This site has reproduced images of the actual NSC-68 document found in the Truman Library, reproduced in its entirety.

[88]"NSC-68" in http://www.trumanlibrary.org/whistlestop/study_collections/korea/large/week2/nsc68_99.htm.

[89]"NSC-68" in http://www.trumanlibrary.org/whistlestop/study_collections/korea/large/week2/nsc68_8.htm.

[90]"NSC-68" in http://www.trumanlibrary.org/whistlestop/study_collections/korea/large/week2/nsc68_28.htm.

[91]"NSC-68" in http://www.trumanlibrary.org/whistlestop/study_collections/korea/large/week2/nsc68_32.htm.

[92]"NSC-68" in http://www.trumanlibrary.org/whistlestop/study_collections/korea/large/week2/nsc68_60.htm.
Emphasis added.

[93]http://history.sandiego.edu/gen/20th/acheson.html (Retrieved on 15 September 2008)

[94]Truman quote in Paul S. Boyer, Clifford E. Clark, Jr., et al., *The Enduring Vision: A History of the American People* 3rd ed. (Lexington, MA: D.C. Heath and Company, 1996), 912.

[95]Warner R. Schilling, Paul Y. Hammond and Glenn H. Snyder, *Strategy, Politics, and Defense Budgets* (New York: Columbia University Press, 1962), 394-5.

[96]*Ibid., 46.*

[97]*Ibid*., 6.

[98]Futrell, 290.

[99]*Ibid*., 387.

[100]David A. Rosenberg, "The Origins of Overkill: Nuclear Weapons and American Strategy" in Norman A. Graebner, *The National Security: Its Theory and Practice, 1945-1960* (New York: Oxford University Press, 1986), 143.

[101]"Historical Statistics of the United States" in http://www.sjprep.org/tclifford/USweb/MILITARYSIZE.html.

[102]Smoke, 58.

[103]Mueller, 282.

[104]Smoke, 58-9.

[105]"NSC 162/2" in *Foreign Relations of the United States, 1952-1954: Volume II: National Security Affairs,* Part I (Washington, DC: United States Government Printing Office, 1984), 578.

[106]"NSC-68" in the conclusion part 19 from NSC 20/4

[107]MacFarland, 6.

[108]"NSC-68" in

http://www.trumanlibrary.org/whistlestop/study_collections/korea/large/week2/nsc68_63.htm.

[109]"NSC 162/2" in *Foreign Relations of the United States, 1952-1954: Volume II: National Security Affairs,* Part I (Washington, DC: United States Government Printing Office, 1984), 593.

[110]Schilling, et al., 492-3.

[111]Rosenberg, 141-2.

[112]Stephen J. Cimbala, *The Politics of Warfare: The Great Powers in the Twentieth Century* (University Park: The Pennsylvania State University Press, 1997), 46.

[113]Samuel F. Wells, Jr., "The Origins of Massive Retaliation" *Political Science Quarterly* XCVI no. 1 (Spring 1981), 34. He argues that the popular notion of massive retaliation of "the indiscriminate lashing out with SAC forces – never was the operational policy of the Eisenhower administration." In the conclusion he states that "massive retaliation is one of those odd phrases in the lexicon of strategic discourse that is more symbol than reality."

[114]Rosenberg, 142.

[115]Charles R. Morris, *Iron Destinies, Lost Opportunities: The Arms Race Between the U.S.A. and U.S.S.R, 1945-1987* (New York: Harper & Row, Publishers, 1988), 99.

[116]Denys Volan, "Air Defense" in *American Peoples Encyclopedia* (1964), found in folder K410.04-8A 1964 in the Air Force Historical Research Agency, Maxwell, AFB: Montgomery, Alabama.

[117]"Tu-4 Bull" in http://www.fas.org/nuke/guide/russia/bomber/tu-4.htm. The article mentions that the Soviet Union actually had the largest number of four-engine bombers in the world in 1940.

[118]Air Vice-Marshal R. A. Mason and John W. R. Taylor, *Aircraft, Strategy and Operations of the Soviet Air Force* (London: Jane's Publishing Company Ltd., 1986), 129.

[119]Raymond L. Garthoff, "Air Power and Soviet Strategy" *Air University Quarterly Review* IX no. 4 (Winter 1957-58), 81.

[120]*Ibid.*

[121]*Ibid.,* 84.

[122]*Ibid.*

[123]Mason and Taylor, 131.

[124]Arnold L. Horelick, *Soviet Power and Soviet Foreign Policy* (Chicago: The University of Chicago Press, 1966), 28.

[125]Garthoff, 87.

[126]*Ibid.,* 89.

[127]*Ibid.* Italics added by author. Source quoted in article.

[128]*Ibid.*

[129]*Ibid*., 91. Source quoted in article

[130]Edward J. Felker "Soviet Military Doctrine and Air Theory: Change through the Light of the Storm" in Phillip S. Meilinger, *The Paths of Heaven: The Evolution of Airpower Theory* (Maxwell AFB, Alabama: Air University Press, 1997), 488-9.

[131]*Ibid.,* 488.

[132]Garthoff., 94.

[133]Morris, 91.

[134]*bid.*, 107.

[135]John Lewis Gaddis, *The Long Peace: Inquiries into the History of the Cold War* (New York: Oxford University Press, 1987), 143.

[136]"Memorandum of Discussion at the 148th Meeting of the National Security Council, Thursday, June 4, 1953" in *FRUS: 1952-54*, II, 369.

[137]"Notes by the Assistant Staff to the President (Minnich) on the Legislative Leadership Meeting, December 14, 1954" in *FRUS: 1952-54*, II, 825.

CHAPTER 3 - U.S.-Canadian Defense Relations and Continental Defense

Providing a comprehensive continental defense against the growing Soviet nuclear threat was not an automatic response. Many supporters of the Strategic Air Command (SAC) believed that it was the United States' best hope to prevent a surprise attack and that it should be the primary element of U.S. defense policy. As long as the United States could threaten the Soviet Union with its own devastating nuclear holocaust, the Soviet Union would not risk provoking an atomic exchange. Many SAC supporters argued that any funds diverted from strengthening SAC could weaken the overall U.S. defense posture. By funding SAC, supporters knew what they were getting a decent return for their military dollar and enhancing U.S. offensive capabilities.

The loss of its atomic monopoly caused the United States to give continental defense improvement a higher priority. Erecting an adequate defense, though, came with a wide-variety of inherent problems. Would it work? If it was effective, how close to perfection would it be? As the Soviet atomic arsenal grew and would soon contain the even more power hydrogen bomb, a near 100% efficiency had to be achieved; with anything less, there might as well be no defense at all—unless the purpose of improved continental defenses was not to protect population, industry, and national infrastructure but SAC. Warning SAC of approaching enemy bombers would provide SAC with the necessary alert to get airborne and take its deadly payload on a retaliatory strike against the Soviet Union and the greater amount of warning time the better. If that was the case, then it was the deterrent value of continental defense, including the early warning element, that would become its primary purpose for existing. Before these issues could be further explored, the United States and Canada would have to decide whether a comprehensive continental defense would be worth the monetary commitment needed and, if so, what should be the components of the continental defense system.

By the early 1950s, the president, government agencies, and the military had authorized numerous committees to study continental defense issues. Because of the increasing importance of technology in defensive matters, scientists often made up the membership and substantially contributed to these studies. A topic that was intensely debated and scrutinized thoroughly was early warning, particularly the establishing of a radar chain as far north as technologically and logistically possible. The DEW Line and other continental defense issues attracted increased hostility from military leaders, who had concerns about the primacy and funding of SAC.

Many Canadian government officials became cautious of the rumblings for improved continental defenses emanating from the United States. They were under no illusions that a more comprehensive continental defense would involve Canadian territory. They questioned not only what the extent of that commitment would be but what the defense partnership with the United States would entail. A large part of the continental defense system would be placed on Canadian territory, potentially bringing more U.S. military and civilian personnel into Canada. Some of the more important problems arising from this arrangement were sovereignty concerns, fiscal matters, and manpower. Another major concern for Canada, as pointed out in a memorandum by W. H. Barton, Defence Liaison (1) Division, to Jules Léger, Under-Secretary of State for External Affairs, was, "Will the existing arrangement for command and control be adequate, and if not, what steps should Canada take to ensure that the air defence system operates with maximum effectiveness and that at the same time Canadian interests are protected?"[1] Canada must be careful to protect its national interests in a bilateral arrangement, especially when cooperating with a superpower.

If U.S security from the Soviet nuclear threat was to become a reality, then the United States must place more emphasis on defending the American continent from air attack. In order to improve the continental air defenses, collaboration with Canada was essential. Since the most plausible route that Soviet bombers could take to U.S. continental targets was over Canada, the northern neighbor of the United States was sure to figure greatly into U.S. continental defense strategy. The greater the cooperation between Canada and the United States, the better the chances for sufficient air defenses, which included more elaborate radar coverage, advance interceptor aircraft, and surface-to-air missiles. All of these features would be tied together into a centralized command and control system. Ultimately, the DEW Line would become a major component of the continental defense system. First, though, the DEW Line would not only have to be conceived, but would need the required approval from both the United States and Canadian governments.

With the approach of World War II, the relationship between the United States and Canada significantly changed, as the nations came closer together, especially in matters concerning the common defense of North America. In 1938, when Japan was already at war with China and becoming increasingly aggressive and when Germany was shaking off the restraints of the Versailles treaty, at Queen's University on 18 August, President Franklin Delano Roosevelt delivered a speech in which he promised, "[T]he people of the United States will not stand by if domination of Canada is threatened by any other Empire."[2] Two days after Roosevelt's proclamation, Mackenzie King said:

> We, too, have our obligations as a good friendly neighbor, and one of these is to see that, at our own instance, our country is made as immune from attack or possible invasion as we can reasonably be expected to make it, and that, should the occasion ever arise, enemy forces should not be able to pursue their way either by land, sea, or air, to the United States across Canadian territory.[3]

While not disagreeing with Roosevelt's declaration for defending a threatened Canada, King emphasized in his response that the Canadian position would not be one of total defenselessness and that Canada would do all in its power to help protect the northern approaches of the United States from enemy attack. King stopped short of interpreting Roosevelt's pronouncement as some sort of defense pact. The Canadian Prime Minister said nothing about coming to the aid of the United States if it were attacked by means other than through Canadian territory.

Even though Canadians might have had some qualms about this new arrangement, contemporaries and historians regarded Roosevelt's pronouncement as an extension of the 19th century Monroe Doctrine to include Canada. If not a change in foreign policy, at least Roosevelt made explicit in his address at Queen's University that Canada is now included in the American defense strategy of the Western Hemisphere.[4] The exchange of sentiments on defense between Roosevelt and King in 1938 was the beginning of a closer military relationship between the United States and Canada.[5]

Roosevelt's statement about aiding in the defense of Canada recognized the changing reality of Canada's defense position. It was a subtle indication that Canada's traditional defense partner, Great Britain, might not be able to provide Canada support as in the past. In 1940 the United States and Canada formed a cooperative partnership for the defense of North America, partly as a result of the growing reality that Great Britain's involvement in the defense of Canada was waning. With the outbreak of the war in Europe in September 1939, Britain had to place primary emphasis on the European continent and the British Isles. By the summer of 1940, not only could Great Britain supply little to aid in Canada's defense, but Britain herself was under the serious threat of a potential German invasion.[6]

Mackenzie King's 1938 response to Roosevelt's pledge verbalized a major concern of Canadian - United States relations: the threat to Canadian sovereignty. Would thousands of U.S. troops in Canada raise some nationalistic apprehensions among the Canadian people? If these troops did enter Canada, could the United States be persuaded to remove them at Canada's request? Mackenzie King, along with succeeding Canadian leaders, realized the potential hazards of increased defense commitments with Canada's stronger southern neighbor. The realities of World War II, however, brought Canada and the United States into a special partnership for the defense of North America. Canada, exercising the independence in matters of foreign policy that it had gained in 1931, waited until 10 September 1939, to declare war against Germany, a week after Great Britain.[7]

In the summer of 1940, when the war in Europe was at a particularly low point for the Allies, pressures were increasing in the United States, but especially in Canada, to address the issue of joint defense of North America. A number of members of the Canadian Institute of International Affairs, a private institution comprising businessmen, government officials, and academics interested in public awareness of foreign policy, released the following statement to try to influence future defense policy:

> While self-respect demands that Canadians conduct their own defense as much as possible, the United States will, in order to protect herself, insist on intervening at once if Canada is attacked or threatened – particularly if she is not sure of . . . Canada's strategy and strength. Therefore, Canada's best chance of maintaining her national existence is the frank admission from the beginning that her defense must be worked out in cooperation with the United States, on the basis of a single continental defense policy. The emphasis must therefore be on *continental effort rather than on national effort.*[8] [emphasis added]

In this statement by a private entity, Canadian concern for defense is carefully balanced by concern for sovereignty. It is important to point out, though, that Canadian sovereignty issues were not yet formulated into specific public policy.

The next month, on 17-18 August 1940, the heads of government of Canada and the United States met at Ogdensburg, New York to discuss Canadian-United States defense. From this meeting came the announcement of the creation of the Permanent Joint Board on Defense (PJBD). The purpose for such a bilateral organization was greater cooperation and coordination for the defense of North America. The text of the Ogdensburg Agreement follows:

> The Prime Minister and the President have discussed the mutual problems of defense in relation to the safety of Canada and the United States. It has been agreed that a Permanent Board on Defense shall be set up at once by the two countries. This Permanent Board on Defense shall commence immediate studies relating to sea, land and air problems including personnel and material. It will consider in the broad sense the defense of the north half of the Western Hemisphere. The Permanent Joint Board on Defense will consist of four or five members from each country, most of them from the services. It will meet shortly.[9]

The PJBD met for the first time on 26-27 August 1940 and became the primary conduit of senior military and diplomatic contact between the two countries. The term "permanent" was not chosen randomly or without thought by the President and the Canadian prime minister.[10] They assumed that this organization would continue after World War II.

The PJBD established the precedent for the conduct of defense relations between Canada and the United States. The PJBD forwarded its recommendations to their respective governments, creating "institutional arrangements." The sides looked at continental defense cooperation as a partnership.[11] The Canadian-United States defense arrangement created by the PJBD allowed "a great deal of informal contact" between the two nations.[12] On 12 February

1947, Canada and the United States agreed to continue defense cooperation in peacetime. Thus the PJBD continued into the Cold War.[13]

The Canadians had begun to formulate their postwar defense commitments as early as January 1945. A Canadian study group, the Advisory Committee on Post-Hostilities Problems, believed that no hostile power would pose a threat to the Western Hemisphere "for several years at least [but] adequate protection against airborne attacks, especially from the north, northeast and northwest has become an essential part of North American defenses." The committee also recommended that Canada become more involved in defense efforts for North America, pointing out that these efforts needed greater coordination with the United States. What was implicit was that Canada's primary partner for defense after 1945 would be the United States, not Great Britain.[14] This exchange of defense partners astutely reflected the reality of the postwar world. Great Britain would spend many years trying to repair its war-damaged economy. In the years immediately following the war, Great Britain would have to lessen its world-wide commitments and would be in no position to reestablish closer defense cooperation with Canada.[15] Canadian officials would have to decide whether to maintain the closer defense relations established during World War II or to attempt to extricate themselves from this potential troublesome association with a partner as large and powerful as the United States. The option of defending itself (and convincing the United States that Canada's defensive measures met U.S. requirements for defending the upper part of the North American continent), though less threatening to Canadian sovereignty, would be more expensive. These realities and the pro-American attitude of the Mackenzie King government led Canada to favor the continuation of the PJBD and support the creation of a special committee under the PJBD to broaden the Canadian-United States military defense partnership.

After the war, the defense of North America grew more complex. New threats began to appear, forcing more time and effort to be spent on current projects and preparing future plans for joint continental defense. To reduce the burden on the PJBD, the Board recommended the creation of a lower-level committee specifically to focus on generating and implementing a Basic Security Plan that would guide postwar and later Cold War joint continental defense policies. The Basic Security Plan, as recommended by the PJBD and approved by the U.S. and Canadian Joint Chiefs of Staff, would be put into motion, if both governments agreed, at the eruption of hostilities or if they felt that hostile action against North America was inevitable. Accordingly, the Basic Security Plan "represents simply the best view of the military advisors of the government of the two countries on the defense of North America."[16] On 28 February 1946, the PJBD created the Military Cooperation Committee (MCC), another joint entity. The purpose of the MCC was to recommend cooperation in defending North America from potential threats. The MCC was the "second major institutional expansion of the U.S.-Canadian defense relationship.[17]

The Soviet Union recognized the closer defensive ties between the United States and Canada and showed concern by denouncing their cooperation. According to United States officials, Soviet propaganda made "a special point of taunting the Canadians as the victims of U.S. imperialism."[18]

The MCC focused on planning, spending much time developing a Basic Security Plan (BSP). In formulating a BSP, military planners surmised what the future threats to the "north half of the western hemisphere" might be. The MCC agreed that the Soviet Union posed the greatest threat to the North American continent. However, the Canadian and United States representatives disagreed on the immediacy of the Soviet threat. The United States, although slow in implementing continental defenses, worried from the end of World War II that a surprise air attack on the continental U.S. would be the most likely beginning of the next general war. Some historians have dubbed this the "Pearl Harbor syndrome," saying that the United States had an "over-riding fear of a bolt from the blue."[19] Canadian concerns about matters of continental defense forced the United States to approach continental defense problems more slowly, allowing more time for serious examination of defense plans and thus helping to shape their ultimate composition.

At a very basic level the BSP was a strategy to coordinate closely the land, air and naval forces of Canada and the United States in the event of hostilities directed against North America. As stated above, the planning focused on an emergent Soviet threat as the most likely danger. Because of this, the defense of continental North America needed to include surface and air surveillance to provide early warning of a trans-polar air attack. What both countries would be able to do with this warning, and the length of warning provided, improved over the years, but not without extensive debate on what the proper composition of the radar coverage should be – always mindful of the price tag attached to these endeavors. The first BSP agreed upon in 1946 took into account the growing importance of the Arctic region for staging military operations and called for "a program of air photography, mapping and charting, tests of personnel and equipment in the Arctic environment." To prepare better for joint operations, the BSP also involved personnel exchanges between the corresponding services and promoted standardization of equipment and training.[20]

As planning matured and the defense relationship strengthened, the BSP included the sharing of intelligence, bilateral exercises to test and improve mutual defense efforts and developing a more sophisticated joint command structure. What began as an important continuation of joint defense efforts in peacetime would ultimately culminate in the creation of the North American Air Defense Command (NORAD) in 1957. The original purpose of NORAD was to establish "a bi-national command, centralizing operational control of continental air defenses against the threat of Soviet bombers."[21]

In 1949, the MCC sent its recommendations for slight adjustments of the Basic Security Plan to the PJBD, which in turn endorsed them and forwarded the changes to their respective Joint Chiefs of Staff. Approved, the new Basic Security Plan stated that:

> It may be put into effect by decision of the two Governments upon the outbreak of hostilities or in anticipation of such an event . . . it sets forth in detail the manpower and facilities which should be available in the organization that should be provided to meet an emergency. . . it represents . . the best view . . . on the defense strategy of North America.[22]

The BSP could be reviewed and modified according to any new information or any change of circumstances. The Basic Security Plan's implementation was not immediate, due to financial constraints of both countries and the belief that the Soviet Union would be unable to strike decisively at either Canada or the United States until 1952 at the earliest.[23] There were some improvements in the areas of standardization of equipment and more consistency in training, but outside of discussion at various levels, little was done in the late-1940s to address the need to increase early warning time for a trans-polar air attack.

While the United States and Canada improved and extended commitments to continental defense in the immediate post-war years, another significant alliance was taking shape in Europe in the latter part of the decade. The size of the conventional forces maintained by the Soviet Union, who did not demobilize its forces to the extent of the other Allies, caused concern among western European nations. Even with American forces stationed in Europe taken into account, the western European countries were drastically short in equipment and manpower to counter

Soviet strength. To bolster the defense of western and central Europe, twelve nations spanning the Atlantic Ocean signed the North Atlantic Treaty in April 1949. While the North Atlantic Treaty Organization (NATO) was primarily an alliance to check potential Soviet aggression in Europe, Canada and Iceland joined the United States as three of the original member nations. The armed forces that could be marshaled by the NATO forces still were numerically inferior compared to the opposing Soviet forces. Providing parity to the military situation was the U.S. arsenal of atomic bombs. While the United States had a monopoly of atomic weapons when the NATO was created[24], it lost its monopoly a short four months later with the successful detonation of an atomic device by the Soviet Union. Despite losing this monopoly, the United States still had the numerical advantage for some years to come.

The United States and Canada were afforded their own regional command under the NATO structure. One of the five area structures under NATO was North America, overseen by the Canada-United States Regional Planning Group (CUSRPG). There were some overlaps in membership between NATO's CUSRPG and the MCC.[25] Indeed, the MCC was in effect the Planning Committee of the CUSRPG, reporting to the Chiefs of Staff Committee. Consistency would be sustained as the MCC plans serve the CUSRPG of NATO and the bi-national PJBD, providing a close association with all the North Atlantic nations.[26]

The Basic Security Plans of the MCC were deemed by the PJBD adequate for protection of the northern hemisphere up until 1953, when the United States became increasingly concerned about improvements in the capability of the U.S.S.R to deliver atomic warheads. This concern manifested itself in the development of the Canada-United States Military Study Group, selected by the Chief of Staff of each country, formed in 1953 "to study those aspects of the North

American Air Defence system in general, and the early warning system in particular, which are of mutual concern to the two countries."[27]

Separately, the United States established several committees, planning groups, and studies to analyze the continental defense issue. As early as 1946, the U.S. Joint War Plans Committee produced a "Strategic Importance of the Arctic and Sub-Arctic Regions," a study that determined that "during the next ten years the capability of United States and of the U.S.S.R. for conducting offensive air operations from and through the Arctic area will increase." [28] While the committee predicted the development of weapons technologies that could accommodate the topography and climate, significant ground and naval operations were still "unlikely." The Committee recommended that over the next decade the United States should acquire offensive bases that were logistically practical in the region. Further, the committee called for an "Early warning chain from Alaska, through northern Canada, and extending to Greenland." This was the genesis of the Distant Early Warning Line (DEW Line).[29]

While not ready to approve a controversial project at this time, the U.S. Joint Chiefs of Staff (JCS) acknowledged that an early warning line was in need of further study. In recognition of the increased danger of air attack and the mounting vulnerability of the United States, the JCS created the Continental United States Defense Planning Group (CUSDPG) on 7 April 1948 with JCS 1259/62. A director and a small staff comprised the CUSDPG, which was a joint agency of the JCS located in the Pentagon. Its primary mission was to prepare plans on behalf of the JSC for defending the continental United States.[30]

The JCS approved a Basic Defense Plan (JCS 2086/1) drafted by the CUSDPG on 29 October 1951. The plan assigned the various elements of continental defense in general terms to the branches of the armed forces. Not surprisingly, the CUSDPG, in the words of historian

Robert J. Watson in his book on the JCS, gave the USAF "primary responsibility for air defense . . . but the other Services were expected to contribute as necessary."[31] Later, the following year, the JCS ordered the CUSDPG to examine and draft a plan specifically for an improved early warning radar system.[32]

Due to a lack of funding and technology, little was done to improve continental air defenses. The National Security Council determined that, "for the moment, our atomic retaliatory capability is probably adequate to deter the Kremlin from a deliberate direct military attack against ourselves or other free peoples."[33] In the wake of the Soviet detonation of a nuclear device in August 1949, George E. Valley, Jr., a physicist at MIT and member of the USAF Scientific Advisory Board, advised the board's chairman, Dr. Theodore von Kármán, noted Hungarian-born aerodynamicist, educator and engineer, that "the nation must set about at once to construct an air defense against the threat of nuclear attack."[34] As Dr. Valley's recommendations met with agreement from Dr. Kármán, he was asked to continue the study in the Air Defense Systems Engineering Committee (ADSEC). This marked the first crucial move toward an actual engineering scheme to track and plot radar data. Long before the radar net was in play, the technological challenges of command and control were being explored. In these early studies, the embryonic elements of computer-assisted tracking and intercepting can be found. Eventually, these elements matured into the Semi-Automatic Ground Environment System (SAGE).

In April 1950, NSC-68 articulated a clear interest in a more concentrated effort for early warning.[35] The NSC agreed that the development of two large atomic arsenals might lead to war rather than acting as a deterrent. To survive a surprise attack, the United States must augment conventional forces and air defense. NSC planners suggested this might be enough of a deterrent. Aside from a few radar sites in major cities and around the U.S.-Canadian border, there was no extensive development of the early warning system until the onset of the Korean War. The beginning of the Korean War resulted in an increased awareness of the inadequacies of the continental air defense system, especially early warning measures.

When the news of the invasion of South Korea reached the United States, air defense forces went on "around-the-clock" alert status for several months. Military leaders, including the JCS, did not know the extent, or limitation, of the conflict in Korea. Many military leaders, including the JCS, thought that the invasion of Korea signaled the beginning of a larger, Soviet-directed general war.[36] This immediate threat, coupled with Air Force studies on the problems of air defense, reemphasized continental air warning in American military thinking.

There was much confusion about the actual capability of American air defenses. Major General Gordon P. Saville, USAF deputy chief of staff for development, stated that air defense measures would account for as high as a 60 percent destruction rate, while a USAF-endorsed RAND study placed the probable percentage of Soviet bombers destroyed at half that figure.[37] A further study in 1950 headed by Dr. Valley came to the conclusion that the current air defenses of the United States would only account for 10 percent attrition of an enemy's bomber fleet.[38] This percentage would have to improve if the United States were to mount any sort of an effective continental air defense. A recommendation from the Valley Committee stated that further study was needed, including "establishing an air defense laboratory at MIT . . . [to] employ new technologies to improve . . . [the] percentage rate [of destroyed hostile aircraft]."[39]

This proposal did not bear fruit until February 1951, when MIT President James R. Killian, at the request of the Air Force, launched Project Charles, an innocuously titled study named after the Charles River near MIT. Dr. F. W. Loomis from the University of Illinois directed the study of the problems of air defense. The group of twenty-eight scholars meeting at MIT acknowledged the vulnerability of the United States to Soviet atomic attack.[40] Their report released in August 1951, deemed that United States continental "air defense system was highly vulnerable to surprise attack and that the early-warning system was inadequate."[41] Their report came out in favor of the SAGE system, a radar surveillance line along the U.S.-Canadian border (eventually to be known as the Pinetree Line), but balked at the idea of a radar chain based in the Alaskan and Canadian Arctic to increase the amount of early warning.[42] The reasons that the formulators of Project Charles argued against an Arctic radar line were the hostile topology and climate, communication difficulties due to magnetic disturbances experienced in the high northern latitudes, and the deficiencies and limitations of available radar technology.

The USAF in conjunction with the National Security Resource Board (NSRB) and the Federal Civil Defense Administration (FCDA) undertook a civil defense study. This venture, known as Project East River and chaired by physicist Dr. Lloyd V. Berkner, came to an unanticipated conclusion. Instead of concentrating on the preparation and readiness of such civil defense measures as "bomb shelters, evacuation procedures, and the dispersal of industry," the report hinged all civil defense efforts on the value of increased continental defenses, including an improved early warning system.[43] Civil defenses would be useless and expensive, unless continental defenses could provide near-perfect destruction of attacking aircraft. Although the report called for the impossible, nearly a 100 percent rate of elimination of incoming bombers, Project East River mentioned some specifics to provide an adequate air defense.

Berkner was convinced that "either we find a way to give ourselves four to six hours' warning . . . or we give up the idea of any kind of defense, civil or military."[44] To provide this extending warning, "an outer warning network was needed 'not less than 2000 miles from the continental limits of the United States.' . . . [A] distance of not less than two thousand miles from the United States could only mean arctic Canada."[45] In Project East River, a panel of distinguished scientists had, in a sense, refuted some of the conclusions of Project Charles. The USAF leaders and defense secretary Robert Lovett were not enthusiastic about the report's anticipated conclusions, after receiving an interim statement of the group's work in April 1952.

An event outside of the various studies and panels of specialists brought the inadequacies of the nation's continental defenses into focus. On 16 April 1952, Air Defense Command Headquarters began receiving reports from Alaska and Maine of unidentified incoming aircraft and the disquieting appearance of vapor trails over the Aleutian Islands in the Bering Sea. These events led ADC Headquarters to place U.S. air defense forces on full alert, sending hundreds of pilots to their planes and crews to the nation's antiaircraft guns. Eventually the alarm proved to be false. The unknown aircraft were commercial airliners whose pilots had radioed Canada about changes in their flight plans. These changes were not transmitted to the proper U.S. authorities. This event facilitated an acknowledgement of the poor state of American air defenses both for determining the legitimacy of a threat and for reacting quickly and decisively to an imminent threat. Historian Kenneth Schaffel, in his Air Force study on the evolution of continental air defenses, stated that the existing communication equipment did not allow for the speed needed to "keep an air defense commander cognizant of an evolving air battle. In the wake of the false alert, defense planners decided to reevaluate the emerging air defense system."[46]

Another body interested in reevaluating and further studying air defense issues was a group of forty-five technical experts, including twenty scientists plus technical consultants sponsored by MIT.[47] Dr. Jerrold R. Zacharias, MIT nuclear physicist, not new to these types of air defense studies, helped to organize what became known as the Summer Study Group, an informal gathering of some of the nation's foremost scientific minds. Dr. Zacharias had built a radar system at MIT at the beginning of World War II and he had participated in a number of defense studies in the late 1940s, including Project Lexington, which studied the feasibility of an atomic powered airplane, and Project Hartwell, which analyzed the danger posed by Soviet submarines. He served as associate director of Project Charles.[48] The Summer Study Group met from June to August 1952. Among its highly esteemed members were Isidor I. Rabi, Charles Lauritsen, Lloyd V. Berkner, Albert Hill and J. Robert Oppenheimer. Some of the conclusions made by the Summer Study Group caused concern for the Department of Defense. Samuel P. Huntington in *The Common Defense* stated that the Summer Study Group:

> 1) estimated that in two or three years the Soviet Union would have sufficient planes and atomic weapons to cripple the United States in a surprise attack; 2) declared that existing and planned American defenses were inadequate and improperly integrated and that under optimal conditions would achieve only a 20 percent kill-rate; and 3) argued that new and probable technological break-throughs made it feasible to develop an air defense system which could hope to achieve a kill-rate of 60 to 70 percent.[49]

The Summer Study Group contended that a major component of this improved air defense system would be an Arctic line of radar stations from Alaska, across the Canadian polar region, to Greenland. The scientists believed that it would allow for three to six hours of warning against the approach of atomic weapons-carrying Soviet bombers and that the "distant early warning system be given top priority" and should be constructed immediately, even as early as Summer 1953.[50] An immediate crash program of construction might have the DEW Line operational by the end of 1954.

Construction could begin rather quickly because of two important technological breakthroughs. The first innovation was an automated alarm system linked to the radar. As the radar discerned a target, this detection would automatically trigger an alarm. This application would drastically reduce the manpower requirements needed at each radar station making an Arctic radar chain suddenly much more feasible.[51] The second technological breakthrough was an improvement in the reliability of communication in polar regions. Because of the increased magnetic disturbances occurring in Arctic regions, standard communication equipment failed under certain circumstances and for several months during the year. By using the tropospheric and ionospheric layers of the earth's atmosphere, scientists concluded that these communications "were all but impervious to atmospheric disturbances common to the Arctic."[52]

The Summer Study Group realized that a distant early warning line was only one part of a more integrated continental defense system. Other elements of improved continental defenses included a larger-capacity and more automated communication system along with improved interceptor aircraft and anti-aircraft homing missiles. These improvements, coupled with greater warning, would significantly improve the continental defense of the United States. The costs of this improved continental defense system would be in the neighborhood of several billion dollars, including $370 million to build and equip the DEW Line. This initial expense would have to be supplemented with another $100-106 million per year to cover the annual cost of operations.[53]

For the proponents of a larger commitment to continental defense, finding solutions for the technical problems was only the beginning of their efforts. Standing in their way was a military establishment, especially the USAF, whose primary commitment to continental defense lay in the deterrent value of the nation's offensive striking power – the strategic bombers of SAC and the medium-sized bombers of TAC – located within striking distance of the Soviet Union. Many in the USAF, including the USAF Chief of Staff Hoyt S. Vandenberg and the civilian leaders of the Air Force Secretary Thomas K. Finletter and the Under-Secretary of the Air Force, James H. Douglas, believed that any additional defensive programs would have to come at the expense of SAC and other offensive programs. Therefore, any weakening of SAC, and thus U.S. retaliatory deterrent, would weaken the position of the United States vis-à-vis the Soviet Union. Defense planners feared that this turn of events might embolden the Soviet Union to attack. The faction in the military that favored reliance on the offensive deterrent feared that a strategy of improved continental defenses might result in a "Fortress America" or "Maginot Line" mentality. Historian Thomas W. Ray stated that some detractors of a distant early warning line argued that it might lure "the nation into a complacency resting on a false sense of security."[54] While improved defenses would make an attacker suffer higher rates of attrition, it was only the existence of a powerful SAC that would provide the definitive deterrent; defenses by themselves would not be able to do this.[55]

Others in the USAF were more concerned with the "crash" nature of the Summer Study Group's proposed DEW Line. While some in the military recognized that early warning was crucial, they believed that the scientists might have exaggerated the extent to which the technical problems had been overcome. The USAF believed that radar equipment was still not advanced enough to meet the performance specifications for Arctic employment. Instead of launching an entirely new program of high costs and uncertain reliability and performance, many in the USAF believed that money for continental defense should be used to improve those defenses already in existence.[56] There were also many questions surrounding the logistical challenges of such an endeavor.

The USAF Air Staff, it is fair to mention, was not categorically opposed to the idea of such an outer warning network, just the timing of the proposed development, fearing it would be too rushed. A distant early warning line would be just one component of a more sophisticated, total continental defense system. Pouring money into such an undertaking might prove to be unwise, given the primitive state of other continental defense measures. What was the point of early warning if the nation could not do anything significant with this information? Military leaders responsible for continental defense concerns, such as General Benjamin W. Chidlaw, commander of the Air Defense Command (ADC), 1951-1954, believed that the nation needed to improve its active defenses first, by acquiring all-weather interceptors and better anti-aircraft missiles. After current defenses were up-to-date, a radar net could be added. A radar line so far removed from the continental United States, without other interior radar systems backing it up, would only be able to report that enemy aircraft had been encountered. After the initial contact, enemy aircraft could become lost over the Canadian landmass without other defensive measures in place for helping to detect, track, and identify potentially hostile aircraft. Defense forces would find it too difficult to intercept and destroy with so little information. Thus, the USAF leadership (USAF Secretary Finletter, USAF Under-Secretary Douglas and Chief of Staff Vandenberg), along with Secretary of Defense Robert Lovett, believed that there should be no "crash" program for a DEW Line.[57] But the motivating force behind Air Force opposition to the DEW Line and other continental defense measures was funding for SAC. If money for defenses would come out of SAC's budget, then Air Force officials would be hesitant, if not hostile, towards improving the continental defense system.

The JCS and the Secretary of Defense were not willing to bring the Summer Study Group's report to the National Security Council, since they did not fully support its conclusions. Without a sponsor, the Summer Study Group's recommendations could not reach the appropriate decision makers. The report's authors gave the study's conclusions to Jack Gorrie for review, much to the consternation of Air Force officials. Gorrie, the National Security Resources Board (NSRB) chairman, forwarded the report and his apprehensions to the National Security Council, where he sat as the NSRB representative.[58]

In a blizzard of activity, the National Security Council (NSC) began a series of studies. In August 1952, the NSC conducted a reassessment of its national security goals. While not a fundamental, dramatic departure from previous policy statements drafted before the early 1950s, the new NSC studies needed to take new world developments into account. One was the Korean War and the military response to North Korean aggression by the United States and its allies, while the other significant event was the growing strength of the Soviet Union. The threat provided by the Soviet Union was laid out by the NSC in NSC-135/1:

> There has also been a substantial further development of Soviet orbit strength since 1950. Modernization and expansion programs in the Soviet, satellite, and Chinese Communist armed forces are proceeding, supported by a rapidly growing economic and industrial capacity and by a high level of scientific and technical capability in selected fields of vital military importance. As a result of the developing atomic and possible thermonuclear capability of the USSR, the vulnerability of the United States to direct attack, which is now serious, will in a few years probably assume critical proportions.[59]

In order to deter the Soviet Union from initiating a general war, the NSC called for strengthening alliances and political unity of the free world, the ability to deliver "an offensive of sufficient power to inflict massive damage on the Soviet war-making capacity . . . [and] assure ready defensive strength adequate to provide . . . a reasonable initial defense and to ensure reasonable protection to the nation."[60] The lack of specifics coupled with "inadequate policy guidelines" concerned Chairman Gorrie. He did not believe the nation could adequately prepare its non-military defenses without more concrete information necessary to provide proper guidance.[61]

In late August 1952, Gorrie responded to the policy statement NSC-135/1, "Reappraisal of United States Objectives and Strategy for National Security." Gorrie did not believe that NSC-135/1 satisfactorily addressed important matters concerning passive defense programs, such as civil defense and dispersal of industry. He contended that NSC-135/1 did not adequately coordinate activities between the military defense and the passive defense of the nation. Gorrie argued that "there has been a lack, not corrected by the NSC-135 series, of guidance which would coordinate the nation's passive defense capabilities and its military defense capabilities."[62] In addition, if the Soviet Union were to attack with the full force of its arsenal, the United States would not be capable of resisting the attack effectively.[63] Gradually, improved continental defense measures, particularly early warning, were going to receive more serious consideration.

The pressure for strengthening continental defense grew as experts in other areas of the security community began to consider Gorrie's concerns. At the 123rd meeting of the NSC, on 24 September 1952, Chairman Gorrie distributed a paper based on the conclusions and recommendations of the Summer Study Group, since according to historian Samuel P. Huntington in his seminal work *The Common Defense*:

> Neither the Air Force nor the Department of Defense, however, initially approved the [Summer Study] Group's recommendations, and the Air Force refused to recommend the report to the NSC. At the very beginning of the policy process, consequently, the proponents of continental defense had to outflank the opposition.[64]

Those scientists now believed there was an imminent threat to the North American continent and that the likely cost for early warning was significantly lower than originally estimated. In his paper distributed at the NSC meeting, Gorrie stated that "an effective early warning system is important to both the protective military and passive defense of the continental United States." Next, he provided rationale for his commitment to early warning:

recent technological developments now make it possible to control the advantage of surprise by providing effective early warning . . . [and] the cost of such a warning system would be a nominal fraction of current military outlays; its manpower requirements would be small. It can be operational within two to three years if undertaken now.[65]

NSRB Chairman Gorrie continued by stating that the three to six hours of warning provided by the DEW Line would make "defense in depth feasible," and although he realized that the Department of Defense had the early warning issue under study, he urged "the *immediate* allocation of funds sufficient to initiate this program as a matter utmost urgency and with the highest priority.[emphasis in original]"[66] President Truman, in attendance at this meeting, stated, "[T]he subject of Mr. Gorrie's remarks and his memorandum [were] of the greatest importance."[67] Based on Gorrie's recommendations, Truman suggested that all departments should reexamine an early warning system to determine if it should be in the 1954 fiscal budget.[68]

By 14 October 1952, the Air Force had softened its stance and agreed to work with the Department of Defense to establish four experimental Arctic radar stations. The Department of Defense, however, did not feel the urgency that Gorrie felt, and therefore advocated a slower, incremental development of the early warning system.[69] Instead of the DEW Line being constructed over the next few years, its construction could have been delayed to the very end of the 1950s or possibly the early 1960s— after the period when it would have been the most useful. At the 124th NSC Meeting, on 24 October 1952, Truman initiated NSC Action Number 678 calling for the Secretary of Defense Robert Lovett and Chairman NSRB Jack Gorrie to prepare a coordinated recommendation on the subject of an early warning system with the goal of including it in the FY 1954 budget.

A “Key Data” book was prepared for the president to keep him apprised of all the national security programs under development by the NSC Reporting Unit. The

5 November 1952 update to the “Key Data” suggested that elements of the military program be reviewed for effectiveness in the event of an attack. The authors of the report warned that the United States was quite vulnerable due to the dearth of “all-weather jet interceptors and the delay in the completion of the radar network covering Canada.”[70] The National Security Council determined that a 3-6 hour warning was necessary and would be achieved with radar improvements, land radar cover at low altitudes, and seaward radar coverage at any altitude.

Paul Nitze, the primary author of NSC-68, and Carlton Savage of the Policy Planning Staff prepared a policy paper on the topic, “an Early Warning System for detecting the approach of hostile aircraft to the United States.” In their conclusions, which were consistent with those in previous studies, Nitze and Savage claimed that since the United States would not be able to recover from a Soviet atomic attack under current continental defense measures, early warning would be crucial for a more effective civil and air defense.[71] Nitze and Savage depicted the early warning system as by no means the only element necessary for effective continental defense, but the policy planners suggested that the radar line be attended to before other security improvements— interceptors, guided missile defenses and civil defense measures— were undertaken. They continued, “while these and other elements are being developed we should proceed rapidly with the establishment of an early warning system, which is the *sine qua non* of any program for the protection of the United States and which has significant effectiveness in itself.” [72]

Nitze and Savage advised that an early warning system would serve as a deterrent to war, suggesting that an enemy:

> would be reluctant to strike if its blows would not be effective against us. Furthermore, an adequate defense would increase tremendously our security, add to our power position with respect to the Soviet Union, and give us a sounder base for speaking with assurance in international affairs.[73]

The DEW line had another statement of support.

This paper provided momentum for Truman's air defense planning efforts. As a result, the Truman administration allotted $20,000,000 toward the early warning project, with an ambitious deadline of 31 December 1954 set for operation. The effectiveness goal was equally ambitious: a 25% interception and destruction rate in 1954, increasing to a 75% rate by 1957. [74]

All of these studies must have had a cumulative effect and resonated on some level with the concerns of the president. Truman received the report initiated by NSC Action Number 678 and on 31 December 1952, approved the document as NSC-139, despite the general opposition of factions of the military establishment, namely Headquarters USAF, which was made up of the Office of the Air Force Secretary (Secretariat) and the Air Staff. They still had reservations about the "crash nature" of such a program, questioning whether the technical and scientific data proved such an endeavor feasible. The Strategic Air Command (SAC) was also opposed to such a commitment to continent defense, especially if its funding would come at the expense of the strategic air arm. Others in the military who placed primacy on the deterrent value of SAC also expressed great concern that the entire basic national security policy of the United States would be compromised by taking away appropriation from SAC or other offensive striking forces and giving the highly coveted defense dollars to uncertain programs, such as air warning, with the launching of such an ambitious project. The conventional wisdom of the military favored the offensive, and a defensive turn to American strategy might have repercussions for SAC or even for the NATO alliance.

NSC-139 opened with a statement about the growing nuclear threat to the United States posed by the Soviet Union. To meet this threat the United States must continue to increase the nation's retaliatory power (SAC and other means of delivering atomic weapons on the USSR). At the same time, however, the formulators of NSC-139 warned, there existed an "increasing urgency to our efforts to strengthen our capabilities for continental defense." The United States must have "an effective system of air, sea, and land defenses ready no later than December 31, 1955. . . one key element in such defenses [military along with civil defense and industrial security] is a system of early warning against air attack."[75] The drafters of NSC-139 reemphasized that an early warning line should provide three to six hours alert of hostile aircraft approaching the continental United States.

A distant early warning line, as stated in NSC-139, was crucial for both types of defenses, active and passive, and "should be developed and made operational as a matter of high urgency, with as much of the system as possible to be in operation by December 31, 1954, and a target date for completion of December 31, 1955." The report next placed the entire Arctic line under the aegis of the Department of Defense for its "develop[ment], install[ment] and operat[ion]."[76] The initial budgetary requirement for the proposed DEW Line was $95 million: $20 million already made available for the beginning stages (experimental arctic radar stations and equipment), with another $75 million to be allocated from the FY 1954 budget to continue the testing. NSC-139 expressed the urgent and timely need for the DEW Line: "the establishment of this early warning system [in the Far North] should go forward as rapidly as the necessary planning, testing, field preparations, and other preliminary work can be satisfactorily accomplished, and additional financing . . . should be obtained as rapidly as it can be put to use."[77] Clearly, the National Security Council had confirmed the DEW Line as a necessary course of action.

In January Secretary of Defense Lovett made two important decisions concerning the DEW Line. First, Lovett ordered the Joint Chiefs of Staff to proceed in drafting the necessary plans for continental defense. The JCS gave the Continental United States Defense Planning Group (CUSDPG), the agency responsibility for collecting, interpreting and offering suggested changes to the various defense plans of Armed Forces. CUSDPG was in the proverbial "hot-seat" throughout 1953, finding it difficult to please all services regarding continental defense, particularly the DEW Line. Second, Lovett placed the initial experimental stage of the DEW Line under the direction of the Air Force. The USAF would turn to the Western Electric Company to carry out the experimental phase, soon to be known as Project Counterchange.[78]

Although only a beginning, NSC-139 was an important step for the development of the DEW Line and for its proponents. This document urged the construction of the initial tests sites in Alaska and Canada, pending Canadian permission for test stations on its territory (discussed below). Despite the reservations, if not opposition, from Headquarters USAF, the DEW Line was able to attain a tentative footing for inclusion in the continental defense of the nation under the Truman presidency. The creation of the DEW Line, however, was far from certain. Not only was Truman's presidency ending in less than three weeks, a new party had won the nation's highest office. Not surprisingly, the nation's defenses would be given a thorough review and possibly a complete overhaul. There was no predicting if a controversial program such as the DEW Line would fit into the military strategy and budget of the Eisenhower Administration.

NSC-139, however, was not the last word Truman's administration had on continental defense. During the last three weeks of the his final term, including his last full day in office, Truman heard the reports of other committees assigned the task of studying continental defense and formed new committees to examine continental defense from yet other perspectives, which would not report until well into his successor's administration. The National Security Council discussed one of these reports on the eve of Truman's turning over the reins of power, although Eisenhower would decide what to do with the conclusions of NSC-141.[6] On 3 September 1952, during the 122nd meeting of the NSC, Truman directed the Secretaries of State and Defense, Acheson and Lovett, respectively, and the Director for Mutual Security, W. Averell Harriman, to submit to the NSC a reexamination of the allocation of resources necessary for the nation's security policy.[79]

In their final report, presented to the NSC on 19 January 1953, Acheson, Lovett, and Harriman emphasized the increasing significance of "air and civil defenses for North America in light of the growing Soviet atomic threat." Without mentioning early warning specifically but placing it instead under the umbrella "continental defense," they stated that the retaliatory power (nuclear weapon arsenal) of the United States in relation to the Soviet Union was progressively weakening and "under a continuation of our present programs, will rapidly worsen." While agreeing with the military that the heart of U. S. security policy was the deterrent value of offensive striking power, "a continuation of our continental defense and civil defense programs at the level of present appropriations involve critical risks."[80]

In the cover of their report, the authors specifically stated to the president that funds should not be sought from the military budget which would divert funds needed for other

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[6] See below.

essential programs, but instead "more resources" were needed for continental and civil defense endeavors. [81] In order to better defend the United States, more funding must be appropriated for these essential defensive measures. The JCS completely agreed with this statement.[82]

Another committee that reported in January was the Panel of Consultants of the Department of State, a group appointed in April 1952 by Secretary of State Acheson. The members of the Panel of Consultants on Disarmament were Vannevar Bush, John S. Dickey, Allen W. Dulles, Joseph E. Johnson, and J. Robert Oppenheimer. Although their primary purpose, as their title indicates, was arms limitations, the members believed that a more expansive view was necessary to accomplish their assignment and thus titled their report to the Secretary of State "Armaments and American Policy."[83]

They thought that continental defense was important enough to warrant its mention in their conclusions. They also specifically mentioned that while preparing their study, they had to confront the issue due to its ubiquitous nature. In justifying the inclusion of continental defense in their report, the Panel of Consultants recognized that "arms regulation and continental defense are complementary methods of achieving the goal of safety against the danger of surprise knockout blow . . . [I]n our view . . . unless continental defense is taken seriously, arms regulation must seem a foolish goal." The report continued by including five ways in which improved continental defenses would strengthen the United States against an attack:

> [1] every improvement in our defenses delays the time at which the Soviet Union will be able to strike a knockout blow . . . or . . . reduces the amount of damage which the Russians can do at any one time.
> [2] the very act of increasing our attention to continental defense is bound to help in developing a healthy sense of the dangers of the atom . . . each increase in one will help to increase the other.
> [3] a continental defense effort will help the United States Government take a posture in which it can face the possibility of serious negotiations on the regulation of atomic weapons.
> [4] improved continental defense is highly desirable from the point of

view of its effect on the Soviet mind. It cannot be read as an aggressive move, and . . . it will also serve . . . to dissuade Soviet leaders from attempting any catastrophic attack.

[5] if the United States can maintain some immunity to a knockout, the American connection may yet serve to protect the Western Europeans and so to quiet their fears. In this sense an improved continental defense is important to the whole free world; it may be at least in part a substitute for the very difficult and perhaps impossible task of defending Western Europe against the Soviet atomic threat.[84]

The Panel of Consultants recognized that continental defenses would never achieve perfection (100% effectiveness) and might in fact never come near it. They believed, however, that any improvement of the continental defense system would enhance U.S. deterrence. They mentioned specifically that an early warning system was not only scientifically possible but would be within the budgetary means of the nation, "at costs which are moderate in comparison with the total defense budget."[85] In the closing paragraph of this section, they aimed their criticism at those who believed that focusing on continental defense detracted from the development of the strategic offensive. The fallacy, they argued, was the opposition's belief that the nation cannot have both a sword *and* a shield:

> It is sometimes argued that there is grave danger in given greater attention to [an intensified continental defense effort] . . . since such a change would require a lessoning of our attention to the development of our strategic air capability. This argument seems to us to be based on the mistaken notion that we must have one or the other and cannot have both.[86]

Although the Panel of Consultants finished its study and reported to Secretary of State Acheson before the end of Truman's term, it came too late for Truman to take any action on its recommendations.

Before the end of 1952, Secretary of Defense Lovett established another committee staffed by engineers, scientists, leaders of industry, and of course, representatives from the military services. Chosen to head this "Ad Hoc Study Group on Continental Defense" (also known as the Citizen's Advisory Committee, but more popularly known as the "Kelly Committee") was Dr. Mervin J. Kelly, President of Bell Telephone Laboratories. Its mission was to study the necessity or practicality for an arctic distant early warning line in lieu of other continental defense measures, including an early warning line closer to the United States, running across the central region of Canada. The "Kelly Committee" did not finish its thorough review until May 1953, leaving its results to be interpreted by the ensuing presidential administration.

NSC-140, approved by the departing Truman administration on 19 January 1953, implemented another study on various issues relating to continental defense. Truman authorized the Special Evaluation Subcommittee of the NSC (more familiarly known as the Edwards Committee, named after its chairman, Lt. General Idwal H. Edwards) to prepare a "summary evaluation of the USSR's net capability to inflict direct injury on the United States" through 1 July 1955.[87] The subcommittee was to consider in its findings all possible means of attack, focusing on the opening stages of general war. Comprising the Special Evaluation Subcommittee was the Chairman, Lt. General Idwal H. Edwards (USAF), who would be retired by the time the Subcommittee reported its findings; Lt. General Harold R. Bull, USA (Ret.) representing the CIA; the JCS representative, Major General Robert M. Webster (USAF); the member on behalf of the Interdepartmental Committee on Internal Security, W. Barrett McDonnell; and the Interdepartmental Intelligence Conference representative, Lish Whiston. The Edwards Committee report was due at the NSC no later than the middle of May 1953.[88] Like the other overlapping studies, it would be left for the new president to decide whether or not to accept its conclusions or to implement its recommendations.

The increasing atomic arsenal of the Soviet Union and its emergent ability to deliver these horrific weapons on the United States weighed heavily on Truman's mind during the last year of his presidency. This can be seen in the issues discussed at NSC meetings along with the number of committees established under his administration to study various defense-related issues. Truman also subscribed to the military's conception that by mid-1955, the year of imminent, or maximum, danger, the Soviet Union would have the capability to inflict a crippling blow against the United States in the event of a surprise attack. If the United States was to avoid nuclear annihilation, other defensive and offensive measures must be put into operation to reduce the nation's vulnerability. Some of the committees formed to study this problem advocated that the military budget be increased for defensive measures, while still believing that the bulk of the military budget be placed in the deterrent value of the country's offensive threat, the Strategic Air Command.

Improving continental defense began to assume a larger place in discourse both inside and outside of military circles. A new administration with different values and policies was sure to reexamine all of the pertinent defense issues and institute a thorough overhaul of the national security policy.

Truman must have been swayed by the arguments of the proponents for improved continental defenses. He did what he could under the circumstances and chose to support the one element vital to all other continental defense measures: early warning. Truman rejected the slower, more cautious approach for extending the early warning radar net advocated by the DOD, the JCS and the USAF and approved NSC-139, committing the government to build the DEW Line as quickly as possible, despite not having the final reports of various studies. This was the situation when Dwight D. Eisenhower assumed office in January 1953, dedicated to revamping the U.S. defense establishment and its policies. In a letter to his Secretary of Defense Charles E. Wilson, Eisenhower outlined his views on an appropriate military strategy for the United States. Eisenhower believed that:

> due to the destructiveness of modern weapons and the increasing efficiency of long-range bombing aircraft, the United States has reason, for the first time in its history, to be deeply concerned over the serious effects which a sudden attack could conceivably inflict upon our country.
>
> Our first objective must therefore be to maintain the capability to deter an enemy from attack and to blunt that attack if it comes – by a combination of effective retaliatory power and a continental defense system of steadily increasing effectiveness. These two tasks logically demand priority in all planning.[89]

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[1] *Documents on Canadian External Relations*, Vol. 20 (1954), Chapter V Relations with the United States, Part 1, Defence and Security Issues, Section B, Distant Early Warning System, Mid-Canada Line and continental Air Defence, Document 486, "8 December 1954 Memorandum from Under-Secretary of State for External Affairs to Secretary of State for External Affaire, enclosure." Retrieved 9 October 2003 from http://www.dfaitmaeci.gc.ca/department/history/dcer/details-en.asp?intRefid=659.

[2]Quoted in Nathaniel French Caldwell, Jr., *Arctic Leverage: Canadian Sovereignty and Security* (New York: Praeger, 1990), 24.

[3]*Ibid;* This pronouncement by King has been dubbed the "Kingston Dispensation" by Michel Fortmann and David Haglund.

[4]Lionel H. Laing, "Does the Monroe Doctrine Cover Canada?" *The American Journal of International Law* Vol 32, no. 4 (October 1938), 796.

[5]http://www.mta.ca/about_canada/defending/index.htm

[6]Stetson Conn and Byron Fairchild, *The Framework of Hemispheric Defense: United States Army in World War II: The Western Hemisphere* (Washington, DC: Center of Military History, 1958), 367.

[7]Nathaniel French Caldwell, Jr., *Arctic Leverage: Canadian Sovereignty and Security* (New York: Praeger, 1990), 23. While Canada created the Department of External Affairs in 1909, Canada did not, yet, have a completely independent foreign policy. At the end of World War I, Canada did sign the Treaty of Versailles and became a member of the League of Nations, but it was not until Statute of Westminster in 1931, when Canada became a truly independent nation.

[8]Conn and Fairchild, 368.

[9]Tab A "The Ogdensburg Agreement" in "29 July 1949 Memorandum for Secretary Johnson" in Folder 9, Records of International Military Agencies, Permanent Joint Board on Defense, Canada – United States Section, Top Secret Correspondence, 1941-1956, RG 333, National Archives II, College Park, Maryland.

[10]Military historian Charles P. Stacey states in *Canada in the Age of Conflict* (Toronto: University of Toronto Press, 1981), 340, that the Ogdensburg meeting was "strictly the Franklin-Mackenzie axis at work" since there were no advisors or military personnel present.

[11]Charles P. Stacey states that while "there is considerable difficulty in military cooperation between two greatly disparate nations unequal in population and power," he insists that the agreement did not totally disregard the wishes of Canada, the junior partner. Elizabeth R.B. Elliott-Maisel states in her chapter in Thomas C. Howard and William D. Pederson,eds, *Franklin D. Roosevelt and the Formation of the Modern World* (Armonki, NY: M.E. Sharpe, 2003), 147 that "successful compromises and accommodations were found when negotiating cooperative agreements."

[12]Dwight N. Mason, "Canada and the Future of Continental Defense: A View from Washington" *Policy Papers on the Americas* Vol. XIV, study 10, (2003), 3. For a more thorough history of the PJBD see, Christopher Cunliffe, "The Permanent Joint Board on Defense, 1940-1988" in David G. Haglund and Joel J.

Sokolsky, *The U.S.—Canada Security Relationship: The Politics, Strategy, and Technology of Defense* (Boulder, CO: Westview Press, 1989), 146-165 and Sean M. Maloney, "Our Defended Borders: A Short History of the Permanent Joint Board on Defence and the Military Cooperation Committee, 1940 to the Present," *The 200th Meeting of the Canada—United States Permanent Joint Board on Defence* (Ottawa, Canadian Section, PJBD, 1997).

[13]Tab B "Press Release No. 117, February 12, 1947," page 2, in "29 July 1949 Memorandum for Secretary Johnson" in Folder 9, Records of International Military Agencies, Permanent Joint Board on Defense, Canada – United States Section, Top Secret Correspondence, 1941-1956, RG 333, National Archives II, College Park, Maryland.

[14]Richard A. Best, Jr., "The Limitations of Continental Defense" *Colloquium on Contemporary History*, Seminar 8 in http://www.history.navy.mil/colloquia/cch8d.html; see also Report of the Advisory Committee on Post-Hostilities Problems, "Post-War Canadian Defence Relationship with the United States: General Considerations," 23 January 1945, reprinted in James Eayrs, *In Defence of Canada: Peacemaking and Deterrence* (Toronto: University of Toronto Press, 1972), 375-380.

[15] While Britain removed the last of its military garrisons from Canada as early as 1905, the Royal Navy still protected Canadian shores until the late 1930s. As England became engulfed in the Second World War, its defensive commitment to Canada was gradually assumed by the United States.

[16]"29 July 1949 Memorandum for Secretary Johnson", page 2, in Folder 9, Records of International Military Agencies, Permanent Joint Board on Defense, Canada – United States Section, Top Secret Correspondence, 1941-1956, RG 333, National Archives II, College Park, Maryland; and Mason, 4.

[17]*Ibid.*, page 3.

[18]"29 July 1949 Memorandum for Secretary Johnson", page 3, in Folder 9, Records of International Military Agencies, Permanent Joint Board on Defense, Canada – United States Section, Top Secret Correspondence, 1941-1956, RG 333, National Archives II, College Park, Maryland.

[19]Tariq Rauf, "Canada's Perspectives on NMD." Rome Forum: Missile Threats and BMD. Retrieved 28 June 2005 from http://www.mi.infn.it/~landnet/NMD/rauf.pdf

[20] Richard A. Best Jr., "The Limitations of Continental Defense". Retrieved 2 March 2008 from http://www.history.navy.mil/colloquia/cch8d.html

[21]The NORAD agreement summary on the official website of NORAD. Retrieved 2 March 2008 from http://www.norad.mil/about/agreement.html

[22]"29 July 1949 Memorandum for Secretary Johnson", page 3, in Folder 9, Records of International Military Agencies, Permanent Joint Board on Defense, Canada – United States Section, Top Secret Correspondence, 1941-1956, RG 333, National Archives II, College Park, Maryland.

[23]*Ibid.*

[24]Even though the United States had an atomic bomb monopoly in early 1949, the total number of atomic bombs in the U.S. stockpiled number only 50 at the end of 1948. Gregg Herken, *Counsels of War* (New York: Alfred A. Knopf, 1985), 27.

[25]Philippe Lagassé, "Northern Command and the Evolution of Canada – US Defence Relations," *Canadian Military Journal* (Spring 2003): 17; and Rauf, 179.

[26]" 23 May 1950 Memorandum for the U. S. Section, Permanent Joint Board on Defense, Canada-U.S." in Folder 13, Records of International Military Agencies, Permanent Joint Board on Defense, Canada – United States Section, Top Secret Correspondence, 1941-1956, Box 2, RG 333, National Archives II, College Park, Maryland.

[27]*Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII Relations with the United States, Part 4, Defence Issues, section I, Distant Early Warning System and Mid-Canada Line, Document 700, "27 February 1953 Letter "Project Counterchange" from Ambassador in United States to Secretary of State for External Affairs. Retrieved 9 October 2003 from http://www.dfaitmaeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2331.

[28]"29 September 1946 Joint Staff Planners- Strategic Importance of the Artic and Sub-Artic Regions." Page 2, Folder 1, Records of the U.S. Joint Chiefs of Staff Geographic file 1948-1950, RG 218, Box 3 National Archives II, College Park, Maryland.

[29]"29 September 1946 Joint Staff Planners- Strategic Importance of the Artic and Sub-Artic Regions." Page 3, Folder 1, Records of the U.S. Joint Chiefs of Staff Geographic file 1948-1950, RG 218, Box 3 National Archives II, College Park, Maryland.

[30]Helen Bailey, *Chronology of JSC Organization, 1945-1984*, JSC Special Historical Study (Washington, D.C.: Historical Division, Joint Secretariat- JCS, 1984), 44

[31]Robert J. Watson, *The Joint Chiefs of Staff and National Policy, 1953*-1955, Volume V: History of the Joint Chiefs of Staff, (Washington, D.C.: Historical Division, Joint Chiefs of Staff, 1986), 111

[32]*Ibid.,* 121.

[33]"NSC-68" in http://www.trumanlibrary.org/whistlestop/study_collections/korea/large/week2/nsc68_5.htm. This site has reproduced images of the actual NSC-68 document found in the Truman Library, reproduced in its entirety.

[34]Murphy, Charles J.V., "The Polar Watch," *Fortune* (December 1957): 120.

[35]NSC-68 was treated extensively in Chapter II.

[36]Kenneth Schaffel, *The Emerging Shield: The Air Force and the Evolution of Continental Air Defense, 1945-1960* (Washington, D.C.: Office of Air Force History, 1991), 129.

[37]Schaffel, 129; and David F. Winkler, *Searching the Skies: The Legacy of the United States Cold War Defense Radar Program* (Langley AFB, VA: USAF Headquarters Air Combat Command, 1997), 24.

[38]Winkler, 24.

[39]*Ibid.*

[40]C. L. Grant, *The Development of Continental Air Defense to 1 September 1954*, (U.S.A.F. Historical Studies No. 126), 62.

[41]*Ibid.*

[42]Joseph T. Jockel, *No Boundaries Upstairs: Canada, the United States, and the Origins of North American Air Defence, 1945-1948* (Vancouver: University of British Columbia Press, 1981), 61-62

[43]*Ibid.,* 63.

[44]Murphy, 245.

[45]Jockel, 63-4.

[46]Winkler, 26; and Schaffel, 169-171.

[47]Jockel, 64.

[48]Norman F. Ramsey, *Jerrold R. Zacharias* http://www.nap.edu/readingroom/books/biomems/jzacharias.pdf (Retrieved on 1 November 2007)

[49]Samuel P. Huntington, *The Common Defense: Strategic Programs in National Politics* (New York: Columbia University Press, 1961), 329.

[50]Huntington, 329-30; and Watson, 117.

[51]Murphy, 245.

[52]*Ibid.,* 245-6.

[53]Alfred Goldberg, ed., *A History of the United States Air force, 1907-1957* (Princeton, NJ: D. Van Nostrand Company, Inc., 1957), 135; and Schaffel, 176.

[54]Thomas W. Ray, *A History of the DEW Line, 1946-1964* (ADC Historical Study No 31), 9-10.

[55]Schaffel, 176. One of the purposes of the DEW Line was to provide protection in the form of warning for SAC.

[56]Goldberg, 135; and Ray, 9.

[57]Grant, 64.

[58]Huntington, 330.

[59]*Foreign Relations of United States, 1952-1954* [after abbreviated as *FRUS*], II, pt. 1, ("Reappraisal of United States Objectives and Strategy for National Security" (NSC 135/1)): 82.

[60]I*bid.*, 83.

[61] *FRUS, 1952-1954,* II, pt. 1 (Views of the Chairman, NSRB (Gorrie), on "Reappraisal of United States Objectives and Strategy for National Security" (NSC 135/1)): 114.

[62]*Ibid., 115.*

[63]*Ibid.*

[64]Huntington, 330.

[65] *FRUS*, 1952-1954, II, pt. 1, (Paper Distributed by the Chairman of the National Security Resources Board (Gorrie) at the Meeting of the National Security Council, September 24, 1952): 141.

[66]I*bid.,* 142.

[67]*FRUS*, 1952-1954, II, pt. 1, (Memorandum for the President of Discussion at the 123d Meeting of the National Security Council on Wednesday, September 24, 1952): 136.

[68]*FRUS,* 1952-1954, II, pt. 1, (Paper Distributed by the Chairman of the National Security Resources Board (Gorrie) at the Meeting of the National Security Council, September 24, 1952): 141.

[69]*FRUS*, 1952-1954, II, pt. 1, (Memorandum by the Under Secretary of State (Bruce)): 164.

[70]*FRUS*, 1952-1954, II, pt. 1, (Key Data Prepared by the Reporting Unit of the National Security Council for the President): 167.

[71]*FRUS*, 1952-1954, II, pt. 1, (Paper Drafted by Paul H. Nitze and Carlton Savage of the Policy Planning Staff): 182.

[72]*Ibid*., 183.

[73]*Ibid.*, 183.

[74]*Ibid.*, 184.

[75]*FRUS*, 1952-1954, VI, pt. 2 (No. 958, "NSC 139: Statement of Policy on an Early Warning System"): 2063.

[76]*Ibid.*, 2064.

[77]*Ibid.*

[78]Watson, 119; and Ray, 11.

[79]*FRUS*, 1952-54, II, pt. 1, ("Memorandum for the President of Discussion at the 122d Meeting of the National Security Council on Wednesday, September 3, 1952"): 123.

[80]*FRUS*, 1952-54, II, pt. 1, ("Report to the National Security Council by the Secretaries of State and Defense and the Director for Mutual Security", NSC 141): 213-14.

[81]*FRUS*, 1952-54, II, pt. 1, ("Memorandum for the President by the Secretaries of State and Defense and the Director for Mutual Security" enclosure to "Report to the National Security Council by the Secretaries of State and Defense and the Director for Mutual Security", NSC 141): 211.

[82]Watson, 2.

[83]*FRUS*, 1952-1954, II, pt. 2, ("Armaments and American Policy: Letter of Transmittal" Report by the Panel of Consultants of the Department of State to the Secretary of State): 1057.

[84]*FRUS*, 1952-1954, II, pt. 2, (Report by the Panel of Consultants of the Department of State to the Secretary of State): 1083-1084.

[85]*FRUS*, 1952-1954, II, pt. 2: 1084.

[86]*Ibid., 1085.*

[87]*FRUS*, 1952-1954, II, pt. 1, (Draft Directive by the Director of Central Intelligence (Smith), "National Security Council Directive for a Special Evaluation Subcommittee): 207.

[88]*FRUS*, 1952-1954, II, pt. 1, p. 207-8 and fn. 5, 329-330.

[89] "Exchange of Correspondence Between the President and the Secretary of Defense," (Army (Volume I [May 1953-December 1954) (1), Box 2, Alphabetical Subseries, Subject Series, White House Office, Office of the Staff Secretary: Records of Paul T. Carroll, Andrew J. Goodpaster, L. Arthur Minnich and Christopher H. Russell , Dwight D. Eisenhower Library, Abilene, Kansas.

CHAPTER 4 - 1953: The Eisenhower Administration, Canadian Sovereignty, and Continental Defense

Many crucial events paved the way for Eisenhower's approval of the DEW Line. Truman began seriously to consider implementing an early warning line, but the decision to go ahead with it came at the very end of his administration. Since the DEW Line had only just been approved, Eisenhower could still review his predecessor's decision and determine whether an early warning line fit into his defense strategy. Eisenhower, along with his National Security Council, had a chance to review numerous studies that delved into the issues concerning improving continental defense, including the controversial topic of early warning. Ultimately, Eisenhower came to support not only improved continental defenses but also, if it proved practicable, the DEW Line.

Canadian officials also grew concerned over the interest that their southern neighbor was showing towards a greater commitment to continental defense. They were under no illusion that Canada, or at least Canadian territory, would play a critical role in any comprehensive continental defense scheme. The two issues that concerned Canadian officials most were sovereignty and the financial burden of increased defenses. How would such a middling power be able to impact the decision-making of its powerful neighbor, one of two superpowers? Defence Minister Brooke Claxton realized all too clearly the conundrum in which Canada found itself. He stated in 1951 that "it may be very difficult indeed for the Canadian Government to reject any major defence proposal which the United States Government presents with conviction as essential to the defence of North America."[1] Luckily, while the United States was more adamant about the DEW Line than Canada, the two countries saw largely eye-to-eye on the importance of improving continental defenses to counter the increasing Soviet capability to launch a nuclear attack on North America. This commonality in defense concerns made for cordial and effective collaboration, while keeping differences to a minimum.

The DEW Line fit perfectly into Eisenhower's New Look strategy. Two cardinal tenets of the New Look were a powerful, nuclear retaliatory force (SAC) and improved continental defenses. Both would serve the purpose of deterring the Soviet Union from launching a nuclear attack on the United States. If the Soviet Union did not believe that it could effectively neutralize SAC with a surprise nuclear attack, then it would be less likely to go down a path that ended in launching a nuclear attack against the United States. Adding further doubt to Soviet success would be improved continental defenses, including the DEW Line, which could significantly increase Soviet losses. The DEW Line would be a major piece, although underappreciated, in the overall continental defense system.

At the midnight hour of his administration, Truman attempted to leave his successor the groundwork necessary to improve the nation's continental defenses. Truman assented to the speedy construction of the Distant Early Warning (DEW) Line without waiting for some of the detailed defense studies, designed, in general, to examine the place of early warning within the continental defense framework and, specifically, the feasibility of the proposed Arctic radar chain. The president believed that the keystone to all continental defense measures, military and civilian, was early warning. In this version, the DEW Line was being constructed, before other defense measures— such as new models of interceptor aircraft, ground-to-air missile systems, and improved radar coverage nearer and within the continental United States— were ready to be implemented or even fully designed. By the time the DEW line was operational, all elements of the improved defenses would benefit from three to six hours of warning provided by the DEW Line.

President Dwight D. Eisenhower had different priorities from Truman. Eisenhower believed that the current military expenditures, which were largely the result of the Korean War and the growing nuclear and conventional threats of the Soviet Union, needed to be reduced, although without weakening American defense posture. Eisenhower disagreed with the basic national security policies formulated under the Truman administration. Incorporated into the NSC policies under President Truman had been the assumption of a "year of maximum danger," the period when the Soviet Union could inflict devastating damage on the United States, or a time when the Cold War would reach a climax. To prepare for this fateful day meant continuously strengthening and improving the armed forces and the U. S. nuclear arsenal, at the expense of other governmental responsibilities. Military planning would damage the overall health and stability of the American economy.

In contrast, Eisenhower advocated a military posture suitable for the "long haul" or "long pull." Such a policy would reduce, if not prevent, the instability inherent in massive military spending fixed to a specific future date. Also implicit in Eisenhower's view was the belief that the Cold War was not to be a short-term anomaly but a condition that would continue for the indefinite future. Considered in this framework, the Cold War would not be won based on military power alone. Political and economic features would prove to be just as important as military factors.

Underlying new security policy was Eisenhower's absolute certainty that an all-out nuclear war would be unwinnable and detrimental to all parties involved and that the policy needed to be adopted by the United States should be first to prevent nuclear war from occurring and, second, to be able to counter effectively the growing Soviet threat.[2] The Eisenhower strategy called for the United States to have a sound economy, with a balance between military spending and other parts of the national budget. At the very least, the nation's military budget would have to be drastically reduced. Eisenhower acknowledged this in his recommendation for the budget for fiscal year 1955. In his "Annual Budget Message to Congress," dated 21 January 1954, he explained:

> the previous history of our military budgets has been one of feast or famine, depending on the state of world affairs. In peacetime, appropriations have customarily been much reduced. In wartime, financial considerations have been largely ignored. Our present budgetary plans represent a departure from these practices. They provide for the continued maintenance of a strong military force which is within the financial capability of a sound economy. We cannot afford to build military strength by sacrificing economic strength. We must keep strong in all respects.[3]

These words guided the Eisenhower administration's efforts to arrive at a national security policy throughout its first year. Continental defense, and specifically its early warning element, had to meet the necessary requirements, including being critically important to America's defenses and proving cost efficient, before Eisenhower would be willing to invest vast sums of diminishing military appropriations into it.

The years 1953 and 1954 proved to be hectic, if not crucial, years for continental defense. The various studies and debates in these years laid the foundation for the improvement of all continental defenses measures, including early warning systems. The DEW Line received the go-ahead from the president by the end of the first year; Canadian approval did not come until September 1954, when the feasibility studies had been concluded and their results placed under thorough analysis. It was not guaranteed, however, that a complicated and expensive undertaking would come to fruition.

As Eisenhower took over the reins of government, many studies examining various aspects of continental defense were still underway. Although Truman assigned high priority to the DEW Line, Eisenhower was not obligated to carry out the conclusions or the timeline set by the previous administration in regards to the DEW Line. It was by no means certain that the Eisenhower Administration would continue its construction without further study to determine its costs, its feasibility and its necessity. The DEW Line remained a topic for continued examination and extensive discussion throughout the first year of Eisenhower's presidency.

Eisenhower let the feasibility and testing studies of the DEW Line proceed on the timetable set up by the Truman administration, but he balked at the goal of having the Arctic radar chain completed by the end of 1955. Eisenhower had not yet made up his mind on the DEW Line. There were too many unresolved issues, both technical and economic, to throw the support of the new administration immediately behind its construction. Although improved continental defenses seemed a certainty, the particulars still needed to be worked out, including whether the DEW Line would be integrated into an improved continental defense system.

The Joint Chiefs of Staff (JSC) operating under the authority of NSC-139 began to draft a plan for an early warning system. On 22 January 1953, NSC designated the Continental United States Defense Planning Group (CUSDPG) as the agency responsible for creating the plan. CUSDPG ordered each branch of the armed forces to submit proposals for their service's responsibilities within the nation's improved continental defense system, along with projected force levels and recommendations for how those defenses would be improved.[4]

In order to begin the testing and feasibility studies for the DEW Line inaugurated by NSC-139, the United States had to acquire permission to use Canadian territory. Convincing Canada to grant its approval helped to initiate serious joint Canadian-United States cooperation in continental defense, but it also reignited traditional Canadian fears about joint defense issues with the United States. U.S. interest in projects on Canadian soil, even in the name of joint continental defense issues, reminded the Canadians of the heavy presence of American military personnel in Canada during the World War II years.

In the years immediately following World War II, the U.S. presence on Canadian territory dramatically diminished. The Canadians, despite the growing danger posed by the Soviet Union, hesitated throughout the 1950s to permit the numbers of American military personnel on their soil to approach the World War II level. The 1953 Soviet detonation of a hydrogen bomb would help to change Canadian complacency. Eventually, improved continental air defense measures necessitated an increased American presence, as Canada lacked the required large numbers of trained personnel. Although the use of Americans could solve this shortfall, there was a strong Canadian desire to keep American numbers to a minimum.

One of the more sensitive issues in U.S.-Canadian relations was Canadian concerns over how much an influence the United States had on Canadian decision making. At the heart of Canadian anxiety was the asymmetry of the U.S.-Canadian relationship. Even though the interests of the two countries were remarkably similar, would Canada be able to have a truly independent defense policy, separate from its superpower neighbor? Many Canadians wanted to establish their country firmly in the ranks of a "Middle Power," emphasizing the separation of interests, independent of that of the United States. Two other major views of Canada's position in the international community includes considering Canada as a satellite, or dependant, state (economic nationalist perspective); or ranking Canada among the world's principal powers (neo-realist perspective).[5]

It is the internationalist perspective that places Canada amongst the middle powers. The problem with the middle-power classification is that it lacks a concrete definition and is thus open to interpretation. Because of this subjectivity, there is not a definitive list of states that all can agree as being middle powers. Thus, the views of the advocates of the middle-power status are divided into three major categories: the functional, behavioral and hierarchical models.[6]

The functional model originates from its practitioners during the 1940s and 1950s. Mackenzie King in the 1940s labeled Canadian foreign policy as "the functional principle." In effect, King stated that "in areas where Canada and other middle-sized powers had the capability to play the part of a major power, they should be so treated."[7] The scope of Canadian activity in international affairs is based on its "relative capabilities, interests, and involvement in specific issues at specific times."[8] King recognized that Canada was not a great power, but it was more powerful and important than many weaker powers. Because of this difference, Canada should be held in higher esteem in international affairs.

The behavioral model focuses on more of a multinational approach to foreign affairs. Political scientists Andrew Cooper, Richard Higgott and Kim Richard Nossal postulate that middle powers are identified as such by "their tendency to pursue multilateral solutions to international problems, their tendency to embrace compromise positions in international disputes, and their tendency to embrace notions of 'good international citizenship' to guide their diplomacy."[9] Activities implementing the above guidelines include "foreign aid, peacekeeping and . . . a devotion to world peace through the principles of collective security."[10] Canada's support for the creation of the United Nations falls under this model. By backing the middle power concept, Canada was attempting to carve out a larger role for itself in the international organization.

The third model, the hierarchical, established a ranking system amongst the nations based on a variety of factors. Below the superpowers and great powers lie a number of nations that have certain advantages because of a variety of circumstances over less influential nations. An early proponent of what will later be known as the positional, or hierarchical model was Canadian diplomat R.G. Riddell. In the late 1940s, he saw a role for nations who are below the most powerful, but still could play a significant role in international affairs. Riddell argued that these middle powers, “by reason of their size, their material resources, their willingness to accept responsibility, their influence and their stability, are close to being great powers.”[11] Other factors that others have used in quantifying a middle power status are population, Gross National Product (GNP)[12], and technological level.[13] All of these models have in common is trying to provide a theoretical framework in which to permit less-than-great-powers assume a greater role. Others argue that labeling the middle powers as such is not going to affect the actual influence that these nations have on world affairs. Adam Chapnick asserts that “Status is power, and in the international community, simply to call oneself important seems to be an ideal way to promote national self-worth, and maintain at least the illusion of international influence.”[14]

Defining Canada as a middle power becomes a bit more complicated when analyzing Canadian defense policy. In many Canada took on attributes more akin to a satellite state under the economic nationalist perspective. While not wholly bending to the will of the United States, Canada made choices that it might not have devised without pressure from its superpower neighbor.

In a speech delivered in 1954, Secretary of State for External Affairs Lester B. Pearson did refer to Canada as “the junior member of a North American partnership.” He does go on to state, however, that “the junior partner [will] occasionally express its own point of view and . . . you will find Canada no automatic ‘yes man’.”[15] Kenneth McNaught’s influential article in the late 1960s takes a more hard-lined position and argued that *modus operandi* which highly influencing Canadian defense policy was Canada’s dependence on the United States. [16] Others describing Canada's defense policy would wryly observe that "when you live beside a giant your policy and his must frequently be 'parallel'."[17]

Geography is one the most important factors causing an infringement on Canadian sovereignty and one of the conditions which is outside of Canadian control. Canada does not only share a boarder with the United States, but it lies between the United States and the Soviet Union. Canadian diplomat L. Dana Wilgress in the late 1940s noted this reality due to the rise of American predominance: "On account of our proximity to the United States this gives rise to all sorts of problems for us and makes it necessary for us to subscribe to the main lines of United States policy. Hence, in our relations with the Soviet Union, we have no alternatives other than to accept and follow the 'Truman Doctrine'."[18]

Even the Canadian military leadership recognized this circumstance, which is somewhat unique since military leaders tend to lean towards being extremely nationalistic. In Canada the military leaders tended to be "less nationally minded than [their] political masters. . . .[and] have usually been in favour of close co-operation with . . . the United States, even at the risk of a slight infringement of Canada's independent position."[19] Canadian General Charles Foulkes, who became the first Chairman of the Chiefs of Staff, emphasized this geographical reality when he stated, "Canada is physically joined to the United States just like the Siamese twins. If one of the twins gets hurt the other one suffers. It is just as impossible to separate the defence of Canada from that of the United States as it would be to separate the Siamese twins and expect them to survive."[20]

With the United States eyeing the Canadian Arctic for the location of the DEW Line, Canadians began worrying about sovereignty issues, or at least, *perceptions* over sovereignty. The United States ultimately paid for and constructed most of the northern defenses. For a time a large number of Americans were working in the Arctic, potentially outnumbering the Canadian population in those areas of American activity.   While not *actually* threatening Canadian sovereignty in those areas, the perception might be both internationally and domestically, that Canada's claim to its Arctic sovereignty was weakened since a foreign power exerted a "*de facto* control" over this region where the Canadian presence was limited.[21]

Canadian officials sought to bolster the image of their participation in Arctic affairs in an attempt to avoid a public outcry about the perception of its weakening sovereignty claims of its Arctic lands. One way they tried to minimize the "appearance of American hegemony in the North, an effort was made to use the terms 'joint-project' and 'cooperation' at every possible occasion."[22] A policy guidance paper produced by the Advisory Committee on Northern Development also explained how the variety of activities in the Canadian North was to be represented, or "spun." The major idea which needed to be conveyed was "to emphasize that the northern regions are as much a part of Canada as any other area in the country."[23] To minimize the impact of the American presence on Canadian sovereignty the committee further recommended that any "reference to U.S. activities in the Canadian North in isolation should be avoided, if they can be coupled with reference to Canadian work."[24] Again the perception of full Canadian sovereignty was more important than the reality.

The concerns that Canadians had about U.S. infringements on Canadian sovereignty in the Arctic has an ironic conclusion. It is *because* of U.S. activities, in essence the building up of the infrastructure (communication facilities and airstrips) in the underdeveloped Arctic region, which ultimately improved Canadian claims of sovereignty over the Canadian Arctic.[25]

U.S.-Canadian diplomacy during the 1950s offers an important case study in "superpower-middle power" relations. However, despite the asymmetry in their relationship, U.S.-Canadian defense policies were very comparable. In effect, this similarity meant never having to put to the test the way in which significant differences in defense strategy would have affected their affable relations.

In the wake of the Soviet detonation of the atomic bomb in 1949, the United States Congress appropriated $161 million for a chain of radar stations along the United States – Canadian border. After planning meetings between USAF and RCAF representatives, the Permanent Joint Board on Defense (PJBD) agreed on 6 February 1951 that the Pinetree Line should be built. The Pinetree Line was located in Canada roughly along the 50th parallel. Its western terminus was Holberg, British Columbia. As the Pinetree continued and approached eastern Canada, the sites were planned for a more northerly latitude, up to the coast. From there the Pinetree Line went north along the eastern shore of Canada, terminating at Frobisher Bay on Baffin Island in what was then the former Northwest Territories.[a] The highest military bodies of the two countries, the JCS and the Canadian Combined Chiefs of Staff (CCS), assented as well. Despite this agreement between the military leadership of both countries, President Truman delayed immediate action on a formal exchange of notes between the governments. He hesitated to obligate the United States immediately to the construction of the Pinetree Line, since there still remained uncertainties how manning and costs were to be divided between the two countries. Those ambiguities left the scope of the U.S. commitment unknown, particularly the U.S. financial obligation.[26]

The initial cost shouldered by the United States for the Pinetree Line amounted to $100,000,000. Roughly 61 percent of the cost covered construction, with the remainder earmarked for communication and electronic equipment. More money was required for

[a] Today Baffin Island is in the Nunavut Territory which was separated officially from the Northwest Territories on 1 April 1999.

subsequent phases of construction, including more funding for equipping the stations.[27] These figures do not include the costs for manning and operating the radar stations, which were estimated at $33,000,000 annually.[28]

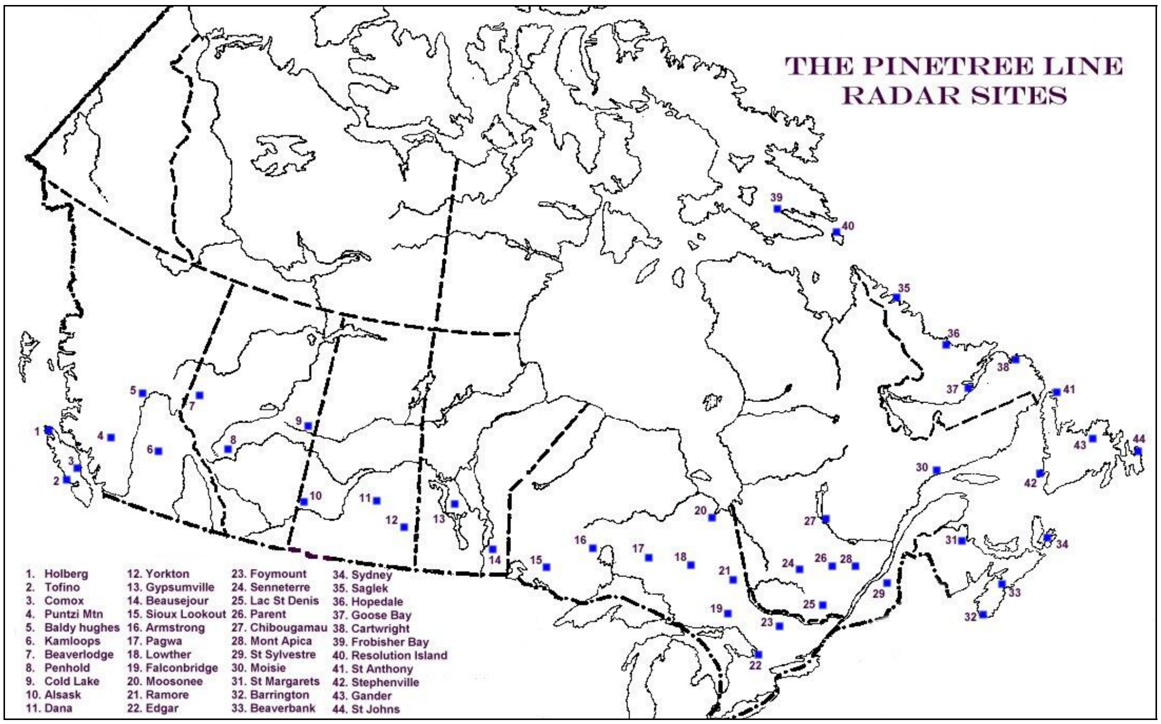

Figure 4.1 The Pinetree Line (http://www.pinetreeline.org/boundary/canada.html

After the approval of the Pinetree Line in August 1951 by the formal exchange of notes between the governments of the United States and Canada, further joint measures in continental defense were limited to studies and discussions at meetings of such groups as the Military Cooperation Committee (MCC) and the PJBD. The Pinetree Line, the first outward extension of the radar system from the continental United States, consisted of thirty-three radar sites with twenty-two, or two thirds, paid for by the United States, and eleven, or one third, by Canada. Manning and operating the stations did not follow the two thirds/one third formula stipulated for financing initial construction; the United States was responsible for only eighteen of the aircraft control and warning (AC&W) sites, while Canada operated the remainder.[29] The reason for this division was that the locations of the radar stations were on Canadian territory, and Canadian officials, ever-diligent over sovereignty, wanted to limit the number of U.S. personnel on their territory.

There were two major problems hindering joint United States-Canadian defense efforts, particularly continental air defense. The first challenge was that any program that might be undertaken would require large expenditures and possibly an increased presence of U.S. military personnel, or both. The approved Pinetree Line was expected to bring at least 2,300 Americans into Canada. As stated previously, Canadians were constantly concerned about sovereignty *vis-à-vis* an increased American presence. Brooke Claxton, the Canadian defense minister, stated that "sooner or later someone is going to say that while we are sending our troops to defend the frontiers of civilization on the Yalu and the Elbe, we are permitting our own country to be occupied strategically by the Americans"[30]

Canadian fiscal concerns were just as powerful an impetus as the sovereignty issue in causing Canadian reluctance to implement further continental defense efforts. Any new defense program would most certainly incur costs that the Canadian government would find difficult to support while maintaining fiscal responsibility. Between the approval of the Pinetree Line and the beginning of 1953, U.S. members of the PJBD and the MCC believed that Canadian commitment to planning was being hindered due "almost entirely to the Canadian planners' lack of authority to develop requirements."[31] For instance the Canadian contingent of the MCC failed to draft a new Future Defense Analysis in cooperation with the U.S. element. The Future Defense Analysis was basically a projected force and materiel estimate for what its planners believed to be future defense requirements for the mutual security of the United States and Canada. The Future Defense Analysis included plans for "desirable measures" for continental defense, those that might need to be implemented in the "period beyond that of present approved national defense programs."[32]

General Andrew G. L. McNaughton, Chairman of the Canadian Section of the PJBD, outlined the problem in a letter to the Canadian Defense Minister, Brooke Claxton. General McNaughton stated that the Canadian hesitancy revolved around increasing the Canadian military commitment, both in personnel and defense programs, without official sanction from the Canadian government. Canadian political leaders did not want to adopt defense plans based on the tail wagging the dog. The Canadian government, not lesser elements within the government, must make military policy. General McNaughton's thoughts on the subject were recorded in the Journal of Permanent Joint Board on Defense: "a subordinate official [military officer] of the Government cannot be permitted, in joint discussions with representatives of another country, to assert that he considers a 'requirement' exists for something which has not been approved by the Canadian Government."[33] The future "requirements" might be interpreted as being officially approved policies to be put into operation. Agreements carried out under these mistaken pretenses could lead to unwarranted tension, or even recrimination, between the parties in the joint defensive relationship.

General McNaughton recognized the limitations that the lack of authority of Canadian members of the MCC was having on defense planning. If not corrected, McNaughton contended, planning for defense might be done primarily by the Americans with little Canadian input:

> I can but conclude that if Canadian military planners are not permitted to work with their US counterparts, then plans in which we are vitally concerned will be developed by US officers and firmed up without regard to Canadian interests. As a consequence, the Canadian Government will continue to be confronted piecemeal with a series of US military operating requirements on Canadian

territory which it will be difficult if not impossible to deny.[34]

To prevent having "joint" defense plans being shaped by only the United States and being presented by them as a *fait accompli* with little Canadian input, General McNaughton encouraged his superiors to allow joint preparation for projected future defense requirements. The views of Major General Guy V. Henry (U.S. Army, retired), Chairman of the U.S. Section, PJBD, on planning for future defense requirements were summed up by McNaughton: "the US Government neither could nor would concede that plans for the defence of North American in future years should be based on present capabilities rather than on estimated military requirements."[35] McNaughton believed that joint planning needed to continue and he favored a compromise. A view also supported by Canadian political officials:

> The Canadian Government recognizes the desirability of, and is agreeable to, the joint preparation by the military planners of the two countries of realistic estimates of the forces which, in their opinion, it would be desirable to have for the defence of North America. Such estimates are not to be confused with, or construed "requirement plans." In order to ensure that the Canadian position is not lost sight of, every document containing estimates should be headed by a preamble worded along the following lines: "These estimates constitute a military opinion only of the desirable future strength of armed forces and equipment, and in no sense are to be construed as commitments by either country."[36]

Major General Guy Henry agreed that by no means were the estimates to be perceived as approved policy. With Canadian military strategists now having the authority at least to plan accordingly, Henry believed that the MCC and other groups could effectively devise future joint defense requirements.

After agreeing to underwrite one third of the Pinetree Line, the Canadians were disinclined to open themselves up to even greater continental defense expenditures. It is important to remember that Canada was already spreading itself thin by supporting military endeavors in both Korea and Europe as a NATO partner. But with U.S. pressure mounting to extend the early warning net even further northward, Canada assented to Future Defense Analysis studies by the second quarter of 1953.[37]

During the last months of 1952, Canadian officials were getting wind of the deliberations in the United States in the wake of the contentious study by the Summer Study Group specifying the need for distant early warning. They knew it was only a matter of time before the United States would sound out the Canadian position on further improvements in continental air defense. Beginning in September, there was increasing dialogue within the Canadian government on U.S. intentions with an effort called Project Lincoln, a study air defense issues. The United States contacted the RCAF, the Canadian Department of Transport, and the Department of External Affairs to seek permission initially for three American scientists to conduct acoustic tests for Project Lincoln at Resolute Bay station (approximately 75°N latitude, 95°W longitude) located on the southern coast of Cornwallis Island, in the Queen Elizabeth Island group. External Affairs did not have any information on what Project Lincoln entailed and voiced concerns that the United States needed to take these types of requests through proper diplomatic channels.[38]

By October, the Canadians had obtained additional information about the specifics of Project Lincoln and became apprehensive about the threat of a surprise Soviet atomic air attack whose flight path would cross the Arctic polar region and, thus, Canadian territory. Secretary of State for External Affairs Lester B. Pearson recorded for the Cabinet Defence Committee, the Canadian equivalent of the U.S. National Security Council, his observations from conversations with a U.S. official, Dr. W. G. Whitman, Director of the Research and Development Board of the Department of Defense. At its heart was the devastating damage that would occur if even one enemy bomber reached its target, let alone if a high percentage were able to deliver their nuclear payloads. In this environment, Dr. Whitman stated, "early warning becomes of paramount importance." While such a system might ultimately prove impractical, "early warning against a sneak attack had become a primary defence requirement."[39]

A chain of forty-five radar stations in the polar regions of the North American continent between Aklavik, Alaska, and Thule, Greenland became an integral piece of the early warning network advocated by the Summer Study Group. This chain had an estimated cost of $225,000,000. Pearson questioned that the anticipated cost of this proposed version of the DEW Line was too low. He also correctly predicted that the growing American concern over continental air defense issues and the conclusions of such studies as the Summer Study Group would "have the most serious implications for this country [Canada]."[40] This belief permeated all departments of the Canadian government during the last half of 1952 and throughout 1953.

On 23 January 1953, Chairman of the U.S. Section, PJBD, Major General Henry, drafted a letter to the Canadian Section, PJBD forewarning them of a topic to be brought up an upcoming PJBD meeting. Included in this memorandum was an official request for permission from the Canadian government to place at least two experimental radar stations on Canadian soil.[a] The Americans hoped familiarizing the PJBD with the nature of the arctic radar tests would assuage the Canadian government and help prompt approval.

The Department of Defense assigned this project (Project Counterchange[b]) a high priority status. Since the United States wanted to begin construction during the upcoming Arctic summer, early Canadian approval was critical. The use of Canadian territory was necessary, the letter

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[a] The proposed radar sites on Canadian territory would be constructed at Herschel Island, Yukon Territory, and at Aklavik, Northwest Territories, along with the intermediate stations.
[b] The code name for the testing under Arctic conditions, in both Alaska and northwestern Canada, of new technologies and procedures for the proposed DEW Line.

stated, for "proper experimental purposes." The Alaskan Arctic might have been suitable for the initial tests; however, by using Canadian territory to test the feasibility of the DEW Line, perhaps the thinking of the Eisenhower Administration was that, if indeed, Project Counterchange was successful, it would be difficult *not* to continue with the entire span of the DEW Line. Canadian approval was essential if the DEW Line was to be built as projected, crossing the entire northern part of the continent near the Arctic circle. Most of the sites of the DEW Line would have to be placed on Canadian territory.[a] To forestall potential opposition regarding funding and the unilateral nature of the experiment the memo asserted that the United States "is prepared to meet all the expense of the experimental stage, but at the same time invites Canadian participation, both financial and technical, if so desired."[41] A similar letter at the diplomatic level was sent on 30 January from H. Freeman Matthews, Acting Secretary of State, to Canadian Ambassador Hume Wrong.[42] After considerable discussion, the Canadian Cabinet approved the U.S. request on 25 February and the following day sent its formal reply (Canadian Note 163).[43]

Over the previous months, U.S. interest in building Arctic test stations in Canadian territory had instigated increasing discussions within Canada about the intentions of their powerful southern neighbor. By December, officials in the Canadian government were well aware of the impending request from the United States to utilize Canadian soil for conducting Arctic tests of an early warning system, originating out of the Summer Study Group's recommendations. On account of two major impediments, the cautious Canadian government did not sanction the tests immediately.

The first concern was Canadian territorial sovereignty. The increasing presence of U.S. servicemen in Canada during World War II had caused a nationalistic backlash in some quarters.

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[a] American intentions on selecting Canadian territory for part of the feasibility studies and the Canadian reaction is further explored below.

The Canadian government tolerated the U.S. presence in Canada as essential during World War II. However, as the external threat disappeared, Canada was determined to remove U.S. troops as soon as it was prudent.

An inter-agency memorandum within the Canadian government in July 1952 was particularly reticent regarding increasing pressure by the United States for more U.S. personnel in Canada. The letter noted that over the preceding four years (1949-1952) the United States had requested increasing commitments for joint continental defense measures, such as Arctic weather stations, radar sites (Pinetree), and an increased number of U.S. troops at Torbay. In addition, there had been questions about SAC operations and U.S. interceptor flights over Canada. While the possibility that U.S. requests for more facilities might begin to decrease after the initial military buildup in the wake of the Korean War,

> we should not overlook the possible shift in U.S. policy towards greater defence at home and lesser defence abroad should there be a Republican victory next November, and especially if the new President were Mr. Taft or a compromise candidate. A shift in the emphasis of policy towards continental defence would almost certainly result in more pressure for facilities in Canada, pressure which might be very difficult to withstand.[44]

Canadian officials were not under any illusions of what a Republican victory might mean for U.S.-Canadian relations, if continental defense was to become a priority of the new administration. A memorandum from L. D. Wilgress, Under-Secretary of State for External Affairs, to his superior, Pearson, remarked that Canada had to undergo "a vigorous programme intended to 're-Canadianize' the Arctic" at the end of World War II, a process that would take at least four years. If continental defense again became the focus of the United States policy toward Canada, an increase in U.S. personnel in the Canadian Arctic with the possible scenario in which U.S. citizens would outnumber “white Canadians”[a] in certain districts, was to be expected. In addition, concerns were expressed in the letter about the underdeveloped nature of Canadian communication and transportation facilities; if they could not meet the increase demand placed on them by an escalated U.S. presence, then “additional U.S. commitments” would be necessary.[45]

Canadian officials were also aware of the expense of an Arctic radar chain. Although not a big factor in the early stage of approving the test stations, the fiscal issue would be the focus of much discussion within the Canadian government and between Canada and the United States throughout the following year. Despite the initial trepidation regarding an influx of U.S. personnel and an unknown fiscal responsibility, Canada, as stated above, approved the American request to begin Operation Counterchange. It would be difficult to say no to the United States, especially when it comes to issues of national security. Canadians realized that first of all there was no certainty that the radar chain would get the nod of approval by the United States. If the DEW Line was not approved than all concerns would be academic. Pecuniary concerns would be addressed if and when the project is approved. As part of their agreement to the Arctic radar tests, the Canadians sought some concessions from the Americans in order to help alleviate some of their fears over fiscal and sovereignty issues that might emerge from Project Counterchange.[b]

The first reservation asserted by the Canadian government was the specification that Canadian approval of Project Counterchange “involves no commitment on the part of the Canadian Government to authorize the subsequent installation of an operational early warning chain.”[46] Canada would, indeed, once the U.S. Arctic tests proved its feasibility, spend over a year internally debating the extent of Canadian commitment to such an early warning system.

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[a] The term “White Canadians” refers to Canadians of European origin and does not include the Inuit population.
[b]Project Counterchange later became known as Project Corrode.

The Canadian government also made it clear that it would "retain title to all sites" required by the United States for Operation Counterchange and also that these test sites would be placed under the jurisdiction of Canadian law.[47]

One of the most important stipulations for Canadian approval included establishing "immediately" a

> Joint Military Study Group designated by the Chiefs of Staffs of each country . . . with instructions to study those aspects of the North American Air Defence system in general, and the early warning system in particular, which are of mutual concern to the two countries. The Canadian and United States sections of the Military Study Group shall respectively report to their Governments through the respective Chiefs of Staff. The Military Study Group will be advised by a joint United States-Canada scientific team[48]

Canadian officials determined that the establishment of such a joint agency would help to prevent the United States from conducting the tests as a unilateral undertaking. The Military Study Group (MSG) would guarantee Canadian participation in observing the tests, thus keeping the Canadians in the loop. The MSG would also keep the Canadians abreast of U.S. continental air defense planning.[49] Without the MSG, the Canadians ran the risk of being informed of a *fait accompli* and not having a significant impact on the developmental stage of a distant early warning system.

Another request by the United States, approved by Canada, was permission to conduct site-surveys in the event the DEW Line proved feasible and both the United States and Canada agreed to its construction. Having the surveys already accomplished when the DEW Line received the green light would allow for greater flexibility in its construction, possibly allowing a much earlier completion date.

While CUSDPG was carrying out its orders for possible continental air defense plans and the State Department was waiting for Canadian approval to begin Project Counterchange, the

Eisenhower administration dealt with other issues concerning continental defense. Many of these subjects were unresolved questions carried over from the Truman Administration. Carlton Savage of the State Department's Policy Planning Staff issued a memorandum on continental defense on 10 February 1953. In this paper, Savage discussed NSC-141, the East River Report, and the results of the study conducted by the Panel of Consultants on Disarmament.[a] What the three reports had in common "with striking unanimity" of views is a commitment to develop continental defense.[50]

The Panel of Consultants on Disarmament indicated to the Secretary of State that they could not escape the ubiquitous nature of the continental defense theme. No matter what aspect of disarmament was studied, the issue of continental defense seemed to permeate the study and appeared in its conclusion. The panel warned that strategic planning, thus far, had been too focused on building up the nation's massive retaliatory nuclear stockpile and "is not matched by any corresponding concern for U.S. defense in case of Soviet attack . . . the Soviet Union may fairly soon have enough [atomic bombs] to threaten the destruction of our whole society." Savage continued by summing up the view of the Panel, that "there is every reason to proceed with greatly intensified efforts of continental defense." Taken collectively, these three documents (NSC-141, the East River Report, and the study conducted by the Panel of Consultants on Disarmament) demonstrated the urgency for improved continental defense efforts.[51]

The NSC under Eisenhower approved its first policy statement at the end of April 1953. The Basic National Security Policy, NSC-149/2, emphasized that "the maintenance by the United States of a sound, strong economy" would help to ensure the "long-term survival of the

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[a]The conclusions reached by NSC-141,the East River Report, and the Panel of Consultants are discussed in Chapter 3.

free world."[52] If the nation continued the trend of massive federal spending, the economy would be destroyed. The appearance of this at the very beginning of NSC-149/2 leaves no doubt about the Eisenhower's seriousness in trying to maintain a healthy economy by balancing the budget. A balanced budget required reduced defense spending, but this must come gradually in order to maintain commitments to national security. NSC-149/2 continued by stressing that the United States must "increase emphasis on . . . protection of the continental United States from enemy attack, by both offensive and defensive military measures and by non-military measures."[53] Eisenhower, by approving NSC-149/2, concurred with his predecessor's high valuation of improved continental defense measures. However, the administration did not yet focus on specific programs, which might carry with them enormous costs, since many of the continental air defense study groups had not yet submitted their conclusions.

Before the study groups initiated by the Truman administration reported their findings, Carlton Savage and Paul H. Nitze of the State Department's Policy Planning Staff submitted another memorandum on the topic of continental defense for the National Security Council, which sent the paper to the NCS Planning Board for discussion. The paper was a historical summary of the place of continental defense in the strategic planning of the United States over the six years up to NCS-149/2 and of the rationale of why the importance of continental defense had been down played by policy planners over the proceeding years. Their conclusion was that this minimalization should be corrected.[54]

Although the burgeoning atomic weapons stockpile of the Soviet Union posed a growing threat to the United States, the U.S. failed to prepare adequately for this threat. Nitze and Savage delineated a number of reasons for this enormous deficiency in American strategic planning. The four points outlined in the paper were:

> (1) . . . [an] earl[ier] Soviet development of atomic weapons than had been anticipated, and an under-estimation of general Soviet technology;
> (2) the realization of danger in the [U.S.] has not been intense enough . . . in the Executive Branch, in Congress, or among the people to bring about appropriate action;
> (3) there has been a general belief that by building a powerful offensive capability we could deter a Soviet attack on the United States;
> (4) there is apprehension that we might devote more resources to home defense than merited by the security which such a system is capable of providing, and thereby unduly penalize both the deterrent value and direct defense value of offensive striking power.[55]

The authors contended that a thorough overhaul of U.S. strategic plans had to occur, with a greater emphasis placed on continental defense, if the United States was to survive. Particularly important to continental defense was the preeminent position of early warning. The importance of early warning lay in its dual purpose, for civilian defense programs as well as for military defense of the continental United States. Improved early warning for military purposes would allow more time to alert interceptor aircraft, ground defenses, and SAC bases. In addition, early warning's primary benefit to civilian defenses would be either to allow time for the population to find shelter or to be removed from the threatened areas. While the existing early warning system could be improved immediately, costing a relatively small sum, the Policy Planning Staff advocated that a distant early warning line providing even more valuable time should be given "urgent consideration," but would prove to be a more expensive alternative.[56]

The Eisenhower administration found itself in a quandary. On one hand, there was a growing desire for greatly improved continental air defense, as supported by the Summer Study Group, NSC-141, and two elements within the State Department, the Panel of Consultants and the Policy Planning Staff. On the other hand, Eisenhower ran on a platform of reduced spending and balancing the budget. The Eisenhower administration, particularly the NSC, spent much time during the first months in office trying to figure out a way out of the dilemma of the need for improving defenses without failing to reach the stated economic goals.

On 27 May the Ad Hoc Committee on Armaments and American Policy of the NSC Planning Board, represented by Drs. J. Robert Oppenheimer and Vannevar Bush, presented their findings (referred to as NSC-151) to the NSC. The group recommended "the best possible defense system" and suggested a policy of candor when dealing with the American people, as the danger of an attack was grave.[57] The NSC's Deputy Executive Secretary S. Everett Gleason summed up the presentation given by Dr. Bush to the NSC on 27 May 1953 on the topic of improved defenses. While not delving into specifics:

> referring to the discussion of possible defense measures, [Dr. Bush] expressed the view that it was plainly hopeless to expect any complete defense against the atomic attack. Nevertheless, he insisted that it was possible to construct a defense sufficient to post-pone and deter the evil day. We should have commenced this task several years ago. We have delayed almost too long the construction of a defense system for the North American Continent. Along with the facts of their grim situation, the American people must be told what the Government proposes to do to defend the continent.[58]

The policy of candor, key to securing understanding among the populace, would lead to the conviction of Congress to fund the defense program.[59] Bush and Oppenheimer earnestly believed any defense against an atomic attack was bleak. They did agree, however, in the deterrent power of a defense system.[60]

About the same time, two committees submitted their highly anticipated reports to the NSC. The Ad Hoc Study Group on Continental Defense,[a] or the Kelly Committee, named after

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[a]Secretary of Defense Robert Lovett appointed the Kelly Committee, also known as the Citizens Advisory Committee, or "seven wise men." The membership of the committee included, Dr. M. J. Kelly; Walker Cisler, president of the Detroit Edison Company; S. C. Hollister, Dean of Engineering at Cornell University; F. L. Hovde, president of Purdue University; C. C. Lauritsen, Professor of Physics, California Institute of Technology; Arthur E. Vance, chairman of the board, the Douglas Aircraft Company; H. S. Raymond, vice-president of the Studebaker

its chairman, Dr. Mervin J. Kelly,[a] turned its report over to the Secretary of Defense Charles Wilson on 11 May 1953. The Special Evaluations Subcommittee of the NSC[b], or the Edwards Committee, after its chairman, Lt. General Idwal H. Edwards, submitted their report, NSC-140/1, on 15 May 1953.

The mission assigned to the Kelly Committee was to "submit general recommendations for improved continental defense and specifically to study the possibilities of an improved warning system and its relation to other measures."[61] The report did not definitively answer many of the continental air defense problems. In fact, Samuel P. Huntington referred to the Kelly Committee study as "a masterpiece of compromise."[62] Those outside the committee who favored the immediate construction of the DEW Line found vindication for their view in the conclusion of the Kelly Report as did those in the opposing faction[c], who were concerned either about the cost or about the hurried nature of such an untried and unproven early air warning endeavor.

The report stated that the most effective way to deter attack was not necessarily found in continental defense measures but in the "… continued development of a powerful U.S. atomic offensive capability, reasonably invulnerable to initial attack, as a vital, major part of the over-all

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Corporation; and R. E. Wilson, chairman of the board, the Standard Oil Company of Indiana. (New York Times (Jan 1, 1953)

[a]Dr. Kelly was the president of Bell Telephone Laboratories.

[b] The five members of the Special Evaluations Subcommittee were Lt. Gen. Idwal H. Edwards, USAF (Ret.), Chairman; Lt. General Harold R. Bull, USA (Ret.), Central Intelligence Agency; W. Barrett McDonnell, Interdepartmental Committee on Internal Security; Maj. Gen. Robert M. Webster, Joint Chiefs of Staff, and Lish Whiston, Interdepartmental Intelligence Conference.

[c]Important to note was that the opposition who did not favor the immediate construction of the DEW Line were a collection of factions: those who were concerned about the cost of such an expanded commitment to continental defense and those who wanted to extend the continental air defenses progressively outward. Other groups who were more categorically against the DEW Line in general were those who did not want to upset the primacy of U.S. offensive capacity and those who saw that the DEW Line would not greatly enhance deterrence.

defense system."[63] The pro-SAC element of the military and government wholeheartedly endorsed this part of the Kelly Committee's conclusions. This faction saw any program, especially a defense-oriented system that might compete with SAC for defense appropriations, as a potential threat.

The Kelly Committee suggested that the construction of a "continental air defense system much better than that which is assured under present programs."[64] The continental air defense faction, particularly the DEW Line supporters, focused on this part of the report. The Kelly Committee in its conclusion still cautioned about the government rushing into the construction of the DEW Line with incompletely thought-out or hastily devised defensive plans that might ultimately prove economically wasteful, technically infeasible, or both. This advocacy for avoiding the "crash" nature of the DEW Line supported the position of the USAF.[65]

In addition, the Kelly Committee specifically asserted that an early warning line, "a modest distance from US boundaries, was the most rewarding *first step* toward an improved warning system *in being*. It should be located as far north as possible while remaining within range of backup facilities for tracking and intercept."[66] This view was also consistent with the position of the USAF and the Canadians, who favored what ultimately became the Mid-Canada Line along the 55th parallel. Further, the report included a statement endorsing the value of early warning: "there is no limit to the amount of warning time that is desirable; the more the better, so long as it is reliable and useful warning."[67] The Kelly Committee also included in its report an encouraging recommendation for a more developed early warning network:

> Eventually the warning network should be pushed as far as possible from US borders. Preparations should be made for selecting sites and procuring equipment for a line in the far North, so that construction could begin as soon as results of the Arctic test program justified a decision to proceed.[68]

This conclusion, not necessarily out of line with USAF thinking, partly supported the position taken by pro-DEW Line elements. While advocating a more cautious approach, it still affirmed that testing and site surveys should continue and when proven feasible, construction should proceed. Only the urgency for building the DEW Line was ultimately questioned.

The report of the Kelly Committee, apparently not sent to the NSC,[69] helped the Eisenhower administration to proceed more deliberately with continental air defense planning. While by no means a death knell for improved continental defense measures such as the DEW Line, the Kelly Committee's conclusions helped to dispel the belief that these defenses must be built immediately. Consequently, final approval for the DEW Line would not come until other study groups reported their conclusions, Project Counterchange/Corrode provided positive results, and the administration developed its own Basic National Security Policy.

The Truman Administration had assigned the Edwards Committee the responsibility of preparing a summary evaluation of the net capability of the USSR to inflict direct injury on the United States for the period up to 1 July 1955. Eisenhower approved the study and allowed it to proceed. The report was submitted on its 15 May 1953 deadline to the NSC and disseminated on 18 May as NSC-140/1.[70] The Edwards Report was brought up before the NSC during its 148th meeting, on 4 June 1953.

Scattered throughout the report is the constant reference to the need for greater early warning. If the United States could ensure earlier warning, allowing for the preparation for attack on urban populations and the SAC bases, Soviet damage to the United States would be greatly reduced. The Edwards Committee surmised that the United States, despite experiencing a massive atomic attack, could survive the damage inflicted, retaliate with its own atomic weapons, and continue further air operations. Optimistically, the committee presumed U.S. success. The report continued:

> Any failure by the USSR to gain the strategic surprise or any substantial increase in the *tactical warning* [emphasis added] received by the United States upon which the evaluation is based, would greatly reduce the damage indicated and would jeopardize the success of the entire operation by alerting the defensive systems and counteroffensive forces of the entire Western World.[71]

Since neither the Mid-Canada Line nor the DEW Line had been approved by the time the Edwards Committee submitted its report, their impact was not figured into the projected damage caused by a Soviet atomic air attack. Many of their estimates would have to be re-evaluated if radar lines were constructed far to the north of the nation's border.

Analyzing the civil defense measures to be taken by the United States in response to a Soviet attack, the report again returned to the critical need for greater early warning:

> [while] the over-all program [civil defense] . . . is capable of materially reducing deaths and casualties which might result from an atomic attack, the degree of reduction depend[s] on the amount or warning received. . . .Adequate early warning is the most important requirement to bring the civil defense program into full effectiveness.[72]

As for civilian casualties, an all-out Soviet atomic attack against the most heavily populated urban centers attaining complete surprise could inflict 24,000,000 casualties in mid-1953 and as many as 31,000,000 on 1 July 1955. The report over-optimistically asserted that with only one hour of warning, casualties could be reduced to nearly one-half of the above figures.[73]

Early warning was also essential to allow for the proper dispersal of the atomic retaliatory bomber force from the SAC bases. The report stated that the only way the Soviet could inflict "critical damage" to SAC would be to achieve total surprise. The percentage of successful dispersal of SAC bombers rose proportionately with increased early warning: less than an hour of warning, “no significant dispersal”; two hours’ warning, a 65% dispersal rate; six hours’ warning, 85% dispersal.[74]

The Edwards Committee reported that a Soviet air attack in mid-1955 would find it more difficult than in the previous years to achieve total surprise. The estimates calculated by the committee took into account some of the improved early warning measures that would be in place by that time, although not incorporating the effects of either the Mid-Canada Line or the DEW Line.[75] One can only surmise that, with a fully operational, tiered early warning system providing even more complete coverage, the committee would have estimated total surprise to be nearly impossible.

Before the NSC met to discuss the Edwards Committee’s “Summary Evaluation” (NSC-140/1), James S. Lay, Jr., who was the Executive Secretary to the NSC, forwarded views of the agencies whose representatives took part in formulating the report to the Council. Their agencies’ reactions were somewhat mixed. Allen Dulles stated that the CIA “strongly recommends NSC-140/1 to the Council as a sound intelligence estimate and as an appropriate basis for developing national policy.”[76] J. Edgar Hoover of the Interdepartmental Intelligence Conference also approved the report. Less enthusiastic support of NSC-140/1, though still generally positive, was the view of Thomas J. Donegan of the Interdepartmental Committee on Internal Security. He did not disagree with many of the conclusions of the study but believed the Edwards Committee had not given serious enough consideration to, and potentially underestimated, the damage that would be caused by “atomic demolition weapons” employed for purposes of sabotage.[77]

The only negative response, not surprisingly, came from Rear Admiral W. G. Lalor (USN, Ret.), reporting the on behalf of the Joint Chiefs of Staff.[a] He stated that NSC-140/1 was too restricted and focused on "only one aspect of the over-all problem of effects of the possible courses of action with which the USSR may initiate war." While begrudgingly appreciating NSC-140/1 as a "valuable contribution to defense planning," the JCS believed that the report "does not constitute a sufficiently broad basis for planning for the over-all security of the United States."[78] The military seemed to be dragging its feet yet again when it came to supporting the idea of improved continental defenses, specifically early warning. While not hostile to these continental defense programs per se, it seemed that animosity arose when there was a threat to the funding of the offensive atomic retaliatory arm (SAC and, to a lesser degree, TAC) or a potential shift in defense policy not originating within the military

During the NSC meeting, after briefing the Council on NSC-140/1, Edwards proceeded to answer some questions posed to him by the president. Eisenhower asked whether a DEW Line was really a necessity. The answer must have pleased him, since the president commented on the importance of early warning to the effectiveness of our defenses, especially if at least two hours of warning could be effected. CIA Director Allen Dulles also spoke tangentially in favor of the need for tactical warning in response to a question by Roger M. Kyes, Deputy Secretary of Defense, about our intelligence capabilities to provide warning. Dulles stated that he "did not think that we would get any prior warning through intelligence channels of a Soviet sneak attack. Certainly there could be no guaranty [sic] of any such warning."[79] The DEW Line would be the radar system to provide the nation with the greatest amount of tactical warning.

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[a]It is important to note that the Joint Chiefs of Staff inherited by Eisenhower did not yet include any of Eisenhower's appointees as of May 1953.

The Edwards Committee also spent time calculating the attacker's losses in the event of an all-out Soviet attack in mid-1953 and again in mid-1955. Because of the primitive state of continental defenses, the United States would destroy only seven percent of the Soviet bomber force before it reached its intended targets. The committee estimated that two years later, with improved early warning and other defense improvements, twenty-seven percent of the Soviet bomber force would be destroyed. Again, these figures did not account for either the MCL or the DEW Line, both of which were not yet approved and could not be operational by mid-1955. Such miserably low percentages had to be improved, especially since the ordnance dropped would be atomic bombs. The entities that favored improved continental defenses found support for their stance in NSC-140/1.[80]

A week later, the NSC issued its first basic national security policy, circulated as NSC-153/1. The NSC Planning Board warned in their opening statement of the "Restatement of Basic National Security Policy [BSNP]" (NSC-153/1) that "there are two principal threats to the survival of fundamental values and institutions of the United States." These two dangers were:

> The formidable power and aggressive policy of the communist world led by the USSR [and] the serious weakening of the economy of the United States that may result from the cost of opposing the Soviet threat over a sustained period. The basic problem facing the United States is to strike a proper balance between the risks arising from these two threats.[81]

Observed in the above policy was Eisenhower's message repeated *ad nauseam* throughout the campaign, which was in fact a core belief held by the president: that the threat to American national security was *both* military and economic. Huntington surmised that Eisenhower considered "the economic threat was, if anything, more serious than the military."[82] Eisenhower noted that rising defense spending could only spell disaster and, if unchecked, would lead to either "spiraling inflation" or a "disastrous depression."[83] To avoid these calamities the defense budget thus had to be brought under control. The United States had to achieve and maintain a sound economy. The quality of life in America could be ruined in a state of financial disaster brought about by ever-increasing military expenditures, just as easily as it would be affected by war. Eisenhower also wanted to prevent the United States from becoming a garrison state, one in which all positive attributes of the American quality of life and freedoms were lost in the increasing militarization of American society. It would be ironic that the same defenses that the country was in the process of constructing to avoid defeat at the hands of the Soviets, would be, in the end, the reason for a collapse, economic or otherwise, of the United States. NSC-153/1 warned that operating under an unbalanced budget "over a long period of time would place the United States in danger of seriously weakening its economy and destroying the values and institutions which it is seeking to maintain."[84]

The Planning Staff noted in NSC-153/1 that a proper course of action was to undertake measures that would convince the Soviets that the risks associated with war with the United States were unacceptable. The United States must continue to improve its "offensive capability, particularly the capability to inflict massive damage on" the Soviet Union. Thus, the deterrent value of the atomic stockpile of the United States still had top priority in national strategy. However, a commitment to improve continental defenses was growing. U.S. security policy must "emphasize the development of a continental defense system, including early warning, adequate to prevent disaster and to make secure the mobilization base necessary to achieve U.S. victory in the event of war."[85] While not a direct endorsement of the DEW Line, the NSC in their BNSP supported the improvement of the early warning radar system, a move by the Eisenhower administration toward committing to the construction of the DEW line.

The Democratic Truman presidency had established both the Kelly and Edwards Committees, so it was not a big surprise when the new administration called for another air defense study on 1 June 1953. Defense Secretary Charles E. Wilson reflected the beliefs of other members of the administration when he stated that the membership of the committee would be "our own people."[86] The Continental Defense Committee (CDC) was headed by former Eisenhower staff officer and long-term associate General Harold R. Bull.[a] Bull had served on the Edwards Committee as the CIA representative thereby giving him some credibility as an air defense analyst. The president ordered the CDC to review the conclusions of the Kelly and Edwards reports and "study the present and future threat of air attack, and examine air defense measures under way and programmed . . . then recommend physical and organizational improvements necessary in the immediate future and estimate the cost."[87] The CDC's report was designated NSC-159 and submitted to the Council members on 22 July 1953.

NSC-159 emphasized that current air defense plans "were entirely inadequate" and the United States must spend between 18 and 25 billion dollars over the next five years in order to bring them quickly to an acceptable level.[88] The Bull Committee stated:

> the present continental defense programs are not now adequate either to prevent, neutralize or seriously deter the military or covert attacks, which the USSR is capable of launching, nor are they adequate to ensure the continuity of government, the continuity of production or the protect-tion of the industrial mobilization base and millions of citizens in our great and exposed metropolitan centers. This condition constitutes an unacceptable risk to our nation's survival. We are convinced that the nation must act now with speed and energy, using such of our resources as are available, to meet the potential threat, even though the threat may not materialize for several years.[89]

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[a] Other committee members included General Smith, the ADC vice commander (DOD representative) and representatives from the Office of Defense Mobilization (ODM), the Federal Civil Defense Administration (FCDA) and the Interdepartmental Committee on Intelligence and Security (ICIS).

As far as improvements to air defense, the Bull Committee gave the “highest priority” to the “Southern Canada early warning system, including its seaward extension.” The Southern Canada Line was the early name for what was eventually called the Mid-Canada Line. The DEW Line, or the Northern Canada early warning line, was given secondary priority, meaning it should be considered for implementation “if it proved practical.”[90] The report also favored “candor” with the American people about the prevailing dangers and the exact nature of the Soviet threat. Understanding the rationale behind the need for increased defense spending would make the American people more prone to accept these changes.

The report did not receive immediate attention from the NSC. The Council remained divided between those who wanted more funding and improvements for the continental defenses and those who were concerned that such an increase in defense spending would make the goal of a balanced budget well-nigh impossible. The former group included Vice President Richard M. Nixon, Secretary of State John F. Dulles, Under Secretary of State Walter Bedell Smith, and Mutual Security Administrator Harold Stassen. The bloc within the NSC against such an expensive defense program consisted of the Secretary of the Treasury George M. Humphrey and Budget Director Joseph M, Dodge.[91] Secretary of Defense Charles E. Wilson was somewhere in the middle, leaning perhaps toward the latter group, since many of the senior officers in the military questioned the necessity of the DEW Line. They were concerned that the continental defense program would likely take funding away from other military programs, which were already in the process of being pared down.

Other factors prevented the Bull Report from gaining an early hearing. The Joint Chiefs of Staff (JSC) was in the process of experiencing a major overhaul. By August the JSC looked remarkably different. Many of the members’ terms were expiring, and Eisenhower took the opportunity to place onto the JCS officers he believed would work towards his goal of decreasing spending without compromising security. Admiral Arthur W. Radford succeeded General Omar N. Bradley as Chairman; General Matthew B. Ridgway succeeded General J. Lawton Collins as Army chief of staff; General Nathan F. Twining succeeded Hoyt S. Vandenberg as Air Force chief of staff; Admiral Robert B. Carney became Chief of Naval Operations; General Lemuel C. Shepard, Jr., remained the Commandant of the USMC. The Chiefs of Staff who were being replaced reported to the NSC at the beginning of August that they did agree with improving the nation's continental air defenses but "urged . . . that improvements not be undertaken at the expense of more important requirements."[92] Discussion of the Bull Report in the NSC would have to wait until September, allowing time for the newly appointed JCS members to review the continental air defense problem.

On 11-12 July 1953, SAC took part in a major test of the nation's air defenses. Operation Tail Wind was a maneuver conducted by the USAF to assess the ability of U.S. continental defenses to intercept incoming bombers. The results of Operation Tail Wind ultimately proved the need for stronger continental defense measures. In these maneuvers, SAC attacked in two waves. One group of ninety-four bombers attacked at night, using all the advantages that a surprise night attack could provide. The second wave simulated a daylight attack with 108 bombers. In the night attack, only seven of the ninety-four bombers were intercepted before they reached their targets. Officials conducting the maneuver also surmised that all targets would have been destroyed. In the second attack the next day, 108 bombers simulated an attack. Twenty-nine of the thirty-eight SAC groups were intercepted, though the "attackers" minimized the use of defense measures. The Air Defense Command (ADC) and other military observers learned from the simulated attacks that "the air defense system needed better early warning, solid radar coverage from the ground to 50,000 feet, better interceptor armament to include atomic warheads and some automatic means of tying all these elements together."[93] Operation Tail Wind completely supported the conclusions of the Summer Study Group, the Edwards and Bull Committees, and all others who called for improved air defenses.

In mid-July the president ordered the new chiefs to undertake a review of the basic national strategy policy. On the 6-7 August, the new members of the JCS met aboard the official yacht of the Secretary of the Navy, the *Sequoia*, to finish the task assigned to them by Eisenhower in the middle of July. Their report stated that there were "certain deficiencies in the U.S. military situation" that needed to be resolved, including the most threatening elements to the nation's security— "air defense of the Continental U.S. vitals and our ability to retaliate swiftly and powerfully in the event we are attacked." Instead of continuing to accentuate a military policy that placed U.S. troops "on peripheral deployments overseas, to the neglect of our vitals in Continental United States," a new strategic policy would put continental defense "in the first priority" along with massive retaliation. These policies would improve the current situation without "seriously weakening the stability and durability of the national economy."[94] [a]

While the still divided NSC was waiting for the new JCS to be formed for further discussion of continental air defense improvements, scheduled for early September, the Soviet Union on 12 August 1953, detonated a thermonuclear device (hydrogen bomb) at Semipalatinsk. The United States had detonated its first hydrogen bomb only nine months earlier.[b]

The threat posed by the Soviet Union to the United States had increased exponentially. The new chairman of the JCS, Admiral Arthur W. Radford, announced during his first press

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[a]This changing defense policy with a greater emphasis on the new, more powerful generation of retaliatory nuclear weapons would become the basic feature of the so-called "New Look" policy.
[b]The United States detonated its first hydrogen bomb on 1 November 1952, on the Pacific Island Elugelab in the Eniwetok Atoll. Elugelab was vaporized by the hydrogen bomb explosion during Operation Ivy. A crater on the ocean floor is all that remains of the former island.

conference on 26 August that, since the Soviet Union now had the hydrogen bomb, the "United States must review and strengthen its air defenses."[95] The Soviet detonation of a hydrogen bomb by itself might have caused those who opposed improving the continental air defense system to modify their stance. However, when the nation's top military officer, Admiral Radford, made such a forceful statement, all opposition, military and civilian, virtually collapsed.

Eisenhower had appointed Admiral Radford knowing his overall strategic viewpoint accorded with the president's. This was par for a president adept at outmaneuvering those forces, especially in the military, who might have opposed the "New Look" strategy. The "New Look" included increasing SAC's size and strength, but for its deterrent value to be maximized, SAC needed a stronger continental air defense, including greater early warning. The plan that would provide SAC and other military and civil defense efforts with the greatest amount of warning was, in fact, the Distant Early Warning Line. Improved continental defenses, thus, became a critical component of Eisenhower's "New Look."

During the 24 September meeting of the NSC, the Bull Report, along with other continental defense studies, was extensively discussed.[a] Admiral Radford took the lead in discussing the various continental defense reports, providing Eisenhower with the views of the Joint Chiefs of Staff. Admiral Radford had questions on some technical issues that might affect the validity of some of the programs up for approval. Unknown to Radford was that technology then undergoing testing in Operation Corrode might address the issue he had raised. As mentioned in the previous chapter, an automated alarm system would soon prove workable,

[a] NSC-159 was the Bull Report; NSC-159/1 was a joint report by the Interdepartmental Intelligence Conference and the Interdepartmental Committee on Internal Security on continental defense; NSC-159/2 was a continental study by the JCS; and NSC-159/3 was a continental defense report prepared by the NSC Planning Board. All were discussed under item 2 "Continental Defense" during the 24 September 1953 meeting of the NSC.

minimizing the tedium experienced by radar operators, thereby eliminating the necessity for the efficiency studies suggested by Radford.

Another problem raised by Radford was the lack of trained personnel needed for the continental defense program envisioned in NSC-159. The expanded commitment to continental defense would place at a premium the retention of military personnel with certain technical proficiencies. Radford remarked during the 24 September NSC meeting that since the government did not have the authority "to hold military personnel in service," this might necessitate "a complete reappraisal of our total military capability." He continued, as summed up by S. Everett Gleason, Deputy Executive Secretary of the NSC:

> Actually, the problem of inadequate manpower, with respect to continental defense, was a more severe problem than finance or the budget. Even if we had all the funds we requested to do what we felt necessary . . . under existing arrangements we would just not have the trained people to carry out the program.[96a]

Again, the automated alarm system would alleviate the manpower requirements by greatly reducing the manpower needed at the radar stations. But the Arctic radar tests were not yet completed, so the military and civilian leadership forming defense policy did not yet have this information.

Arthur S. Flemming, director of the Office of Defense Mobilization (ODM), spoke next and voted in favor of expanding continental defense measures. Since the present status of U.S. defenses was less than adequate, he stated that he was "now convinced that the important thing was to get behind the total continental defense program. . . and that we should move ahead as rapidly a possible to develop the program in [NSC-159]. It was vital . . . to get ahead with an

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[a]This dissertation will return to this subject in a later chapter. It is worth noting here that the need for highly specialized personnel would be solved by manning the DEW Line with civilians, contracted under an American company under the aegis of the USAF.

early warning system."[97] If the required funding could not be garnered from the existing defense budget, then, he believed, it was of such importance that Congress should pass a supplemental appropriations bill.

Espousing the views of the other camp, Defense Secretary Wilson commented that even if the administration approved everything in NSC-159, a perfect defense system would still not materialize. He doubted the ultimate effectiveness of improved continental defense measures. It is unclear whether his opposition was rooted in support of pro-SAC elements in the military or based on fiscal concerns.

In the end, the supporters of improving the continental defenses of the nation won out. President Eisenhower approved what would become NSC-159/4, which specifically superseded NSC-139.[a] NSC-159/4 was truly a momentous event in the history of continental air defense. Air force historian Kenneth Schaffel in *The Emerging Shield* states that NSC-159/4 "was the first postwar air defense directive approved at every level of military command – at the presidential, at the Office of the Secretary of Defense, and at the JCS levels."[98] The improved continental air defense measures proved to be a key feature in the "New Look" strategy of President Eisenhower.

NSC-159/4 began with a general overview of the connection between continental defense and other elements of national security. The opening paragraph, similar to other NSC documents from 1953, stated the importance to the Free World of a United States that was not only militarily powerful but also "over the long pull." To maintain effective military power, the U.S. must strike a balance between its offensive and defensive components. The report continued,

> each . . . has its proper role in the defense of the vitals of America against attack and destruction. For example, our existing commit-

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[a]NSC-139 was approved by Truman, and called, for a rush program for constructing the DEW Line.

> ments to help in creating outposts of indigenous strength in NATO countries and in the Orient contribute to the defense of the continental United States as well as does the development of an early warning system in the Western Hemisphere.[99]

NSC-159/4 went on to say that in the past the United States had largely focused on "peripheral defense, offensive capabilities, and mobilization base" at the expense of continental defense. Under Eisenhower, this deficiency would be rectified, since the continental defense of the nation "is clearly inadequate."[100]

The National Security Council argued that Soviet thermonuclear capabilities placed top priority on the development of an early warning system. Improved defenses, including early warning, would help to deter Soviet aggression and would prevent or reduce the damage from a nuclear attack. NSC-159/4 also claimed that improved continental defenses improved continental defenses would allow the United States greater freedom of action in its strategy and would help to prevent the weakening of the morale of the American population.[101] It would seem that the authors of NSC-159/4 were asserting that improved defenses brought with it a psychological benefit. In an atmosphere of deteriorating relations between the Soviet Union and the United States, just having improved defenses might provide the American people with a greater sense of security against the horrendous consequences of a nuclear war.

The NSC recommended in the document that the Southern Canadian early warning system and its seaward extensions "be completed with all possible speed." Further, the Northern Canadian early warning line (DEW Line) should "be developed to a high state of readiness over the next two years," if proved practicable by the Arctic tests (Project Corrode). Such an early warning line was desirable, if not critical, to future continental defense measures, since the speed of future bombers would only increase.[102]

As the NSC approved the new continental defense policy, the Council also worked on reviewing the basic national security policy, prompted by the reorganized composition of the JCS and the Soviet detonation of a hydrogen bomb. While continental defense was not the focus of the new NSC policy, it had been extensively dealt with in NSC-159/4 and so was incorporated into NSC-162/2 as part of Eisenhower's "New Look" policy. At first glance NSC-162/2, outlining the Basic National Security Policy, seemed to include only the so-called "massive retaliation" strategy, the willingness by the United States to respond with the nuclear arsenal if attacked first. This document thus appeared to be a dramatic shift by the United States in favor of the offense, and minimizing the defense. So, while offensive military power certainly comprised a major aspect of the new national security policy and overshadowed the other elements of the New Look, namely continental defense, SAC's "massive retaliation" capability had to be protected to survive a first strike. Since there was no guarantee that the United States would receive strategic warning in the event of a Soviet nuclear attack, only the tactical warning provided by an improved continental radar system could provide the necessary alert. As the final paragraph of the basic national security policy, NSC-162/2, approved by Eisenhower on 30 October 1953, states:

> the foregone conclusions are valid only so long as the United States maintains a retaliatory capability that cannot be neutralized by a surprise Soviet attack. Therefore, there must be continuing examination and periodic report to the National Security Council in regard to the likelihood of such neutralization of U.S. retaliatory capability.[103]

Even in the highest governmental security policy statements, continental defense, especially early warning, developed into an essential component of overall U.S. strategy. NSC-159/4, the latest continental defense strategy statement, prioritized various components for improving defenses, and early warning was growing in significance.

The United States, however, could not implement an improved early warning system on its own. Necessary for this endeavor was Canadian assent. Since most of the proposed early warning systems would inevitability have to be placed on Canadian soil, Canada would have to be involved in the decision-making process. Even if Canada chose not to contribute materially or financially to the early warning lines, the United States must convince Canada of the severity of the Soviet threat and, at the very least, attain Canadian approval to build the radar sites on sovereign Canadian territory.

[1]Quote in John Herd Thompson and Stephen J. Randall, *Canada and the United States: Ambivalent Allies* (Athens: The University of Georgia Press, 1994), 190.

[2][http://www.eisenhowermemorial.org/legacyreport/military-legacy.htm] [7/20/05]

[3] *Public Papers of the Presidents of the United States.* Dwight D. Eisenhower, 1954 (Washington, DC: USGPO, 1960), 118.

[4]Robert J. Watson, *The Joint Chiefs of Staff and National Policy, 1953-1955,* Vol. V: History of the Joint Chiefs of Staff (Washington, DC: Joint Chiefs of Staff, 1986), 121; and Kenneth Schaffel, *The Emerging Shield: The Air Force and the Evolution of Continental Air Defense, 1945-1960* (Washington, DC: Office of Air Force History, 1991), 187.

[5]Michael K. Hawes, *Principle Power, Middle Power, Or Satellite?: Competing Perspectives in the Study of Canadian Foreign Policy* (Toronto: York University, 1984), 1.

[6]Adam Chapnick, "The Middle Power" *Canadian Foreign Policy* vol. 7, no. 2 (Winter 1999), 73.

[7]J. L . Granatstein, ed. *Canadian Foreign Policy Since 1945: Middle Power or Satellite?* (Toronto: The Copp Clark Publishing Company, 1969), 2.

[8]Chapnick, 78.

[9]Andrew F. Cooper, Richard A. Higgott and Kim Richard Nossal, "Niche Diplomacy: A Conceptual Overview" in Andrew F. Cooper, ed., *Niche Diplomacy: Middle Powers After the Cold War* (London: Macmillan Press, 1997), 19.

[10]Hawes, 5.

[11]R.G. Riddell, "The Role of the Middle Powers in the United Nations," Department of External Affairs, *Statements and Speeches*, 48/40, 22 June 1948, quoted in John W. Holmes, *The Shaping of Peace: Canada and the Search for World Order*, vol. 2 (Toronto: University of Toronto Press, 1982), 38.

[12]Chapnick, 77.

[13]R. J. Sutherland, "Canada's Long Term Strategic Situation," *International* Journal, XVII (Summer 1962) in A Defence Strategist Examines the Realities." in J. L . Granatstein, ed. *Canadian Foreign Policy Since 1945: Middle Power or Satellite?* (Toronto: The Copp Clark Publishing Company, 1969), 22.

[14]*Ibid*., 79.

[15]Donald C. Masters, *Canada World Affairs: 1953 to 1955* (Toronto: Oxford University Press, 1959), 12.

[16]Hawes, 22.

[17]Masters, 68.

[18] Holmes, 33.

[19]Trevor Lloyd, *Canada in World Affairs: 1957-1959* (Toronto: Oxford University Press, 1968), 14.

[20] J. L . Granatstein, ed. *Canadian Foreign Policy Since 1945*, 6.

[21] Adam Lajeunesse, "The Distant Early Warning Line and the Canadian Battle for Public Perception" *Canadian Military Journal* (Summer 2007), 51.

[22] *Ibid*., 54.

[23] *Documents on Canadian External Relations*, Vol. 20 (1954), Chapter V: Relations with the United States, Part 2, Arctic Sovereignty and Northern Development, Document 508, "28 May 1954 Policy Guidance Paper for Release of Information on the North." Retrieved 6 June 2009 from http://www.international.gc.ca/department/history-histoire/dcer/details-en.asp?intRefId=682.

[24] *Ibid*.

[25] Lajeunesse, 58 and Rob Huebert, "Walking and Talking Independence in the Canadian North," in Brian Bow and Patrick Lennox,eds., *An Independent Foreign Policy for Canada: Challenges and Choices for the Future* (Toronto: University of Toronto Press, 2008), 120.

[26] "14 March 1951 Memorandum for the Secretary of the Air Force", in Folder 17, Records of International Military Agencies, Permanent Joint Board on Defense, Canada – United States Section, Top Secret Correspondence, 1941-1956, Box 3, RG 333, National Archives II, College Park, Maryland.

[27] "12 March 1951 Memorandum for the Record: Extended Radar System in Canada," page 3, in Folder 17, Box 3, RG 333: Records of International Military Agencies, Permanent Joint Board on Defense, Canada – United States Section, Top Secret Correspondence, 1941-1956, National Archives II, College Park, Maryland.

[28] *Ibid.*, 2.

[29] C.L. Grant, *The Development of Continent Air Defense to 1 September 1954*, USAF Historical Studies No. 126 (Maxwell AFB: Air University, 1955?), 60; and Schaffel, 159. The 18 United States manned sites were divided between the Northeast Air Command (NEAC) and the Air Defense Command (ADC); the former operated 10 stations and the latter was responsible for 8. The Canadian sites were placed under the responsibility of the Royal Canadian Air Force (RCAF).

[30] *Documents on Canadian External Relations*, Vol. 17 (1951), Chapter VII: Relations with the United States, Part 1, Defence and Security issues, Section F, Torbay, Document 657, "24 April 1951 Memorandum from Minister of National Defence to Chiefs of Staff Committee." Retrieved 15 January 2005 from http://www.dfait-maeci.gc.ca/department/history/dcer/details-en.asp?intRefid=6097.

Another interesting manpower issue encroaching on U.S. and Canadian relations is the American use of African-American troops in Canada. In the document "Extract from Canadian Conclusions" dated 28 November 1952, "the United States wished to station army units in Canada for the manning of some of the radar stations and the units would include negroes integrated into white formations. They had enquired whether there would be any objection. There might well be objection to the stationing of negro units but it was difficult to take exception to units that included only a proportion of negroes. He [the minister of defense] suggested that the U.S. authorities be informed that the units could be brought in but they be asked informally to ensure that the proportion of negro personnel did not exceed ten percent." In *Documents on Canadian External Relations*, Vol. 18 (1952), Chapter VIII: Relations with the United States, Part 1: Defence Issues, Section C: Admission of Black Troops, Document 693, "28 November 1952 Extract from Cabinet Conclusions." Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=4189.

[31]*Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII: Relations with the United States, Part 4, Defence Issues, Section I, Distant Early warning System and Mid-Canada Line, Document 713, "Extract from the Journal of Permanent Joint Board on Defence." Retrieved 15 January 2005 from http://www.dfait-maeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2344.

[32] "22 January 1953 Canada-United States Channels of Communication and Military Planning," page 4-5, in Folder 18, Box 3, RG 333: Records of International Military Agencies, Permanent Joint Board on Defense, Canada – United States Section, Top Secret Correspondence, 1941-1956, National Archives II, College Park, Maryland.

[33]*Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII :Relations with the United States, Part 4, Defence Issues, Section I, Distant Early warning System and Mid-Canada Line, Document 713, "Extract from the Journal of Permanent Joint Board on Defence." Retrieved 15 January 2005 from http://www.dfait-maeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2344.

[34]*Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII :Relations with the United States, Part 4, Defence Issues, Section I, Distant Early warning System and Mid-Canada Line, Document 702, "28 April 1953 Chairman, Canadian Section, Permanent Joint Board on Defence." Retrieved 15 January 2005 from http://www.dfait-maeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2333.

[35]*Ibid.*

[36]*Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII: Relations with the United States, Part 4, Defence Issues, Section I, Distant Early warning System and Mid-Canada Line, Document 713, "Extract from the Journal of Permanent Joint Board on Defence." Retrieved 15 January 2005 from http://www.dfait-maeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2344.

[37]"22 January 1953 Canada-United States Channels of Communication and Military Planning," page 4-5, in Folder 18, Box 3, RG 333: Records of International Military Agencies, Permanent Joint Board on Defense, Canada – United States Section, Top Secret Correspondence, 1941-1956, National Archives II, College Park, Maryland.

[38]*Documents on Canadian External Relations*, Vol. 18 (1952), Chapter VIII: Relations with the United States, Part 1: Defence Issues, Section M: Project Lincoln, Document 758, "15 September 1952 Proposed Visit of U.S. Civilian Scientists to Resolute – "Project Lincoln." Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=4254.

[39]*Documents on Canadian External Relations*, Vol. 18 (1952), Chapter VIII: Relations with the United States, Part 1: Defence Issues, Section M: Project Lincoln, Document 759, "8 October 1952 Extract from Memorandum from Secretary of State for External Affairs to Cabinet Defence Committee." Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=4255.

[40]*Ibid.*

[41]"23 January 1953 Memorandum for the Canadian Section: Extension of Early Warning System", page 1, in Folder 19, Box 4, RG 333: Records of International Military Agencies, Permanent Joint Board on Defense, Canada – United States Section, Top Secret Correspondence, 1941-1956, National Archives II, College Park, Maryland.

[42]"30 January 1953 Letter from Acting Secretary of State, H. Freedman Matthews to Canadian Ambassador to U.S., Hume Wrong", in Folder 19, Box 4, RG 333: Records of International Military Agencies, Permanent Joint Board on Defense, Canada – United States Section, Top Secret Correspondence, 1941-1956, National Archives II, College Park, Maryland. A copy of this letter is also found in *Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII: Relations with the United States, Part 4: Defence Issues, Section I: Distant Early Warning

System and Mid-Canada Line, Document 696, Enclosure to "31 January 1953 State Department Note of January 30 Regarding US Proposals Concerning an Early Warning System in the Far North." Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2327.

[43]Note No. 163 can be found in *Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII: Relations with the United States, Part 4: Defence Issues, Section I: Distant Early Warning System and Mid-Canada Line, Document 700, Enclosure to "27 February 1953 Ambassador in United States to Secretary of State for External Affairs." Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2331.

[44]*Documents on Canadian External Relations*, Vol. 18 (1952), Chapter VIII: Relations with the United States, Part 1: Defence Issues, Section A: Defence Presence in Canada, Document 686, "9 July 1952 Memorandum from Defence Liaison (1) Division to Under-Secretary of State for External Affairs." Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=4182.

[45]*Documents on Canadian External Relations*, Vol. 18 (1952), Chapter VIII: Relations with the United States, Part 1: Defence Issues, Section J: Defence Relations in the North, Document 746, "31 December 1952 Memorandum from Under-Secretary of State for External Affairs to Secretary of State for External Affairs." Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=4241.

[46]*Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII: Relations with the United States, Part 4: Defence Issues, Section I: Distant Early Warning and Mid-Canada Line, Document 700, "27 February 1953 Ambassador in United States to Secretary of State for External Affairs, enclosure Note No 163" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2331.

[47]*Ibid.*

[48]*Ibid.*

[49]Joseph T. Jockel, *No Boundaries Upstairs: Canada, the United States, and the Origins of North American Air Defence, 1945-1958* (Vancouver: University of British Columbia Press, 1987): 71.

[50]*Foreign Relations of United States, 1952-1954* [abbreviated *FRUS*], II, pt. 1, "Memorandum by Carlton Savage of the Policy Planning Staff": 232.

[51]*Ibid.*, 233.

[52]*FRUS,* 1952-1954, II, pt.1, "Basic National Security Policies and Programs in Relation to Their Costs": 307

[53]*Ibid.*, 307-8.

[54]*FRUS,* 1952-1954, II, pt. 1, "Memorandum by Paul H. Nitze and Carlton Savage of the Policy Planning Staff": 318-323.

[55]*Ibid.*, 320.

[56]*Ibid.*, 321.

[57]*FRUS,* 1952-1954, II, Pt. 2, "Memorandum of Discussion at the 146th meeting of the National Security Council, Wednesday, May 27, 1953": 1171.

[58]*Ibid.,*1172.

[59]*Ibid., 1171.*

[60] *Ibid*., 1172.

[61]Watson, 118.

[62]Huntington, Samuel P., *The Common Defense: Strategic Programs in National Politics* (New York: Columbia University Press, 1961), 332.

[63]*Ibid*.

[64]*Ibid.*

[65]Grant, 67.

[66]Watson, 120.

[67]Jockel, 73.

[68]Watson, 120.

[69][Ff 31, Watson, 381.]

[70][Ff. 32, Watson, 381.]

[71]*FRUS, 1952-1954,* II, Pt. 1, "Report of the Special Evaluation Subcommittee of the National Security Council": 334.

[72]*Ibid.,* 340.

[73]*Ibid.,* 343.

[74]*Ibid*., 340.

[75]*Ibid.*, 346.

[76]*FRUS,* 1952-1954, II, Pt. 1, "[Enclosure 2] of Memorandum to the National Security Council by the Executive Secretary (Lay)":357.

[77]*FRUS,* 1952-1954, II, Pt. 1, "[Enclosures 3 & 4] of Memorandum to the National Security Council by the Executive Secretary (Lay)":357-360.

[78]*FRUS,* 1952-1954, II, Pt. 1, "[Enclosure 1] of Memorandum to the National Security Council by the Executive Secretary (Lay)":356.

[79]*FRUS,* 1952-1954, II, Pt. 1, "Memorandum of Discussion at the 148th Meeting of the National Security Council, Thursday, June 4, 1953": 369.

[80]Willard C. Matthias, *America's Strategic Blunders: Intelligence Analysis and National Security Policy, 1936-1991* (University Park: The Pennsylvania State University Press, 2001): 115-116. Matthais actually served on the Edwards Committee and provides and insider's view on the formulation of the report (NSC-140/1).

[81]*FRUS,* 1952-1954, II, pt. 1, "Statement of Policy by the National Security Council [enclosure] to Report to the National Security Council by the Executive Secretary (Lay)": 379.

[82]Huntington, 66.

[83]*Ibid.*

[84]*FRUS,* 1952-1954, II, pt. 1, "Statement of Policy by the National Security Council [enclosure] to Report to the National Security Council by the Executive Secretary (Lay)": 380.

[85]*Ibid.,* 382.

[86]Schaffel, 190; and Huntington, 332.

[87]Schaffel, 190.

[88]Richard F. McMullen, *Air Defense and National Policy, 1951-1957* ADC Historical Study No. 24: 44.

[89]Watson, 126.

[90]*Ibid.*

[91]Huntington, 331.

[92]Schaffel, 192.

[93]McMullen, 50-51.

[94]Watson, 18-19; and Huntington, 333.

[95]Huntington, 333; and McMullen, 44.

[96]*FRUS,* 1952-1954, II, pt. 1, "Memorandum of Discussion at the 163rd Meeting of the National Security Council, Thursday, September 24, 1953": 464.

[97]*Ibid.,* 471.

[98]Schaffel, 193.

[99]*FRUS*, 1952-1954, II, pt. 1, "NSC 159/4: Statement of Policy by the National Security Council: Continental Defense, September 25, 1953": 477.

[100]*Ibid.*

[101]*Ibid*., 479 and 482.

[102]*Ibid*., 483-485.

[103]*FRUS*, 1952-1954, II, pt. 1, "[Enclosure] NSC 162/2 Statement of Policy by the National Security Council, in Report to the National Security Council by the Executive Secretary (Lay)": 595-596.

CHAPTER 5 - Canadian Concerns about Continental Defense

By 1952 officials in the Canadian government were very well aware of the growing deliberation over the subject of continental defense by its powerful ally to the south. Many Canadian officials realized that the change of administrations as a result of the 1952 presidential election meant a potential change in U.S. military commitments, responsibilities and organization. On the subject of hemispheric or continental defense, a topic which most certainly would be addressed, any change in U.S. defense posture would have an impact on Canada. Just how much impact a likely change of continental defense policy would have on its sovereignty, its relations with the United States and its financial obligation concerned many Canadian officials.

These government officials hoped to pass on their concerns to those who implemented policy from the heads of the various departments of government all the way to the Canadian Prime Minister Louis St. Laurent. Through this correspondence many of the controversial issues surrounding joint-continental defense measures were discussed, debated, and analyzed, while possible options could be produced. This information allowed those at the decision-making level to consider many of the apprehensions (sovereignty and expenditures) of the specialists before putting into action plans that committed Canada to greater continental defense efforts with the United States.

The Canadian government did not sit idly by, allowing events in the United States totally to dictate policy during the years 1952-1954. After approving the Pinetree Line in 1951, Canada had become more guarded in its relationship with the United States. In the aftermath of World War II, the Canadian government seemed determine to reduce, if not eliminate, the American military presence in Canada. The Canadians had been successful in returning to a *status quo ante bellum* in Canadian-U.S. defense policy. With the integration of Newfoundland into

Canada on 31 March 1949, Canada yet again had to deal with a United States military presence on Canadian soil. Before it joined Canada as its tenth province, Newfoundland had extended to the United States several long-term base agreements. Canada reluctantly honored these arrangements but did not grant the United States any more long-term agreements based on the Newfoundland model.[1]

Between 1949 and 1952, Max H. Wershof, Head of the First Defence Liaison Division of the Department of External Affairs, observed that the U.S. requests for "closer cooperation in [the] joint defence of North America" had been progressively increasing. The United States wanted the use of a variety of installations on Canadian soil for weather, Loran, radar, and GLOBECOM[a] sites. Washington also desired a greater use of Frobisher Bay, a joint U.S.-Canadian base on Baffin Island to support the U.S. Air Force base at Thule, Greenland, and wanted to build an air base at Torbay. Sovereignty issues were involved in the American requests to set up a Northeast Command for SAC operations over Canadian air space, and there were questions about permission to intercept and fire upon unidentifiable aircraft over Canadian territory in the event of war.[2]

A letter from the Defence Liaison (1) Division[b] to the Under-Secretary for External Affairs stated that while increased cooperation with the United States in continental defense measures was unavoidable because of budgetary constraints, Canadian commitments abroad, and current joint defense agreements, Canada should adopt a new policy to guide its relationship with the United States. The primary principle of the new policy should be protecting Canadian sovereignty by minimizing U.S. presence on Canadian soil. The Defence Liaison (1) Division

[a] GLOBECOM, or Global Communication, was a system to enable direct, reliable, and long-range communications with Strategic Air Command bombers.
[b] The author of this memorandum is unclear. It is likely that the primary author of the memorandum was Max H. Wershof, Head, Defence Liaison (1) Division. The other likely candidate is W. H. Barton, Defence Liaison (1) Division.

accordingly recommended that the United States no longer be permitted any long-term leases of military bases; if a U.S. military occupation of bases became unavoidable, then the bases "should be joint enterprises, in which Canada ... maintain[s] command and control ... and avoid[s] entering into arrangements which would permit the stationing of U.S. forces in Canada and seek to liquidate existing arrangements permitting this."[3] The Defence Liaison (1) Division concluded that Canada should increase appropriations and personnel committed to its own territorial defense, despite the lack of concern about Canadian sovereignty or autonomy from other elements within the Canadian government, such as the Departments of National Defence and Finance, whose budgetary concerns often superceded other matters.[4]

The faint rumblings emanating from the United States about the need to improve continental defense, specifically the early warning system, were beginning to be heard within parts of the Canadian government. R. A. MacKay, Assistant Under-Secretary of State for External Affairs, received a letter from Max H. Wershof of Defence Liaison (1) Division discussing the MIT Summer Study Group's[a] recommendation for an early warning net in the Canadian Arctic. Materializing from this study was Project Lincoln, a feasibility study. There was already a healthy skepticism in parts of the Canadian government, specifically the Defence Research Board (DRB), about the soundness of an Arctic radar chain. The DRB had already conducted numerous tests and studies and came to the conclusion that it would be practicable to locate an early warning line across the 54th or 55th parallel, the future Mid-Canada Line, a line much further south than the more elaborate Arctic radar line proposed by the Summer Study Group. There was a worry "that the U.S. scheme could turn out to be as much of a fiasco as the LF 'Loran' project of a few years ago."[5] LORAN, an acronym for LOng RAnge Navigation,

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[a] The MIT Summer Study Groups recommendations are discussed in detail in Chapter 3.

was a system that used radio frequencies to determine ship or aircraft positions. The unreliability and problems of the system were numerous, largely due to atmospheric conditions, including weather, sunrises, sunsets, and magnetic storms all hindered the functioning of the LORAN system.

Canadian and American military officers and scientists discussed Project Lincoln on 7 December 1952, providing greater illumination about the nature of its conclusions. At this meeting a delegation from the United States comprised of military officers from all three services and representatives from the Lincoln and Bell Telephone Laboratories met with a Canadian delegation comprised of representatives from the Royal Canadian Air Force (RCAF) and the Defence Research Board (DRB). Walter Whitman, chairman of the U.S. Research and Development Board, headed the American section. The purpose of the meeting was to "facilitate an understanding of the project," and "no commitments were involved."[6] The U.S. delegation made it clear that this early warning system was in no way established policy, as there was still much disagreement within the U.S. government and armed forces on its feasibility, necessity, or exact function. However, by including Canadian territory within the testing area, it might become easier for the U.S. officials to convince Canadian officials to proceed with the full warning line once the results were positive, since the United States would already have its proverbial foot in the door of the Canadian Arctic.

An experimental radar chain built in the Arctic would be an essential step in determining the feasibility of the DEW Line. Project Lincoln emerged from the meeting as a joint test study, since Canadian officials would not accept a unilateral study by the United States on Canadian territory. While Canada would not provide any monetary assistance, Canada would contribute technical advice from the DRB and the RCAF. Plus, Canadian participation might prevent some of the familiar problems that occurred during the Second World War from arising, which were brought about by the increased presence of U.S. personnel on Canadian territory. In general, Canadian participation might help to rein in the behavior of the United States.

At this time there was still discussion about an Arctic radar line of two separate chains of stations, the conception of the Distant Early Warning (DEW) Line in the Summer Study. One chain would be located from the Mackenzie River delta in the west to Thule, Greenland. This more northerly chain would actually place radar stations on the various islands north of the continental landmass. The second chain would be along the Arctic coast until it connected to the chain along the coast of Labrador. The primary purpose of a DEW Line would be to detect enemy coming over the polar region and discern their direction and speed.[7]

A primary concern articulated at the meeting was a radar line located at that high latitude might be easily deceived. The problem was a lack of capacity for tracking incoming aircraft after the DEW Line had made the initial contact. Without this ability, "the information is so far forward that it would be of little help to the air defence forces, and . . . without other detecting devices in the area between it and the main air defence installations, it would be susceptible to false alarms if the Russians were to use parrying tactics."[8] Without other sort of detection lines between the DEW Line and the United States, hostile aircraft could get lost over the immense Canadian landmass and reappear anywhere, rendering a DEW Line all but ineffective. At best, it would provide only the initial warning of an impending attack, with little chance of being able to direct interceptors to make effective contact.

Realizing this, supporters of the DEW Line were pleased to learn that the Canadians were considering placing a detection system of their own along the 54th parallel.[a] Dr. O. M. Solandt,

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[a] When the Mid-Canada Line was constructed, it was actually located along the 55th parallel.

chairman of the DRB, discussed the Canadian experiments on technology that would permit the erection of a lower-cost, centrally located early warning line. This "poor man's early warning system"[9] might prove the key for making the proposed DEW Line a more realistic possibility. The proposed Canadian radar line would be placed north of the Pinetree Line, addressing the problem of those favoring building the defense network outward from the United States, since the Canadian radar chain would be between the Pinetree Line and the proposed DEW Line. The Mid-Canada Line would allow information acquired from the DEW Line to be put to more practical use, allowing more accuracy in the tracking of targets first detected by the DEW Line. With the existence of the Mid-Canada Line, the DEW Line no longer would be located where its detection capacity would be of limited usefulness.

The Canadians believed that the U.S. Air Defense Command was nervous over the proposals put forth by the Summer Study Group. It seemed as though the ADC was afraid of putting the proverbial cart before the horse. If the DEW Line went ahead with all possible speed, the U.S. Air Defense Command feared that it "would prejudice an attempt . . . to solicit Canadian support . . . [for the] immediate installation of the Canadian [MCL] chain."[10] While Benjamin Rogers from the Defence Liaison (1) Division expressed doubt that this was the actual thinking of members of the U.S. Air Defense Command, there is truth to the statement that the DEW Line would be a total waste of materiel and money, if it was not backed by other warning lines.

Canadians were naturally reticent about the growing interest of the United States in the Canadian Arctic. At the heart of Canadian apprehension was, again, a fear about an infringement on Canadian sovereignty in the Arctic. This was a recurrent theme up to and including the building and manning of the DEW Line. Robert Arthur John (R.A.J.) Phillips of the Privy

Council Office (PCO) sent two letters expressing his concerns to John Whitney Pickersgill, the Clerk of Privy Council, on the same day.

In his first letter, Phillips mentioned incidents in which U.S. armed forces operating in Canada overstepped their authority and violated proper protocol. In these events, the U.S. *modus operandi* was to treat Canada as an inferior entity, by not respecting Canadian sovereignty. One example, from 5 March 1952, involved an RCAF aircraft attempting to take photographs along the coast of Baffin Island. The USAF Air Base at Thule contacted the Canadian plane to ascertain its purpose. When the Americans learned that the aircraft had *Canadian* authority, they ordered the RCAF plane to desist immediately in its undertaking and to land at Thule, until the *proper* authority could be attained. Other incidents of concern were U.S. aircraft attempting to land in areas that they had not previously been granted permission to use, the crew of the U.S. Navy icebreaker *Barton Island* damaging an Inuit archaeological site, not allowing an RCAF aircraft to land at the U.S. installation at Frobisher, and not allowing a Canadian vessel to anchor at the USAF weather station at Padloping despite its location on Canadian territory.[11] These were only a few of the incidents that Canadians felt were an inappropriate encroachment on their sovereignty. Singularly, each event was not necessarily a threat to Canadian sovereignty; however, collectively they indicated a disturbing trend in the U.S. military presence in Canada. If left unchallenged, these infringements might lead to other impositions on Canadian sovereignty. By the early 1950s Canadians had allowed the United States to establish weather, LORAN, and GLOBECOM stations on Canadian territory. The latest agreement was the creation of the Pinetree Line, which placed a chain of radar sites on Canadian soil. While the United States and Canada maintained good relations up to this point in continental defense cooperation, sovereignty infringements might lead to a serious deterioration of United States-Canadian collaboration.

The second letter from Phillips of the PCO focused on U.S. projects under consideration that might bring large numbers of Americans to the Canadian Arctic. One such activity was Project Lincoln, in which the United States would want Canadian permission to establish a number of experimental radar stations in the Canadian Arctic. If the tests proved successful, the United States might then push for the creation of at least forty radar stations, predominantly manned by Americans, along the Arctic shore of the North American continent. Phillips already realized that if the United States was adamant about constructing the forty stations, "we may anticipate heavy pressure, both official and public, since the installations would be designed for the protection of North American cities."[12]

The potential threat to Canadian sovereignty in the Arctic was of particular concern, since the number of white Canadians occupying those regions was small. In the northern archipelago, the Canadians and Americans manning the various weather stations numbered fifty each. Any further activity that would increase American presence in the Arctic might put the Canadians in the minority. Phillips made a special point in stating that "our experiences since 1943 have indicated the extreme care which we must exercise to preserve Canadian sovereignty in remote areas where Canadian are outnumbered and outranked."[13] He next noted that Lester B. Pearson, Secretary of State for External Affairs, had privately commented that he expressed concerns about Canada's legal claim to certain regions of the Arctic. Pearson, according to Phillips, had stated, "if it [Canada's claim] must rely on discovery and continuous occupation, it may well be in the future that our claim to some relatively unexplored areas will be shaky indeed."[14]

While Phillips was not overly distressed that the United States might actually attempt to assert control over Arctic land claimed, but not occupied, by Canada, he was concerned about a "sort of *de facto* U.S. sovereignty which caused so much trouble in the last war and which might be exercised again." Again he alluded to incidents, some of which were mentioned above, that if made public might "embarrass the government."[15] The effect might be not only a loss of popular support for the Canadian government but a call for less cooperation in defense with their southern neighbor. Canadian officials, while wary of U.S. encroachments on its sovereignty, sought to avoid spending enormous sums that a more unilateral approach to continental defense would require.

The same concerns are found in a letter, dated 31 December 1952, from Dana L. Wilgress, Under-Secretary of State for External Affairs, to his superior Pearson. Wilgress outlined the program to "'re-Canadianize' the Arctic" after World War II. Placed under the authority of the Advisory Committee on Northern Development, re-Canadianization was "well on the way to completion by 1949" until the committee stopped the program at a meeting in December 1949, four months after the Soviet detonation of their first atomic bomb. If U.S. interest in the Arctic was to increase and some of the proposed projects materialized, then "there is every likelihood in the course of the next three or four years of a new influx of U.S. citizens to the Arctic." If the Canadian infrastructure (transportation and communication) failed to meet the needs of the growing number of Americans, the United States would provide these services, which would further increase American numbers.[16] With this possibility on the horizon, Wilgress asserted

> then it would seem now is the time to give serious consideration to the adoption at the highest level of a vigorous policy in all Canadian Arctic services including communications, transportation, aids to navigation, meteorology and police. I am of the opinion that it should

> be considered a matter of some urgency since past experience has shown that a lengthy period is required, when dealing with Arctic activities, to convert decisions into realities.[17]

In a marginal note, Lester B. Pearson agreed “100%” with Under-Secretary Wilgress’ conclusions.[18]

Pearson brought up these issues during a meeting of the Canadian Cabinet at the end of January 1953. Pearson warned Prime Minister Louis St. Laurent and the cabinet that, if the United States was to have a larger commitment in the Artic, which all evidence indicated, it “would . . . present greater risks of misunderstandings, incidents and infringements of Canadian sovereignty.”[19] Especially disconcerting would be the construction of the Arctic radar chain that would place at least forty stations on Canadian territory. Canadian officials were uneasy about the DEW Line’s estimated cost and manpower even though there was no certainty that it would be implemented. The figures projected at the beginning of 1953, later proven incorrect, were problematic, if not shocking by 1953 standards. The estimated construction cost of the Arctic enterprise was from $6 million to $15 million per radar station. The worst case scenario for the Canadians would have them assuming the entire expenditure, which they could not likely afford. However, assuming a responsibility for only a substantial part of the total capital outlay would still cause a serious financial burden to Canada, a burden that might be impossible to bear without cutting back other defense programs, redirecting current defensive efforts, or increasing defense spending.

Canadian estimates of personnel needed at the Arctic stations were based on the manpower requirements of the emerging Pinetree Line. Operating the Arctic radar sites with current radar technology would have required 100 to 300 people per station, depending on the size and function of the site.[20] These numbers might easily give Americans a numerical superiority in the Arctic. This alone might lead to increased tensions in bilateral relations should there be even a hint of American impropriety regarding Canadian sovereignty. Cooperation between the two nations was essential if improved continental defenses were to materialize; a domineering or unilateral U.S. stance would not pay dividends. At the beginning of 1953, Canadians did not believe in the immediacy of the Soviet threat to North America that Americans did. If the United States was going to obtain Canadian participation in continental defense, then the United States must persuade Canada that the situation was as perilous as they believed.

The proverbial shoe dropped on 30 January 1953, when the United States formally requested permission to build experimental radar stations in the Canadian Arctic. Four days earlier, on 26 January, the Permanent Joint Board on Defense (PJBD) had agreed that the testing of the Arctic radar line begin. Acting Secretary of State H. Freeman Mathews in a letter to Ambassador H. Hume Wrong, stated that "the details of the project [formerly Project Lincoln, now Project Counterchange] were presented for the information of the Canadian Members of the Board, who considered it vitally important that the matter be given prompt consideration by their Government."[21] Thus, the PJBD recommended that the United States send Canada a diplomatic note asking for approval of two test sites to be located on Canadian territory.[a] Mathews continued, "[T]hat there is an urgent necessity for an early warning system in the Far North needed to provide time to enable the Canadian and United States Governments to take appropriate measures for military and civil defense. A much earlier warning is required than can be given by the existing joint radar system."[22] To ascertain the feasibility of dependable radar operation in the Arctic, the United States wanted Canada to approve Project Counterchange, the

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[a] A third site was to be located in Alaska.

experimental stage of what would become the DEW Line. Along with permission to construct two[a] of the three experimental stations on Canadian territory, the United States requested:

> the approval of the Canadian Government to make preliminary site surveys . . . . Permission is also requested to make surveys concurrently for the selection of sites and to make preliminary arrangements for a permanent system, which it is planned to construct if the experiments prove successful and if it is desired to build the chain under mutually satisfactory agreement between the two governments. . . .
> The United States Government considers it urgent that the three experimental stations be installed during the coming open-navigation season in the Arctic. Therefore, the United States Government hopes that the approval of the Canadian Government can be received at an early date.[23]

The letter also stated that the United States would cover the complete expense of Project Counterchange but would welcome whatever assistance Canada was willing to contribute, whether it be financial or technical or both.

The Cabinet Defence Committee took up the American request on 10 February 1953. The Canadian military officials approved Project Counterchange subject to American acceptance of some stipulations. The United States had to agree that:

> [1] The project would be regarded entirely as experimental, and approval of the project would involve no commitment whatsoever to the Canadian government to give favourable consideration to a permanent Radar chain across the Canadian Arctic;
> [2] There would be full Canadian participation at all levels;
> [3] Project Counterchange would be both a technical trial and an operational evaluation of the scheme;
> [4] The Canada-United States Military Study Group[b] [be established];
> [5] All sites in Canadian territory would be subject to explicit approval by Canada.
> [6] Canada would bear no financial responsibility for the cost of constructing the stations or of providing or installing the equipment;
> [7] Conditions for ownership of land, building and equipment on Canadian sites would be [the same as the terms established for the Pinetree radar line].[24]

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[a] Herschel Island and Aklavik were the sites of the two experimental stations in the western Canadian Arctic. The station on United States territory was Barter Island, Alaska. The United States made it clear that, if the DEW Line was implemented, these experimental stations would become operational stations within the DEW Line.
[b] See Chapter three for information on the Joint Military Study Group.

The Canadian Cabinet agreed to the Cabinet Defence Committee's proposed response and, with minor modifications, had Ambassador H. Hume Wrong deliver Canada Note 163 to the U.S. Department of State on 27 February. On the same day, Brooke Claxton, Canadian Minister of National Defence, met with his American counterpart in the new Eisenhower administration, Secretary of Defense Charles E. Wilson, in Washington, D.C. Other high-ranking Defense Department officials and military officers were in attendance, including Walter Bedell Smith representing the Department of State.

During this meeting Project Counterchange came up. Secretary Wilson and the others "were well aware of [Counterchange] and were acting on the assumption that it was urgent and important,"[25] according to Claxton's memorandum evaluating the meeting. Minister Claxton's memo provides an interesting insight into the differing views within the Canadian government. Claxton reported that he had said "we were by no means persuaded that the proposed additional screen would add sufficiently to our defence to justify the expenditures of money and manpower."[26] This view of the National Defence Department is not surprising, considering they were responsible for Canada's overall defense policy. Canada, because of its smaller military budget and the smaller size of its armed forces, had to be more selective with its manpower commitments and defense programs. In addition to this already crucial problem was the obstacle that specially trained personnel were required to operate the radar chain. Technicians would have to be trained in the high-tech field of radar operation. There was a scarcity of this type of highly skilled serviceman in the Canadian armed forces.[a]

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[a] The scarcity of highly trained technicians and radar specialists was not a problem unique to the Canadian military. The United States armed forces also had to worry about too few technically trained servicemen. Making matters worse, servicemen acquiring these skills were not as likely to re-enlist.

Minister of Defence Claxton was particularly concerned by the recent change of administration in the United States. Many of the American policymakers seemed to be novices on the issue of early warning. Specifically, he was surprised by the response he received from the American delegation when he hypothesized "that the appearance of a single identified aircraft might result in our alerting all of [the] North America[n] [defenses] . . . This idea had not been suggested to them before." Claxton recognized that Wilson and many others did not know the history that led up to Project Counterchange. Frank Nash, Deputy Secretary of Defense, who also served under the former Secretary of Defense Robert A. Lovett, intimated that the previous defense secretary "had been skeptical of the plan and critical of the way in which it had been pressed forward."[a][27] Claxton, along with other like-minded high ranking Canadian officials, might make the immediate approval of the DEW Line far from a sure thing until more of the uncertainties could be worked out.

As implementation of Project Counterchange began, other continental defense studies[b] initiated under the authority of Eisenhower supplemented Project Counter-change—a reflection of the changing institutional psyche towards defense. Under Eisenhower, concern for fiscal responsibility in defense spending was of principal interest to the president, providing forces necessary to deter Soviet attack, either in Europe or North America, were maintained. As Eisenhower's military strategy, the "New Look," was taking shape throughout 1953, it was becoming clear that the Strategic Air Command (SAC) as a nuclear deterrent would assume primary importance. To strengthen SAC as a deterrent, continental defenses must be greatly improved. A year into his presidency, Eisenhower had developed a clearer picture of the New Look, along with the ideology on which to justify his national security policy.

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[a] The process is discussed in chapter 3.
[b] Chapter 4 discusses in detail the work of these committees and their results.

In his Annual Budget Message to Congress in January 1954, discussing the upcoming expenditures for fiscal year 1955 (ending 30 June 1955), Eisenhower made the economic policy of his presidency very explicit. He emphasized that military spending must stabilize, only then could military spending be ultimately reduced so it would not wreck the economic health of the country. Eisenhower stated,

> The previous history of our military budgets has been one of feast or famine, depending upon the state of world affairs. In peacetime, appropriations have customarily been much reduced. In wartime, financial considerations have been largely ignored. Our present budgetary plans represent a departure from those practices. They provide for the continued maintenance of a strong military force which is within the financial capability of a sound economy. We cannot afford to build military strength by sacrificing economic strength. We must keep strong in all aspects.[28]

A part of the military expenditures needed to buttress a "sustained military capability at the lowest possible cost is an integrated plan for continental and civil defense . . . in order to hold our civilian losses from possible enemy attack to a minimum." By the beginning of 1954, the skeleton of the New Look was in place. Included in Eisenhower's overall strategy was the need for improved continental defenses. While the DEW Line's future was not yet assured, largely since the feasibility studies of Project Counterchange (now Project Corrode) were not concluded, Eisenhower made it unequivocal in his budgetary address to Congress that:

> Funds are included in the Department of Defense budget to expand the system of continental defense which coordinates the actions of our radar outposts and our air, naval, and land forces. It will provide early warning of enemy attack and the men and equipment to resist any such attack.[29]

While not committed specifically to the DEW Line, the Eisenhower administration could incorporate it nicely into the improved continental defenses system, if proved practicable. One of the major features of Eisenhower's New Look policy was an increased commitment to continental defense programs that were in significant need of improvement. Throughout 1953 and into 1954, the foundation was set for the incorporation of improved early warning capabilities within Eisenhower's developing New Look strategy. At the same time Canada recognized that the United States intended to promote greater cooperative efforts for the defense of North America. The Canadian government had to worry increasingly about how these continental defense measures would affect the highly sensitive issues of sovereignty and military spending. As governmental officials, military personnel and a variety of committees continued to struggle to formulate continental defense policies and programs, the deliberation and debate eventually spilled into the public forum.

[1]*Documents on Canadian External Relations*, Vol. 18 (1952), Chapter VIII: Relations with the United States, Part 1: Defence Issues, Section A: Defence Presence in Canada, Document 686, "9 July 1952 Memorandum from Defence Liaison (1) Division to Under-Secretary of State for External Affairs." Retrieved 9 October 2003 from
http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=4182

[2]*Ibid.*

[3]*Ibid.*

[4]*Ibid.*

[5]*Documents on Canadian External Relations*, Vol. 18 (1952), Chapter VIII: Relations with the United States, Part 1: Defence Issues, Section M: Project Lincoln, Document 761, "11 October 1952 Memorandum from Defence Liaison (1) Division to Assistant Under-Secretary of State for External Affairs." Retrieved 9 October 2003 from
http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=4257

[6] *Documents on Canadian External Relations*, Vol. 18 (1952), Chapter VIII: Relations with the United States, Part 1: Defence Issues, Section M: Project Lincoln, Document 765, "9 December 1952 Memorandum from Defence Liaison (1) Division to Acting Under-Secretary of State for External Affairs." Retrieved 9 October 2003 from
http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=4261

[7] *Ibid.*

[8] *Ibid.*

[9] *Ibid.*

[10]*Ibid.*

[11] *Documents on Canadian External Relations*, Vol. 18 (1952), Chapter VIII: Relations with the United States, Part 1: Defence Issues, Section J: Defence Relations in the North, Document 743, "29 December 1952 Note from Privy Council Office to Clerk of Privy Council." Retrieved 9 October 2003 from
http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=4239

[12] *Documents on Canadian External Relations*, Vol. 18 (1952), Chapter VIII: Relations with the United States, Part 1: Defence Issues, Section J: Defence Relations in the North, Document 744, "29 December 1952 Memorandum from Privy Council Office to Clerk of Privy Council." Retrieved 9 October 2003 from
http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=4240

[13] *Ibid.*

[14] *Ibid.*

[15] *Ibid.*

[16] *Documents on Canadian External Relations*, Vol. 18 (1952), Chapter VIII: Relations with the United States, Part 1: Defence Issues, Section J: Defence Relations in the North, Document 745, "31 December 1952 Memorandum from Under-Secretary of State for External Affairs to Secretary of State for External Affairs" Retrieved 9 October 2003 from

http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=4241

[17] *Ibid.*

[18] *Ibid.*

[19] *Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII: Relations with the United States, Part 4: Defence Issues, Section H: Arctic Sovereignty, Document 694, "21 January 1953 Draft Memorandum from Secretary of State for External Affairs to Cabinet" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2325

[20] *Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII: Relations with the United States, Part 4: Defence Issues, Section H: Arctic Sovereignty, Document 695, "22 January 1953 Extract from Cabinet Conclusions" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2326

[21] *Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII: Relations with the United States, Part 4: Defence Issues, Section I: Distant Early Warning System and Mid-Canada Line, Document 696, "31 January 1953 Ambassador in United States to Secretary of State for External Affairs" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2327

[22] *Ibid.*

[23] *Ibid.*

[24] *Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII: Relations with the United States, Part 4: Defence Issues, Section I: Distant Early Warning System and Mid-Canada Line, Document 698, "10 February 1953 Record of Cabinet Defence Committee Decision" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2329

[25] *Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII: Relations with the United States, Part 4: Defence Issues, Section I: Distant Early Warning System and Mid-Canada Line, Document 701, "10 March 1953 Extract from Memorandum by Minister of National Defence" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2332

[26] *Ibid.*

[27] *Ibid.*

[28]"Annual Budget Message to Congress: Fiscal Year 1955" in *Public Papers of the Presidents of the United States: Dwight D. Eisenhower, 1954* (Washington, DC: The Office of the Federal Register (USGPO), 1960), 118.

[29] *Ibid.,* 119 and 120.

CHAPTER 6 - The DEW Line and Public Opinion

During 1953 and 1954, much discussion on continental defense began appearing in American journals, newspapers and books. Everybody from journalists and scientists to retired military and government officials believed it necessary to impart his wisdom and views on the growing dialogue over continental defense. Specifically under debate was the DEW Line. Unlike the Truman Administration, where the discussion of improved continental defenses was done in secret, under Eisenhower the discussion of the DEW Line and other continental defense measures appeared in a public forum. Public opinion helped to put pressure on both the military and governmental decision-makers, influencing the outcome of the debate on the DEW Line. Canadian officials became aware and somewhat concerned about the growing public debates over continental defense issues, especially those that might bring Canada into closer defense agreements with the United States or bring a greater U.S. presence onto Canadian territory.

The authors of these articles wanted their views to influence public opinion, especially if the traditional route did not provide results, then their arguments augmented with popular support would give the necessary push to the Eisenhower administration to change its views on the role of early warning in continental defense. Many of the civilian scientists who had taken part in the M.I.T. Summer Study Group did not think that the United States military, particularly the Air Force, assigned a high enough priority to continental defense. Armed with the conclusions and recommendations of the Summer Study Group, some of the scientists and journalists took up its mantra for improving early warning defenses and brought it to the public's attention.

The United States Air Force's (USAF) primary concern was funding the Strategic Air Command (SAC) at all cost; all other defense programs were a distant second. The Air Force viewed SAC, with its ability to deliver a multitude of atomic and later, thermonuclear bombs on the Soviet Union, as the nation's foremost deterrent. In this view, any programs strengthening continental defense could divert critical financial resources away from SAC. Most defense programs, then, that would compete for funding with SAC would encounter hostility from USAF. Writing in the mid-1950s, political scientist Roger Hilsman, a specialist in national security issues, contended that "Air Force officers" since World War II, "have tended to oppose air defense measures as an unnecessary diversion from a big bomber program."[1] Continental defense historian Kenneth Schaffel supported this view. He maintained that, "historically, American airmen had assigned defense a place distinctly secondary to strategic offense in their list of priorities."[2]

In defending SAC's overwhelming budgetary dominance, the civilian and military leadership of USAF did not want to sacrifice national security by pouring highly-coveted funds into the unproven and risky venture of an Arctic early warning radar line, especially if these defensive measures would come at the expense of SAC's funding. The United States Air Staff believed that in the case that early warning and other continental defense measures did not live up to their potential, the nation would be worse off. But scientists believed that technological advances were possible to construct a reliable early warning radar chain in the Arctic, and so they saw the USAF's resistance to spending on continental defense as an attempt simply to hoard military funding for SAC.[3]

The blending of military and foreign policy largely due to nuclear weapons held by the United States and the Soviet Union during the early 1950s called for a reevaluation of overall strategy—a strategy that would take into account this growing interdepen-dence. Air Force historian Mike Worden argues that, when asked "to consider a wide range of domestic and international economic and political factors" in formulating strategy, "Air Force senior leaders generally refused and provided strictly professional military advice that protected Air Force interests."[4] These interests included the primary concerns of protecting the funding and position of SAC. Many of the senior officers of the Air Force came from the ranks of World War II bomber pilots, and they tended to support that part of the service they knew best, strategic bombing. Their experience, coupled with what Worden classifies as a lack of "extensive professional schooling," combined to produce an Air Force leadership whose view of an overall defense policy was severely narrow-minded.[5] Because everything centered on the strategic air arm of their service, this limited view prevented them from fully appreciating other important elements of defense policy. Worden believes these limitations "encouraged more extensive incursions by educated civilians in the formulation of defense policy."[6]

Scientists came to play a lead in debating continental defense issues, especially in the debate over the practicality of the Distant Early Warning Line. This is because nuclear weapons helped blur the distinction between military and foreign policy. By questioning the formulators of military strategy because of the growing complexity of defense issues, scientists and others, including journalists, began to formulate ideas of what constituted proper U.S. military strategy and were more willing to challenge the military establishment. The proponents of improved continental defense measures turned to the media to unleash their criticism against a military, who in their opinion, did not give priority to improving continental defense measures. They hoped that the media would be able to rouse public opinion in their favor.

In March 1953, a *New York Times* article discussed some of the recommendations of the Summer Study Group under the heading "20 Billions Proposed for U.S. Air Defense." The study, the article said, "stresses the vulnerability of American metropolitan centers to air attack, and urges the importance of acting soon to protect them. It emphasizes Russia's growing strength, not only in atomic weapons but in intercontinental bombers to transport them." There was a tremendous lack of defensive capability to face this growing threat. The article mentions that USAF had been forced to acknowledge the seriousness of the threat, but as yet had not enacted the recommended strategy formulated by the Summer Study Group. The article went on to note that there was a division on "whether emphasis should be placed on defenses, or our ability to strike, and a compromise that would strike a balance is being sought . . . [but] to be adequately defended in an age of jet planes and atomic weapons, there must be developed the best possible 'early warning' system." The only drawback was that a radar system would be terribly expensive, built "in the remote Continental reaches," and the technology for a warning net was not yet available.[7]

Joseph and Stewart Alsop, syndicated columnists writing mainly for the *New York Herald Tribune*, became the nation's foremost journalists advocating improvement of the nation's early warning system. In a series of newspaper articles in March, they emphasized the vulnerability of defenses of the United States. Joseph Alsop wrote that "this country will be naked and open to a devastating Soviet air atomic attack within two years time."[8] The Alsops were urging a quicker effort to rectify these deficiencies, while other journalists, such as Charles J. V. Murphy of *Fortune* and Hanson Baldwin of the *New York Times*, recommended a slower approach for improving continental air defenses.[9]

The *Saturday Evening Post* published an article by Ralph E. Lapp and Stewart Alsop describing the improvement of continental defenses as necessary. Under the title "We Can Smash the Red A-Bombers," a lead-in to the article stated, "If the Russians launched a transpolar attack tomorrow, we'd be lucky to stop one out of three of their planes. But there is a way for us to be sure of destroying 85%--even 95%--of the attacking force, say the scientists. Here is their proposal."[10] Although the article was an overly optimistic vision of the success that improved defenses might reap, it was a sensationalist means of bringing the continental defense debate to the public. Emphasizing that greater expenditures for continental defenses were a must and that technology had matured so that money appropriated for such measures would not be a wasted endeavor, the authors pointed out that more successful defense was now possible.

A number of scientists were cited in the article to provide credibility to the authors' argument. Dr. Lloyd V. Berkner,[a] a radar specialist, stated that American military leaders projected that only a 20-30% destruction rate could be achieved with the current defenses. Thus "we are highly vulnerable to air attack . . . we can call upon science to help us. Up to two years ago no one was willing to say that an effective defense could be made . . . but [recent] technological break-throughs . . . might make a sound defense reasonable and possible." The authors stated that their conclusion were a "rebellion of American scientists" against those who do not believe that the United States can be defended against Soviet atomic bombs.[11] Presumably, the "rebellion" was against "collusion between USAF and the Department of Defense to thwart construction of an effective air defense network, with the safety and well-being of the nation at stake."[12] Because elements within USAF were primarily interested in protecting SAC as the nation's principal deterrent, all defense projects that might decrease SAC's funding were automatically received with hesitation and skepticism, if not with outright hostility.

The authors pointed out that "there is no villain in our story . . . the Air Force has not been indifferent to the danger," and since the technology did not exist in the past to erect

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[a] Berkner at this time was president of Associated Universities, Inc., which operates the Brookhaven National Laboratory on Long Island for the Atomic Energy Commission.

adequate defenses, USAF leadership did not attempt a truly "leakproof air defense." However, with the development of improved technologies, there was now a pronounced skepticism by USAF generals about implementing the improved defenses advocated by the pro-continental defense faction of scientists.[a] The SAC officials and other supporters emphasized that American security was "the power to retaliate overwhelmingly against any Soviet aggression . . . .They fear . . . the power to retaliate will be disastrously neglected if great sums are spent on defense."[13] According to Lapp and Alsop, USAF policymakers, despite their vehement support of SAC, were beginning to lose ground with the administration and Americans became suspicious of their claims.

Lapp and Alsop brought into their article many of the conclusions of the M.I.T. Summer Study Group and emphasized the improvements in the field of radar technology allowing for effective operation under Arctic conditions. With a cost of approximately $200,000,000, "the whole system can be made practically leakproof . . . . The difference between fifteen minutes and four hours [of warning] is the difference between a fake civil defense and a real civil defense, which can save millions of lives."[14] Other improvements to be implemented in a more reliable continental defense were discussed in the article. Finally, they stated that with the "very-early-warning" combined with improvements throughout the defensive network, scientists predict that they can destroy nearly 95% of an attacking bombing fleet, while greatly decreasing the number of American civilian casualties. The scientists' beliefs, accepted by the authors, were that, while a Soviet attack would be devastating, it still would not "cripple the United States." Since the Soviet Union could not obtain a decisive victory in an attack, "this is why the new kind of air defense proposed by the scientists may offer the best real hope of peace the world has known for

[a] The scientific community did not speak in a unified voice. Many scientists favored mutual disarmament, not a build-up of continental defense systems, as the best means of preserving peace.

a very long time."[15] A newly upgraded continental defense, with the key of providing early warning, would supplement the deterrent value of SAC, while at the same time offering greater protection to the retaliatory arm of the United States military.

The Alsops' pro-early warning views began to be disparaged in a series of short essays that saturated the nation. *Time* magazine, a rival of the *Saturday Evening Post* and had opposing political ties, ran an editorial response to the Alsops' newspaper articles claiming that the Alsops exaggerated the importance that the Summer Study Group's recommendations were having on the Eisenhower's administration determination of defense policy. The *Time* editors rebutted the Alsops' portrayal of Eisenhower, who, in their depiction, was "unable to sleep at night as he wrestled with a problem which might end in 'the physical and final destruction of this republic;'" presumably Eisenhower was considering whether to adopt the Summer Study Group's recommendation. The editorial contested this observation by citing Eisenhower's own press conference remarks that he never analyzed the report or its conclusions "in detail."[16]

To further discredit the Alsops' judgment of the impact of the Summer Study Group's conclusions on the Eisenhower administration, the article mentioned that "Project Lincoln[a] is only one of several air-defense studies, none of which is under active consideration." The editorial staff claimed that the Alsops' embellishment of the impact the Summer Study Group's conclusions had on President Eisenhower would, under proper scrutiny, "collapse like a pricked balloon."[17]

The article's author, though, did agree that the argument that the "U.S. strategists would want to buy bombers rather than [fund] . . . a more elaborate air-warning and air-defense system," since there was no assurance that a reliable and effective defense against atomic attack

[a] Project Lincoln is another name for the M.I.T. Summer Study Group in 1952.

was possible. This offensive-minded stance was reiterated by an air force officer who downplayed the effectiveness of such a defense by comparing it to the Maginot Line, a testament to the cost and ineffectiveness of defense. The article concluded that the optimum counter to the threat of a Soviet atomic attack "is to be ready to hurt the enemy more than he can hurt the U.S. 'A Maginot Line on the ground is bad enough,' said one Air Force officer last week. 'There isn't any line you can hold in the air.'"[18] Journalists were just as divided on the issue of improved continental defenses, including early warning, as were military, governmental and scientific communities.

The Alsops countered at the first opportunity to this attack on their credibility. In an article in *Time*, they noted that during five of the last seven National Security Council (NSC) meetings, the conclusions of the Summer Study Group were not only on the agenda but were also discussed. They mentioned as well the other air defense studies that were being conducted under the authority of the president, such as the Kelly and Edwards committees. In their rebuttal, the Alsops claimed to be aghast at *Time* magazine's blasé attitude, charging that the *Time* editorial staff had "dimiss[ed] as trivial and inconsequential a problem that is enormous and urgent." The Alsop brothers believed that the magazine's nonchalant stance on the air defense debate meant that *Time* supported the viewpoint of USAF. Further, the Alsops emphasized the hostile view on air defense held by USAF:

> the Lincoln report bypassed the Air Force, and was presented directly to the National Security Council and the White House. As we also stated, the air generals not only resent this "end run"; they also have a professional deformation on the subject of air defense. They say: "Offense is the best defense." They warn against a "Maginot Line of the air." What they really mean is that air defense may compete, especially for appropriations, with the Strategic Air Command.[19]

This searing indictment by the Alsops placed the blame for the inadequacies of the continental defenses squarely on the shoulders of the USAF leadership. This anti-Air Force view was quite different from that presented in Stewart Alsop's article in the *Saturday Evening Post* less than a month earlier, in which "there is no villain" in the story of why the United States air defenses were in a dismal state. The Alsops were now willing to call out the pro-SAC elements within the USAF as the major reason U.S. continental defense improvements were being hindered.

The Alsops attacked the offensive-only strategy and believed that too many well placed Air Force generals were its champions. The Alsops contended that focusing on such an offensive strategy, to the detriment of the defense, could only be justified if the United States planned to launch a preemptive first strike with SAC. A preemptive strike, however, was not the established protocol in 1954, and thus, in the event of war, the first strike would likely be launched by the Soviet Union. The Alsops asserted:

> If we have no air defense, we thus concede to the enemy the opportunity to devastate our cities and our industry, and perhaps to cripple the Strategic Air Command itself by destroying its bases. If we have no air defense, we are only to retaliate after being devastated. Surely this cannot be accepted.[20]

After the Alsops' rebuttal article, the editors replied, "*Time* does not dismiss as 'trivial and inconsequential' the problem of defense and counterattack against Russia," but they thought that "a group of scientists [does not] necessarily know more about air defense than the military, nor [do they] believe that the U.S. will vanish from the earth in two years unless it adopts Project Lincoln."[21] Over the next year, the Alsops continued to emphasize the deficiencies in continental defenses.

William L. Laurence, in an article appearing in the *New York Times* at the beginning of May 1953, featured the views and opinions of Dr. Lloyd V. Berkner. At the annual meeting of the American Physical Society, the scientists who had participated in creating nuclear weapons were asked to tackle the familiar dilemma of defenses that were inadequate to counter effectively the delivery of nuclear weapons. Berkner asked his fellow scientists to "restore the balance between the offensive and defensive capabilities." He explained that the military was putting too much emphasis on offense weapons while neglecting appropriate defense measures to counter the increasing destructive of nuclear weapons, "to put it bluntly . . . the United States has acquired a terrific punch with which to meet an all-out war; but it has at the same time acquired a 'glass jaw' because of its own vulnerability to atomic attack . . . We are told by some of our military leaders that all we need is a striking force so powerful that no enemy would dare take us on. This is curious talk for a nation with a 'glass jaw.' Have we forgotten Pearl Harbor?"[22]

The pro-defense scientists and journalists argued that the military leadership was too conservative and not amenable to spending highly coveted funds on improving the technologies needed to establish effective continental defenses. Laurence records Dr. Berkner's thoughts:

> If we are to produce a respectable air defense, we must have the opportunity to develop and test radically new weapons and systems concepts . . . but there is not the general atmosphere in the military establishment, and the conviction on the part of military people in high places, that can initiate the vigorous program needed in our present situation . . . [The problem is that] funds under military control are not made available for the creation of new and imaginative solutions. There is ample evidence that really significant undertakings will not be sponsored by the military except in the event of dire emergency. But when the emergency arrives in this atomic age, it will be too late, for development takes time.[23]

One of the nation's foremost scientific minds joined in the debate on continental defense in articles published in June and July 1953. Dr. J. Robert Oppenheimer, a proponent of Candor,[a] in an interview conducted by Gertrude Samuels published in *New York Times Magazine*, argued that the American people must understand the devastating destruction potential of the present nuclear weapons. Oppenheimer declared that if people knew the truth of the "dangers and choices confronting them," they would have a greater confidence and strength. A crucial element in providing a greater confidence to the American people would be improving defenses against atomic weapons. The government must provide "'the best reasonable defenses against the atom.' The United States and, indeed, the whole free world lacks [*sic*] reasonable defensive measures against the atom."[24] Samuels also mentioned in the article that the debate on how, or whether, to improve continental defense was bitter. In describing Oppenheimer's support in being honest with the American people and his dismissal of the notion that too much information might cause panic or plummeting morale, the article said Oppenheimer "does not believe that candor will produce panic any more than ignorance produces security."[25]

Oppenheimer also described both the offensive power of SAC and improved defense against atomic attack as necessary. SAC and improved defenses would act in combination to provide a greater deterrent against Soviet aggression. While in the past it might have been nearly impossible to put up an effective defense against air attack, but with improved technological developments, Oppenheimer and other scientists believed that a defense was possible. Oppenheimer was under no illusions about the perfectibility of such a defense, even with the technological improvements, but argued in favor of a "reasonable defense against the atom."[26]

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[a] As mentioned in Chapter IV, Operation Candor, was a program debated by the Eisenhower Administration, that would provide the American people with more information regarding national security, so they could better appreciate the nation's defensive needs and possibly provide a greater support for higher taxes and other government programs to meet security needs. Eisenhower ultimately rejected Candor.

Oppenheimer, while advocating improved defenses, did not try to diminish the importance of SAC—he argued for both.

Oppenheimer authored "Atomic Weapons and American Policy" in the July 1953 issue of *Foreign Affairs*, again calling for "candor." More information needed to be provided to the American people short of divulging top secret information or exact figures or specific strategies. What should be released was knowledge of the destructive force of the atom and the rapidly improving delivery methods designed to reap maximum destruction. This information was necessary if the public was to gain a full appreciation of the realities of the atomic age. The American public needed to appreciate the dire consequences of a nuclear-capable Soviet Union.

Oppenheimer emphasized that future security would rely on proper defenses complemented by improved delivery methods rather than simple numerical superiority of weapons in the atomic stockpile. Oppenheimer stated:

> we can conclude . . . that our twenty-thousandth bomb, useful as it may be in filling the vast munitions pipelines of a great war, will not in any deep strategic sense offset their two-thousandth . . . there will come a time when, even from the narrowest technical view, the art of delivery and the art of defense will have a much higher military relevance than supremacy in the atomic field itself.[27]

He recognized that defense against atomic attack had been nearly nonexistent, both for the United States and its European allies. This abysmal situation needed rectification, even if it would not be easy or inexpensive. Continental defenses, though, would not in themselves provide a "permanent solution to the problem of the atom." Oppenheimer continued, "But that is no reason for not doing a little better than we are now doing." Oppenheimer explained further the deterrent value of improved continental defenses. Improved defenses would cause:

> some delay in the imminence of the threat. They will mean a disincentive – a defensive deterrent – to the Soviet Union. They will mean that the time when the Soviet Union can be confident of

> destroying the productive power of America will be somewhat further off – very much further off than if we did nothing. They will mean, even to our allies, who are much more exposed and probably cannot be well defended, that the continued existence of a real and strong America will be a solid certainty which should discourage the outbreak of war.[28]

Oppenheimer believed improved continental defenses would not only provide a deterrent to atomic attack in the near future but that defenses might "be of great relevance" if arms regulation should ever become a reality: "defense and regulation may thus be necessary complements."[29]

Adding to the public debate on continental defense, the unclassified results of the Kelly Committee reached the media during the late spring and early summer 1953. *Fortune* magazine indicated its leaning in an article[a] comparing the Kelly recommendations with those of the highly publicized Summer Study Group of the previous year. The slant of the article was apparent immediately in the accusation that those scientists headed by Oppenheimer and Berkner supported "a kind of aerial Maginot Line . . . and costing at the very least $20 billion[b]."[30] The allusion to the Maginot Line discredited those who favored the early version of the DEW Line, especially if those defenses would compete with SAC for funding. The article stated that recommendations of the Summer Study Group, "which would have had the ultimate effect of shifting the preponderant weight of U.S. air resources from the atomic offensive to the defensive," were "politely rejected" by the findings of the Kelly Committee.[31]

The primary conclusion of the Kelly committee was to reject the crash program for the DEW Line, a definite victory for the anti-DEW Line faction. However, their victory was somewhat tempered, since the committee supported a significant improvement of continental

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[a] While the author was not indicated in the article, the likely author of this relatively brief comparative article was Charles J. V. Murphy, who was a writer for *Fortune* who contributed a number of articles on defense issues.
[b] The $20 billion amount cited in the article was the sum believed by the Summer Study Group to improve all of the nation's continental defense measures, not just the cost for an early warning line. The author of the article misused the estimated appropriations necessary for the DEW Line.

defenses. The Kelly Committee called for the "immediate improvement of the existing AC&W[a] system," a Mid-Canada Line and its seaward extensions.[32] The Kelly Committee recommended to Secretary of Defense Charles E. Wilson that he support research and development for the next phase of improving the continental air defenses, which required a "'much better [air defense] than that which is assured under present programs,' especially for apparatus to give defending forces adequate warning of approaching hostile aircraft."[33] The supporters of the DEW Line, while somewhat disappointed that it had fallen from top-priority status, did not interpret the Kelly Committee's conclusions as the death knell for the Arctic radar chain. They saw the committee's report only as a postponement, similar to the conclusions reached by the Bull committee. So, both sides interpreted the Kelly Report as compatible with their views.[34]

Newly retired General of the Army and former Chairman of the Joint Chiefs of Staff Omar N. Bradley offered his views on pressing defense matters in a two-part article that appeared in the *Saturday Evening Post* during the last two weeks in August. Bradley used his new freedom as a retired officer to offer his expert opinion on the current defense issues. In the first article, he referred to the increased danger of surprise atomic attack and hinted that although impressive scientific strides have been made in air defense and warning technologies, a "controversy among both scientists and military men" existed. Bradley went into detail in the follow-up article. Bradley brought up some concerns about the defense budget of President Eisenhower and his fiscally conservative Secretary of Defense, Charles E. Wilson, when they advocated a $5 billion reduction to the next fiscal year's defense budget. Bradley did not see the U.S. military reaching an adequate defensive stance until all the programs advocated while he was Chairman of the Joint Chiefs of Staff had been implemented. To stop now and not bring

[a] Aircraft control and warning

those programs to fruition appeared to Bradley "like coasting before you reach the top of the hill."[35]

While Bradley believed that the American public needed to be better informed about atomic weapons and thus he supported Candor, he did not side with those who advocated a "crash program" of air defense measures. Bradley instead supported the need for improved continental defenses and the critical role that technology would play:

> Someday it may reach the point where communist leaders are tempted to try for a knockout blow against America. When, or whether, that fateful time may come depends partially upon the extent of our scientific-and-technological lead, particularly in the fields of atomic deliverability and atomic defense.[36]

Although Bradley recognized the importance of science and technology in providing improved defenses, he had qualms about whether the sophistication was there to provide an effective early warning line in the Arctic.

Bradley reasoned that differences in opinion were due to characteristics in scientific research and development itself. He stated that the "problems of continental air defense are on the outer frontiers of scientific advance . . . new discover[ies] . . . in . . . any . . . [fields] can radically change the defense possibilities." Other difficulties include factors beyond U.S. control such as the buildup of the Soviet air forces and atomic weapons and the intentions of the Soviet Union.[37]

Bradley disagreed with the "minority of scientists" who believed the immediate construction of an Arctic warning line would provide the United States with close to perfect air defenses. He listed some of the immense problems, characterized as "scientific riddles," that would need to be solved before an early warning line could even become operational. Included were Arctic phenomena such as the aurora borealis, which hampers communication at higher latitudes; reliance on hard-wired land lines, which would subject the infrastructure to the harsh Arctic climate; and the chance for sabotage of communication lines. Further, Bradley pointed out the vulnerability of the system to Soviet paratroopers who could wreak damage over such isolated outposts, since the Russians were "diligent students and explorers of the arctic." These shortcomings, and the lack of reliable capabilities for tracking or intercepting the incoming hostile bombers, could lead to the Soviets continually spoofing the defenses, leaving Canadian and American air defenses and population in a constant state of turmoil and tension. Under such conditions, the defenses would constantly be "cry[ing] . . . 'wolf, wolf!'" Bradley concluded that "an unreliable warning system may be worse than none at all."[38]

Bradley did not reject the concept of the DEW Line completely. He did, however, oppose the scientists' "backwards approach" to strengthening the continental air defenses. Such an Arctic warning line would prove "tremendously valuable" if it was the outer line of an air defense that had been developed "from the inside out." If the goal was to have a DEW Line that would provide the maximum amount of tactical warning, air defenses, thus, should be pushed "northward in Canada as fast as we can without leaving gaps or holes for the enemy to play tricks in."[39]

Canada, Bradley pointed out, needed to be consulted and a friendly cooperation between the two countries had to be maintained if these air defenses, or any significant improvements to continental defense, were to materialize. While the countries had many similarities, and "in the matter of air defense, we and the Canadians stand or fall together," the United States could not impose its plans on a sovereign Canada. If there was no change in current world conditions, the United States and Canada would be brought closer together in matters of continental defense. In order to help facilitate this growing interdependence, Bradley advocated a more unified and integrated continental command system.[40]

The *Saturday Evening Post* articles by General Omar Bradley did not go unnoticed by Canadian officials. Canadian Secretary of State for External Affairs Lester B. Pearson, Canadian Ambassador to the United States A. D. P. Heeney, and Acting Under-Secretary of State for External Affairs C. S. A. Ritchie were among those who launched a spirited discussion of Bradley's articles and made sure that Canadian Prime Minister Louis St. Laurent was aware of them. Pearson telegrammed Heeney in Washington with the official Canadian opinion of Bradley's observations.[41]

The next day, 28 August, Heeney replied. The first line of the telegram emphasized the Canadian government's viewpoint on the changing nature of Canada-United States relations. Heeney stated, "we think you should assume that you will be faced before long with requests from the United States Government for co-operation in the field of continental defence on a scale considerably larger than any which have been made previously." While Bradley's opinions might not be the exact blueprints for America's future plans, Canadian officials should be prepared for a flurry of activity in the United States over continental air defense. Ultimately, there would be a spillover into U.S.-Canadian military and diplomatic channels in the form of requests for greater cooperation.[42]

Heeney also reported "widespread agitation both inside the United States Government and in the press for a more hermetic system of continental defence" and noted "this agitation has grown" since the 12 August thermonuclear detonation by the Soviets.[43] With U.S. vulnerability to nuclear air attack increasing, anxiety in Washington was also escalating.

Heeney also warned that a new commitment to continental defense might come from the recent overhaul of the Joint Chiefs of Staff and its resultant "review of United States strategy and military planning." Commenting on the ongoing struggle between the U.S. armed forces and scientists over continental defense, Heeney stated that "this dispute has never been completely resolved, but, in so far as a decision has been reached, it has gone in favour of the scientists and civil defense authorities and against the armed services."[44] The victory alluded to was the approval by the Eisenhower administration for Operation Corrode, the testing under Arctic conditions of new technologies and procedures for the proposed DEW Line.

Canada also conducted a reassessment of national security policy and strategy in the aftermath of the Soviet thermonuclear explosion. Heeney astutely cautioned that this re-examination "will almost certainly come to the conclusion that the defences against a Soviet air attack across the Arctic should be strengthened."[45] A. D. P. Heeney accurately prognosticated the implementation of improved early warning and other continental defense measures.

After the publication of the second of Bradley's articles, Acting Under-Secretary of State for External Affairs C. S. A. Ritchie sent a memorandum to his immediate superior, Lester B. Pearson, the Secretary of State for External Affairs. The two most noteworthy items in the article, according to Ritchie, were the call for an "over-all continental defence command" and the necessity to implement as quickly as possible a continuous continental air defense. To provide earlier warning, the proposed defenses would necessarily have to be established in Canada. "Bradley's remarks," Ritchie wrote:

> serve to illustrate a situation that deserves increased attention in Canada . . . there is general agreement in the United States that North American defences are inadequate and that immediate measures must be taken to improve the existing situation. The current economy drive in the US, coupled with the confusion of ideas about what should be done, has delayed the adoption of a firm policy, but there are many

> indications that a combination of political and military pressure will force a decision in Washington in the immediate future, if, indeed, it has not already been reached.[46]

Canada, most certainly, would have to be brought into the continental defense plans of the United States. The effects of this on Canada would be significant, particularly concerning the financial burden and Canadian sovereignty. The sovereignty issue was a particularly sensitive one. As one historian noted about the Goose Bay controversy, one with resonance for the whole the issue of continental defense, the Canadians believed in "the need to protect Canada's sovereignty not only from Soviet attack, but from American encroachment as well."[47]

The U.S. government was also concerned about the continental defense debate in the press. At the 163rd meeting of the National Security Council on 24 September 1953, Vice-President Richard M. Nixon declared that a pressing issue before the Council

> was the problem of public reaction to the present continental defense program in view of the great hullabaloo in the press on this subject. Was the program which was before the Council of sufficient size and efficiency to meet the charges of the Alsops and others that the Administration was neglecting one of the most crucial areas of national defense?[48]

There was some concern among Council members that the public perception of the administration was one of inaction concerning continental defense. Charles Douglas Jackson, Special Assistant to the President for International Affairs with special responsibilities in public relations, recommended that the public be made aware of the administration's high priority on continental defense by avoiding any more postponements on developing a strategy: "make a wise decision and move forward rapidly."[49]

Chairman of the Joint Chiefs of Staff Admiral Arthur Radford claimed that "we could not be doing more than we are doing now." Not enough information had been collected or analyzed on some projected programs to formulate a decision on whether or not to implement them.[50] The

DEW Line was a good example of just such a prospective continental defense program, since its feasibility study, Project Corrode was still under way as of September 1953.

S. Everett Gleason, Deputy Executive Secretary to the NSC, who recorded the minutes of the meeting, noted that Eisenhower slipped in a comment with a smile over the play that continental defense was receiving in the press. Eisenhower stated, according to Gleason,

> that it was unwise for the members of the Council to let themselves get so excited about what the columnists reported, as to fail to use common sense in reaching a decision. He said he was inclined to order the Council members in the future not to read the newspapers on mornings before meetings of the National Security Council.[51]

It was at this meeting that NSC-159/4 received the Council's approval. Two days later, 25 September, Eisenhower approved it as policy. But the new official emphasis on improved early warning, including the DEW Line if proven feasible, did not become public until well into 1954. Meanwhile, the debate over continental defense did not let up in the press. A number of articles and opinion pieces bombarded the public.

Hanson Baldwin, in an October *New York Times* article, still urged caution in increasing funds for programs of air defense. Charles J. V. Murphy seconded this opinion the following month in another of his articles in *Fortune*. He again cautioned against any sort of "crash" program, specifically the DEW Line, for improving continental air defenses. Three other magazine articles of note appeared in October and November that reinforced the view of pro-continental air defense camp. In October, *Collier's* published one of the more sensationalist articles of the period. Journalist William A. Ulman's article "Russian Planes are Raiding Canadian Skies" was placed under the heading "Special Report on U.S. Air Defenses." An introductory paragraph asserted: "They sneak in almost daily, our northern outposts report. And now that Russia has the H-bomb we're wide open to attack. What's being done about it?"[52]

The article emphasized the need for building the Mid-Canada Line, though not yet named as such, and the DEW Line. These early detection lines aided by other radar might be "enough to make the difference between the survival and the utter destruction of our country as a major power." Ulman wrote that with two new technological breakthroughs "never before publicly disclosed," the costs of these early warning defenses would be greatly reduced; from $20 - 150 billion to less than $1.5 billion. The two new technologies disclosed by the author were improved communications under Arctic conditions and automatic alarm radar as discussed earlier.[a] Because the primary threat over the next years would be an aircraft-delivered nuclear attack, Ulman urged that we should prepare defenses for just that danger. He stated that the problem can be solved since the "planes . . . can [be] destroy[ed], provided we have early enough warning and sufficient defense forces."[53] The automated alarm would have the greatest impact on manpower, reducing the staffing from 300 to 10 at each station. These improved defenses would enable the United States to avoid another Pearl Harbor and destroy as many as 90% of the enemy bombers, triple the estimated destruction rate of the early 1950s.[54]

Ulman, like the Alsops, tended to overstate his argument by leaning towards a more sensationalist approach on the issue of improved continental defenses. Ulman provided the ridiculous estimate of $150 billion for the Mid-Canada and DEW Lines, but that made the final, reduced $1.5 billion cost more dramatic. Like other avid continental defense supporters, Ulman emphasized the 90% destruction rate as an easily attainable goal. Even with across-the-board improvements in all areas of continental defense, not just establishing an early warning line, it would be nearly impossible to achieve this high rate of destruction. Despite these overstatements

[a] Chapter 3 discussed these new technological innovations.

and inaccuracies, the highly-charged continental defense debate brought attention to the article, and it did not go unnoticed by Canadian officials.

Ulman's article was discussed at the 6 October meeting of the Cabinet Defence Committee. Minister of Defence Brooke Claxton was appalled by the article's erroneous impression that Soviet planes were appearing almost at will within Canadian air space. The Committee discussed whether an actual refutation of this absurd claim was needed from the Canadian government. The discussion generated lists of the benefits and disadvantages of publicly addressing the issue. The list of negative consequences included:

> [1] The reluctance of officials to comment might lead the public to put undue credence in the story.
> [2] Exaggerated accounts of Soviet flights over Canada might give support to irresponsible elements advocating ill-considered large-scale projects.
> [3] A denial of daily flights would invite questions on the number of interceptions which had been made.
> [4] Any information on the number of Soviet planes sighted would be useful to Soviet intelligence.[55]

The list indicated that there had been at least some interceptions or contact of unknown, presumably Soviet, aircraft. Also the second item illustrates Canadian reluctance to be strapped with cumbersome defense burdens, especially one as politically explosive as the DEW Line. In the end, the Cabinet decided against a public rebuttal of the Ulman article or others.

Canadians had two other pressing concerns about improving the continental defenses of North America. The first was the impact on the worldwide defense commitments of both nations. Canada surmised that the NATO allies might have special apprehension over a new commitment to continental defense. Would such a change in defense policy be interpreted by some NATO allies as "a slackening of [U.S.] interest in Western Europe"? The Canadians surmised that a significant problem could arise within NATO if the United States' new policy concerning continental defense were construed as a "fortress America" strategy, possibly resulting in a diminished U.S. military presence in Europe.[56]

The other issue causing unease among Canadian officials was how upgrading continental air defense would lead to a larger U.S. presence on Canadian soil. Specifically, improving continental defense would most certainly involve an increase in the number of fighter-interceptors. In order to provide the interceptors with the greatest advantage and opportunity, they would need to be stationed near the radar warning line. Since Canada could not afford to provide the required squadrons, the United States would have to take up the slack, resulting in more U.S. servicemen in Canada.[57]

Another powerful article appeared in November, written by MIT President James R. Killian, Jr.[a] and A. G. Hill, Director of the Lincoln Laboratory. The article opened by seconding Oppenheimer's plea for candor with the American public about the realities of the atomic age, especially since the Soviet development of the hydrogen bomb. They proposed that the continental defense debate be discussed openly, "for our government must have—and knows it must have—the help of informed public opinion in dealing with the problem." The authors acknowledged that "it would be better that we [the United States] be frightened than that we remain serenely ignorant and vulnerable."[58] They then sought to persuade readers of the value of improved continental air defenses.

While the Soviets were not yet in a position to launch a devastating attack on the United States, this circumstance would change in only a few years. If the United States refused to improve significantly its defenses, then the effects of a nuclear attack would be horrendous, threatening the very existence of the United States. The authors insisted these were not just idle

[a] James R. Killian, Jr. became the first Special Assistant to the President for Science and Technology in November 1957.

threats or some imaginative "bogeyman" but a realistic assessment of the near future. Killian and Hill also warned that U.S. defense efforts must include a powerful offensive punch and a complete defensive structure: "we find ourselves at the present time wide open to the delivery of atomic bombs by air."[59] The reasons for this dilemma were threefold: one, the offensive had been the primary component of our military plans, not the defensive; two, the Soviets had bested some American estimates of when they would be an atomic threat; and three, there was a supposition by U.S. military and civilian leaders that technological limitations and enormous expense rendered effective continental defensive measures impracticable.[60]

The authors attacked two widely accepted misconceptions in the continental defense debate. First, they disputed the perception that the USAF was guilty of indifference in the developing debate on continental air defense. Second, Killian and Hill contradicted the assertion that "informed and competent scientists" believed in the perfectibility of continental air defense; rather, they say, the scientific community was arguing that present defenses were appallingly inadequate and that technological advances and increased funding could radically improve air defenses.[61]

Killian and Hill argued that a capable defense rested on many elements, but the early warning component was the key ingredient. Early warning would offer greater protection for both the civilian population and SAC. Results would be in proportion to the amount of warning; the greater the forewarning, the more successful defensive efforts were likely to be. The authors added that "effective early warning could reduce expenses and uncertainties in other parts of the [defense] system and thus partly offset its own cost."[62] Overemphasizing the consequences of effective early warning within a significantly improved continental defense configuration was difficult, especially since immediate attention needed to be given "to defense against delivery [of atomic weapons] by manned aircraft."[63]

Killian and Hall agreed with J. Robert Oppenheimer and others that there comes a time when increasing the quantity of nuclear weapons only serves to create redundancy and contributes nothing more to national security. Especially when the enemy's more limited numbers of nuclear weapons are enough to destroy the United States, more did not equal better. When this situation occurred, the importance shifted from the offense to the defense. Offering a greater defense would add significantly to the U.S. ability to deter. Air defenses were going to achieve only a higher status as planning for atomic warfare continued to evolve.[64]

The authors concluded that improved continental defenses would only serve to improve U.S. international position. The offered a convincing rebuttal to the argument that a greater commitment to continental defense was akin to a U.S. retreating back into isolationism. Better defenses, they argued, would strengthen America's position of leadership among the members of the free world. The United States would be serving notice that it was "prepared to repel as well as to invade. In the event of war, there is scant hope for our friends if we destroy our enemy and find ourselves destroyed." The United States, by improving its own defenses, might deter a Soviet invasion of Europe; thus, greater security at home would mean greater security for Europe. Ultimately the aim was to prevent war, and Killian and Hill argued that better defenses could realize this goal. If the surprise element could be removed from a polar attack, and improved defenses meant greater likelihood of interception, the Soviets "would in turn be crippled by our retaliatory blow . . . [Knowing this, they then] might be more amenable to some understanding."[65] These arguments, with some modifications, were echoed by the U.S. military and the Eisenhower administration when it came time to justify their decision to improve significantly continental defenses, particularly early warning.

Other publications and authors threw their opinions into the debate at the end of 1953. Hanson Baldwin in the *New York Times Magazine* spoke against any sort of "crash" program involving continental defense improvement.[66] Charles J. V. Murphy in *Fortune* magazine and articles published in *American Aviation* and *Aviation Week* expressed similar views. The *Bulletin of the Atomic Scientists* argued in favor of improving continental defenses. They hinted that USAF stood in opposition to any improvement of the air defense system by citing statements of Vice Chief of Staff, General Thomas D. White. Claiming that his opinion was representative of the entire Air Force establishment, the authors of the *Bulletin* article argued that White asserted that "the creation of an air defense system which would approach perfection would bankrupt the nation and fail to provide the desired solution."[67] Further, the authors took note of White's statement that the "'safest and surest defense' was a strong retaliatory force and that to neglect this force 'because of preoccupation with last-resort defenses would be suicidal.'"[68]

Leading into 1954, many of those who supported a greater continental effort readily believed that this type of thinking permeated all levels of the Air Force and the other armed forces. During the last quarter of 1953, the continental defense debate, particularly over early warning, had finally obtained paramount importance in the United States and Canadian governments. Both nations would have to decide soon on the validity or fallacy of early warning and its place in their overall military strategy.

[1]Roger Hilsman, "Strategic Doctrines for Nuclear War" in William Kaufman, ed., *Military Policy and National Security* (Princeton, NJ: Princeton University Press, 1956), 52.

[2]Kenneth Schaffel, "The U.S. Air Force's Philosophy of Strategic Defense: A Historical Overview" in Stephen J. Cimbala, ed., *Strategic Air Defense* (Wilmington, DE: Scholarly Resources, Inc., 1989), 3.

[3] Kenneth Schaffel, *The Emerging Shield: The Air Force and the Evolution of Continental Air Defense, 1945-1960* (Washington, DC: Office of Air Force History, 1991), 211 and David F. Winkler, *Searching the Skies: The Legacy of the United States Cold War Defense Radar Program* (Langley AFB, VA: USAF Headquarters Air Combat Command, 1997), 28.

[4]Mike Worden, *Rise of the Fighter Generals: The Problems of Air Force Leadership, 1945-1982* (Maxwell AFB, AL: Air University Press, 1997), 67.

[5]Worden, 68.

[6]*Ibid*.

[7]"20 Billions Proposed For U.S. Air Defense," *New York Times,* 16 March 1953, p. 1.

[8] Leann Grabavoy Almquist, *Joseph Alsop and American Foreign Policy: The Journalist as Advocate* (Lanham, MD: University Press of America, 1993), 76.

[9]Samuel P. Huntington, *The Common Defense: Strategic Programs in National Politics* (New York: Columbia University Press, 1961), 337.

[10]Dr. Ralph E. Lapp and Stewart Alsop, "We Can Smash the Red A-Bombers," *Saturday Evening Post,* 225, no. 38 (21 March 1953): 19.

[11]*Ibid.,* 19-20.

[12]Thomas W. Ray, *A History of the DEW Line, 1946-1964* (ADC Historical Study No. 31), 11.

[13]Lapp and Alsop, *Saturday Evening Post*, 86.

[14]*Ibid.*, 21.

[15]*Ibid.*, 86.

[16]" Maginot Line of the Air," *Time* (30 March 1953), p. 17.

[17]*Ibid.*

[18]*Ibid*.

[19]*Time*, (13 April 1953), p. 8.

[20]*Ibid.*

[21]*Ibid.*, 10.

[22]"Atomic 'Glass Jaw' Said to Imperil U.S.," *New York Times*, 2 May 1953, p. 1.

[23] *Ibid.*, p. 37.

[24] Gertrude Samuels, "A Plea for 'Candor' About the Atom: An Eminent Authority on Nuclear Weapons, Dr. J. Robert Oppenheimer Assesses the Wisdom of Letting People Have the Facts," *The New York Times Magazine*, 21 June 1953, sec. 4, p. 8.

[25] *Ibid.*, p. 20.

[26] *Ibid.*

[27] J. Robert Oppenheimer, "Atomic Weapons and American Policy," *Foreign Affairs* 31 no. 4 (July 1953): 528.

[28] *Ibid.*, 534.

[29] *Ibid.*

[30] "Air Defense: Kelly vs. 'Summer Study' group," *Fortune*, 48 no.1 (July 1953): 40.

[31] *Ibid.*

[32] C.L. Grant, *The Development of Continental Air Defense to 1 September 1954* (USAF Historical Studies No. 126): 67.

[33] "Air Defense: Kelly vs. 'Summer Study' group," *Fortune*, 48 no.1 (July 1953): 40.

[34] Richard F. McMullen, *Air Defense and National Policy, 1951-1957*, ADC Historical Study No. 24 (Ent AFB, CO: Headquarters ADC, n.d.): 43.

[35] Omar N. Bradley, "A Soldier's Farewell," *Saturday Evening Post* 226 no. 8 (22 August 1953): 58, 64.

[36] Omar N. Bradley, "A Soldier's Farewell," *Saturday Evening Post* 226 no. 9 (29 August 1953): 23.

[37] *Ibid.*, 46, 48.

[38] *Ibid.*, 48.

[39] *Ibid.*

[40] *Ibid.*, 48-49.

[41] *Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII: Relations with the United States, Part 4: Defence Issues, Section I: Distant Early Warning System and Mid-Canada Line, Document 703, "27 August 1953 Secretary of State for External Affairs to Ambassador in United States," Retrieved 9 October 2003 from
http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2334

[42] *Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII: Relations with the United States, Part 4: Defence Issues, Section I: Distant Early Warning System and Mid-Canada Line, Document 704, "28 August 1953 Ambassador in United States to Secretary of State for External Affairs" Retrieved 9 October 2003 from
http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2335

[43]*Ibid.*

[44]*Ibid.*

[45]*Ibid.*

[46]*Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII: Relations with the United States, Part 4: Defence Issues, Section I: Distant Early Warning System and Mid-Canada Line, Document 705, "31 August 1953 Memorandum from Acting Under-Secretary of State for External Affairs to Secretary of State for External Affairs" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2336

[47]David J. Bercuson, "SAC vs. Sovereignty: The Origins of the Goose Bay Lease, 1946-1952," *Canadian Historical Review* 70, no. 2 (1989):221, quoted in John Herd Thompson and Stephen J. Randall, *Canada and the United States: Ambivalent Allies* (Athens: The University of Georgia Press, 1994), 198.

[48]*Foreign Relations of the United States [FRUS],* 1952-1954, II, pt. 1, "Memorandum of Discussion at the 163rd Meeting of the National Security Council, Thursday, September 24, 1953": 472.

[49]*Ibid.*, 473.

[50]*Ibid.*

[51]*Ibid.*

[52]William A. Ulman, "Russian Planes are Raiding Canadian Skies," *Collier's* 132 no. 10 (16 October 1953): 33.

[53]*Ibid.*, 34.

[54]*Ibid.*, 42, 39.

[55]*Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII: Relations with the United States, Part 4: Defence Issues, Section I: Distant Early Warning System and Mid-Canada Line, Document 715, "6 October 1953 Extract from Minutes of Cabinet Defence Committee" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2346

[56]*Ibid.*

[57]*Ibid.*

[58]James R. Killian, Jr. and A.G. Hill, "For a Continental Defense," *Atlantic Monthly* 192 (November 1953): 37.

[59]*Ibid.*, 38.

[60]*Ibid*.

[61]*Ibid.*, 38.

[62]*Ibid.*, 40.

[63]*Ibid.*, 41.

[64] *Ibid.*

[65] *Ibid.*

[66] Hanson W. Balwin "What Kind of Defense in the Atomic Age?," *New York Times Magazine*, May 17, 1953, pp. 7-9, 34, 37, and 39.

[67] McMullen, 45.

[68] Huntington, 339.

CHAPTER 7 - Developing Defense Policy, 1953-1957

As journalists, scientists, and retired and active military officers debated publicly continental defense, various military study and planning agencies (both national and bilateral) were intensely studying the improvement of continental air defenses, specifically the early warning component. One of these groups, the Continental United States Defense Planning Group (CUSDPG), played a vital role in the eventual establishment of the Distant Early Warning (DEW) Line.

Recall that CUSDPG, a joint agency of the JCS housed in the Pentagon, was composed of a director and a minimal staff and was assigned the task of "preparing plans for the defense of the continental United States."[1] Although CUSDPG was supposed to plan defenses against *air* attack on the United States, the U.S. Army Chief of Staff was appointed CUSDPG Executive Agent, and in 1952 another U.S. Army general became the director of the joint agency.[a] This decision was to have consequences.

Beginning in September 1950, the Executive Officer of CUSDPG was also from the U.S. Army.[b] Threats to the continental United States were to be countered primarily by the U.S. Navy and the newly independent U.S. Air Force. Although no documentary evidence is available to clarify the issue, it seems possible that the decision to place CUSDPG under U.S. Army leadership was *because* of this competition between the Navy and the Air Force. The senior service, with its continental defense role slightly deemphasized *vis-à-vis* the other branches, might be able to provide a more impartial voice in recommending continental defense policy.

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[a] Before 1952, it appears that the Director of the CUSDPG rotated amongst the services since an Air Force colonel and a Navy captain each held that position. Later, more senior general officers would staff the position of Director.
[b] The Executive Office of the CUSDPG had more authority then is customary. Major General John L. McKee spent some time in the hospital, turning over significant authority to the Executive Officer.

One of the first significant plans generated by CUSDPG was a Basic Defense Plan, approved by the JCS in 1951. JCS 2086/1 provided only a broad outline of responsibilities for the continental defense of the United States. Not surprisingly, the U.S. Air Force obtained the primary assignment for air defense in JCS 2086/1, though as historian of the Joint Chiefs of Staff Robert J. Watson summarized, "the other Services were expected to contribute as necessary."[2] The U.S. Navy was given primary responsibility for defending the United States (and seaborne lines of communication) against oceanic attack, and the U.S. Army was assigned primary responsibility for defense against "terrestrial attack."[3] The various branches of the armed forces were expected to add the specifics to the general defense plans.

Until the beginning of 1953, CUSDPG's contribution to the defense of the United States was unremarkable. According to historian Helen Bailey, CUSDPG's accomplishments included drafting the generic Basic Defense Plan (1951) and maintaining a current "list of key industrial, military, and research facilities vital to the war potential of the U.S . . . which would have to be defended in time of war."[4] Its responsibilities, delineated in JCS 1259/134, included recommending changes to the Basic Defense Plan, "maintaining a continuing study of command arrangements with a view to recommending desirable changes; recommending joint tests, exercises or maneuvers . . . [and] correlating Civil Defense Plans with Military Plans."[5] Later undertakings by CUSDPG were formulating procedures for the stockpiling strategic materials, such as petroleum, for both military and civil defense purposes and devising a program for the decentralization of industries. The latter was essential to avoid the total destruction of any industry by enemy attack or natural causes. Eventually, in the wake of NSC-139, Truman's policy of improving early warning as a "matter of high urgency," CUSDPG was assigned to plan for the implementation of an early warning system.[a]

Even before CUSDPG began formulating an overall plan for continental defense, there were hints of interservice disharmony, especially competition over defense appropriations. Lieutenant Colonel Elmer Russell "Rusty" Powell, USA, began a tour of duty in September 1950 as the Executive Officer of CUSDPG. This was an unusual posting for a lieutenant colonel, since all of the sub-committee heads were either colonels or equivalent rank, while the two previous executive officers had held the rank of general.[b] Colonel Powell asserted in an interview with the author that the situation upon his arrival was far from ideal. Since the creation of CUSDPG, the joint agency had been mired in interservice rivalry, limiting its accomplishments. The Army and the Air Force debated on who should have control over the anti-aircraft battalions in the continental United States. On the issue of an early warning system, Powell stated that all three services could get behind it only if their respective branches had the primary responsibility, which in turn would mean a substantial increase in funding. The directors of CUSDPG remained in their position only for short periods, which did not provide the Group the necessary stability and consistency of command. During the first four years of its existence, there appear to have been as many directors. When Powell arrived at the CUSDPG, he stated that "everything was in a stymie."[6]

Between September 1950 and December 1952, CUSDPG produced the Basic Defense Plan but little more. Powell witnessed firsthand the interservice disagreement and bickering that brought the work of the Group to a standstill. One of the programs that the service chiefs could

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[a] JCS 1899/25 authorized the CUSDPG to devise a plan for the responsibility and implementation of an Early Warning System, on 21 January 1953.
[b] Lieutentant Colonel Powell would receive promotion to full colonel in June 1951, a rank that was more fitting his responsibilityand position.

not agree on for continental defense was the early warning component. According to Colonel Powell, each service was interested in an early warning system, but only if it was granted the primary role. Whichever service had the dominant function would be guaranteed a larger budget. Each branch supported an early warning scheme that would feature its strength. The USAF advocated an early warning system in which radar-equipped aircraft would fly the perimeter of the continent, providing the alert against enemy aircraft. The U.S. Navy concurred but argued that since the planes would be operating primarily over the oceans, the radar planes should be naval aircraft. The Army, not surprisingly, disagreed with the Navy's and Air Force's reliance on radar-equipped aircraft and instead argued for fixed radar installations manned, of course, by Army personnel.[7]

U.S. Air Force Chief of Staff General Hoyt S. Vandenberg, trying to have greater Air Force influence within CUSDPG, suggested an overhaul of its chain of command and lead officer. As it stood, the executive agent of the Group was the U.S. Army, as was its Director. In a memorandum to his fellow Chiefs of Staff, Vandenberg argued:

> As the greatest concern related to the security of the Continental United States is the threat and consequences of air attack, planning for the defense of the Continental United States is predominantly concerned with defense against air attack. I consider, therefore, that the Continental U.S. Defense Planning Group should be monitored by the Chief of Staff, U.S. Air Force as executive agent, and a general officer of the U.S. Air Force should be the Director of that Group.[8]

Ultimately Vandenberg's maneuver proved unnecessary, since CUSDPG adopted an early warning system plan heavily influenced by USAF.[9]

When President Truman approved NSC-139, which favored establishing an early warning system, the CUSDPG was in a position to move from the periphery to a more central role in planning for continental defense and particularly the early warning component. Secretary of Defense Robert Lovett sent a letter to the Joint Chiefs in January 1953 insisting that the planning for NSC-139 should begin immediately. Three weeks after the president implemented NSC-139, the JCS designated CUSDPG as the organization responsible for formulating a plan to integrate the early warning system into the comprehensive strategy for defense.[10] The Secretary of Defense assigned the U.S. Air Force the task of overseeing the testing phase of an early warning line under Arctic conditions, which marked the beginning of Project Counterchange.[11]

The Joint Strategic Plans Group (JSPG)[a] submitted a plan to the Joint Strategic Plans Committee, an organization under the JCS, for implementing NSC-139. The plan, originally designated as JSPC 885/8, was approved by the JCS and re-designated

JCS 1899/26. In this document, the JSPG recommended that the chiefs of the armed forces (JCS) have the responsibility for preparing "plans for an effective system of land, sea and air defenses in accordance with Service functions as set forth in 'Functions of the Armed Forces and the Joint Chiefs of Staff,'" a collection of procedure statements[b] that were not clear directives but do enumerate "policies with regard to Service responsibilities and therefore constitute guidance in planning for the defense of the Continental United States."[12] Using NSC-139 and JCS 1899/26 as a blueprint for improving continental defenses, the JCS implemented JCS 1478/33, titled "Responsibility of the Armed Forces Pertaining to the Defense of the Continental United States," which ordered chiefs of the armed forces to draft service-specific early warning plans for a continental defense system. Each armed service, thus, had to submit a continental defense plan delineating its primary responsibilities in the defense of North America.

[a] The JSPG did the early planning on projects such as war plans, before turning them over to more senior committees.
[b] These are JCS 1478/23, JCS 1478/24, and JCS 1478/26 all under the topic "Functions of the Armed Forces and the Joint Chiefs of Staff."

The JCS agreed that no new organization was needed, since CUSDPG and the Services "with their presently assigned functions, provide adequate machinery for carrying out the responsibilities of the Joint Chiefs of Staff stemming from NSC 139."[13]

Each service was expected to submit to CUSDPG their part of the plan for establishing an early warning system in compliance with NSC-139. CUSDPG would then review the various plans and make suggestions and recommend modifications before submitting to the JCS its comprehensive "Joint Outline Plan for an Early Warning System."

Despite the change of administrations, CUSDPG carried out its assigned mission. The Group spent the next months after submitting its joint outline plan gathering information from the services, seeking advice from both military and civilian experts, traveling extensively to sites throughout the United States, and making some inspection trips to proposed early warning radar location sites.[14] CUSDPG took seriously the urgency conveyed in NSC-139 to establish an early warning system that would provide at least three to six hours of warning. As CUSDPG was preparing this plan to implement NSC-139, its subcommittees were wrestling with other problems of continental defense, such as the stockpiling of strategic materials, especially petroleum, and the decentralization of key industrial targets.[15]

The U.S. Navy was the first of the Armed Services to submit its continental defense plan[a] to CUSDPG. The Navy stressed that its role in continental defense was in no way its primary obligation. The framers of the "U.S. Naval Basic Plans for Continental United States" stressed that the "Navy and Marine Corps would meet continental defense requirements 'within the limitations of available forces and consistent with a continued ability to perform other primary missions.'"[16] With more funding, the Navy could meet all of its obligations more effectively.

[a] The Navy plan was titled the "U.S. Naval Basic Defense Plan for Continental United States," or NBDP 1-53.

Because the focus of NSC-139 was preparing the United States against *air* attack, it is not surprising that the plan submitted by the Air Force was more detailed and complete. The Air Force Council, the main advisory board to the USAF Chief of Staff,[17] approved the Air Staff plan at the end of April and forwarded it to CUSDPG.[18] The proposal called for more interceptor squadrons[a], improvement of IFF (Identify, Friend or Foe) equipment, a greater number of anti-aircraft battalions to be stationed around highly vulnerable targets supplemented by National Guard battalions on 3-6 hours' notice, and the continuation of the Ground Observer Corps (GOC) until the radar net was more complete. The USAF had created the GOC in February 1950 to supplement the inadequate radar defense network. The GOC was comprised of civilian volunteers who manned observation posts and would report any sightings to filter centers, which would then alert the appropriate authorities. By 1957, the GOC manned over 15,000 observation posts and numbered 350,000 volunteers.[19] After the radar system became more complete with gap-filler radar filling the voids and technologically sophisticated, the ADC disbanded the GOC on 31 January 1959.

The Air Force plan also "called for the immediate construction" of the Mid-Canada Line along the 54th parallel line plus seaward barriers to prevent the radar line from being flanked. As in the Navy plan, the barriers would be composed of both Airborne Early Warning (AEW) aircraft and converted destroyer escorts refurbished and re-commissioned as radar picket escort ships (DERs[b]) operating in concert. The major difference was that in the Air Force plan the aircraft would be Air Force rather than Navy planes. The designers of the Air Force plan also visualized that the Air Defense Command would administer the entire system.[20] The Distant

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[a] The Air Force plan called for a minimum of 75 squadrons of interceptors, much greater than the 57 squadrons envisioned in previous planning. (Watson, 122)

[b] The DER designation stands for radar picket destroyer escort. The DERs used along the seaward extensions of the DEW Line were converted *Edsall*-class destroyer escorts. (DEs). The "R" added to the two letter designation for destroyer escort reflects the added radar capabilities installed in these vessels.

Early Warning (DEW) Line, while not yet its official name, should be built if the feasibility test, Operation Counterchange, proved successful.

On 30 June 1953, CUSDPG submitted a report to the Joint Chiefs of Staff in compliance with the specification in JCS 1899/26 "to submit a plan for the establishment and operation of an early warning system to meet the requirements established in NSC 139." CUSDPG stated that since the Air Force proposal[a] called for "the establishment and operations of an early warning system . . . the early warning provisions of this plan were used by CUSDPG as the basis of [the] draft of a 'Joint Outline Plan for an Early Warning System.'" CUSDPG utilized the comments and recommendations from the services to formulate the final draft of the "Joint Outline Plan for an Early Warning System" (JOPEWS) for the Joint Chiefs of Staff.[21]

In the opening paragraphs of the JOPEWS, CUSDPG justified the need for improved continental defenses, in particular the necessity of an early warning system:

> The significant advances made in the development of mass destruction weapons and their carriers, and possession of these weapons and carriers by the Soviet Union, constitute a growing threat to the United States. Without detracting from the necessity of continuing to build up offensive striking power, this developing threat lends increasing urgency to our efforts to strengthen the defenses of the continental United States.
>
> The increasing capability of the USSR to launch heavy nuclear attacks on the continental United States indicates that we should plan to augment our systems of air, sea and land defense. . . .This plan provides for the early warning portion if the aforementioned air defense system.[22]

The primary purpose of early warning was to "allow [all elements of] the defense system to reach maximum readiness."[23]

Next the report suggested guidelines for operating an early warning system. The first principle was U.S.-Canadian collaboration in planning and operation of the defenses. Studies

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[a] The Air Forces proposal titled the "Air Force Plan for the Defense of the Continental United States Against Air Attack, 31 December 1955."

and recommendations should be made jointly, and the two nations should cooperate through agencies such as the Permanent Joint Board on Defense (PJBD) and the Canada-United States Military Study Group.[24] Other principles included the utilization of unilateral and joint command structures; coordination of both nations' early warning systems; continuous operation of the systems; the primacy of the detection mission, followed in priority by identification and weapons deployment; and reliance on "pulsed and CW [continuous wave] radar."[25]

To meet the requirement set out in NSC-139 for three to six hours' warning, JOPEWS recommended top priority for a line of radar stations[a] along the 54th parallel and seaward extensions in the Pacific and Atlantic. CUSDPG's "Priority Two" was "a second line of detectors herein referred to as the Northern Line[b] extending from the Alaskan air defense system through Hershel Island, Aklavik, Norman Wells, Cambridge Bay, Wager Bay, Cape Wolstenholm to Frobisher Bay, connecting with the Northeast Command air defense system."[26] While CUSDPG thus had potential radar locations, many other aspects of the future DEW Line were still uncertain.

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[a] The Southern Canada Line was the American name for what was to become the Mid-Canada Line. Other names for this radar chain include the McGill Fence, as it would utilize the radar technology researched at McGill University, Southern Canada Early Warning Line, and the Southern Canadian Detector Line.
[b] The Northern Line was one of the terms for what eventually would be named the DEW Line.

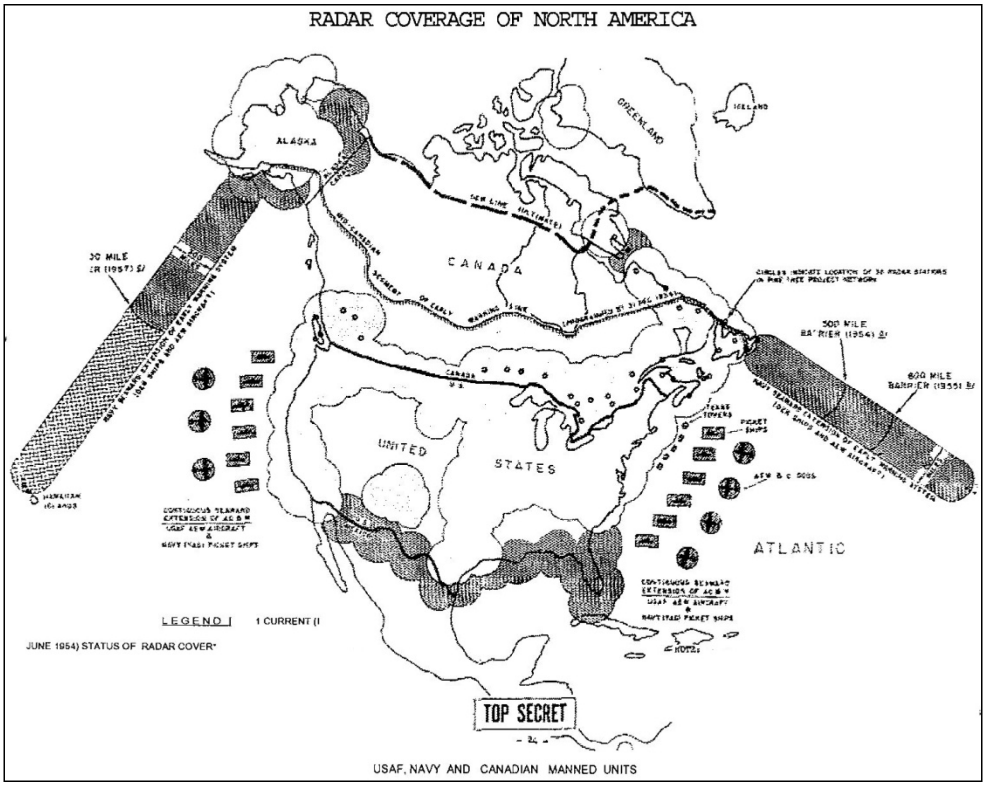

Figure 7.1 The Dew Line with the projected seaward extension and supportin radar lines. (Eisenhower Library, Abilene, Kansas)

One problem was that the equipment and communication systems envisioned for an Arctic DEW Line were still being tested. The JOPEWS noted that the tests, "if successful . . . may lead to the installation and operation of the Northern Line." Next the plan discussed some of the specifics of the communication system currently under assessment, particularly the use of ionospheric scattering of radio waves for inter-station communication and for sending information to points south. The JOPEWS also affirmed that the eastern terminus of the DEW Line might be extended further east, from Frobisher Bay to Cape Dyer and across the Davis Strait to Greenland.[27]

Next the JOPEWS broke down the responsibilities of the different services for implementing the plans. In its heavy reliance on the Air Force plan in drafting JOPEWS, CUSDPG granted USAF the lion's share of the responsibility for the defense against air attack. The U.S. Air Force Chief of Staff would:

> provide for the preparation and implementation of detailed plans for the installation and operation of the early warning system not located within commands established by the Joint Chiefs of Staff . . . coordinate all plans for and operations of the early warning system with those forces responsible for the land and sea defense of the continental United States . . . [and] command, through a designated commander or commanders, all USAF forces, and exercise operational control over all other U.S. military forces participating in the early warning system and not specifically assigned to a Unified Command of the Joint Chiefs of Staff.[28]

The U.S. Navy and U.S. Army were to be assigned supporting roles. The Chief of Naval Operations would "assist and support" the Air Force in all phases of the early warning system, specifically providing CINCLANT and CINCPAC[a] with "suitably equipped surface forces to perform picket ship duty in support of the Atlantic and Pacific AEW Barriers." The Chief of Staff, U.S. Army was to "provide construction, transportation and logistic support in accordance with Joint Chiefs of Staff approved plans."[29] Ultimately, while the Navy would have an active role in patrolling the seaward approaches to the continental United States when the Mid-Canada Line and/or DEW Line were operational, the Army was relegated to only a logistical role and only during the building phase of the DEW Line; in fact, to maintain and operate the early warning system, "no major forces would be required from the U.S. Army."[30]

While this plan was the blueprint for the early warning system, at the time of its submission to the JSC there were elements of the proposal that were still being debated. The major debate was between the U.S. Navy and the USAF over the seaward barriers. They argued over the sizes of the forces needed and under whose authority those forces should be operating. CUSDPG again supported the Air Force position, but the matter was returned to the JCS, who

[a] CINCLANT is short for Commander-in-Chief Atlantic and CINCPAC is short for Commander-in-Chief Pacific.

referred the dispute to Secretary of Defense Charles E. Wilson and Assistant Secretary of Defense Roger M. Kyes. Ultimately, this disagreement, coupled with the significant turnover in the JSC in the summer of 1953, left the plan in a state of limbo.[31]

As action on the JOPEWS was postponed, the NSC adopted a new national security policy, NSC-159/4, which explicitly superseded NSC-139, the directive on which CUSDPG had formulated JOPEWS. While the overall plan of CUSDPG did not go into effect, many of the elements in CUSDPG's proposal found their way into later national security policies and in the operation of the DEW Line. The new policy, NSC-159/4, re-assessed the initial urgency for continental defense measures called for in NSC-139, such as the DEW Line. While not abandoning these continental defense programs, NSC-159/4 called for further study before implementation.

Colonel Powell believed that NSC-159/4 and its revision, NSC-5408, employed some ideas from other CUSDPG studies, especially one about the DEW Line.[32] Powell presented the CUSDPG plan to the JCS and soon the topic of the seaward extensions was being discussed at the National Security Council. According to Powell, Admiral James S. Russell, Director of the Air Warfare Division under the Chief of Naval Operations (CNO)[a], opposed the deployment of naval forces along the barriers as called for in the USAF-influenced JOPEWS. Admiral Russell believed that this obligation would divert funds crucial to other naval projects, such as increasing the number of aircraft carriers and the development of improved sonar. Others argued that the Navy was upset with the costs of "operating and maintaining the forces" necessary for the barriers.[33] When Admiral Russell asked, "Why do we have to do that?" Powell gave the "slightly curt" response that "the President signed the NSC document [NSC-159/4] which is a

[a] The information on Admiral James S. Russell's actual position in late 1953 was found at www.usstopekaclg8.org/History/Recom/JRussell.htm (Retrieved on 13 May 2006)

directive and we are carrying out the directive of the President."[34] Powell had little patience for the hesitation and delaying tactics of the services concerning continental defense measures.

Admiral John J. Hyland, CINCLANT from December 1959 to September 1960, believed the Navy's hesitancy and reluctance to take on the assignment was because it did not deem the barriers necessary. Hyland stated,

> When the concept was first suggested, the Navy disagreed in the Joint Staff that it was essential. But when it became clear that someone was going to do it and it really was a chore over the sea, the Navy decided that it would be better to do it themselves rather than for some other service to do it. That's how the Navy got the job.[35]

These factors contributed to the Navy's reluctance to support a more comprehensive line, but it ultimately agreed to man the seaward barriers.

The U.S. Navy and USAF had been at odds with one another since the National Security Act of 1947, which created the Department of Defense and began the process of greater unification among the Armed Services. At the heart of the controversy were two interlocking issues: funding and primacy of mission. Whichever service operated the weapons system that delivered atomic weapons against the Soviet Union would receive a larger share of military appropriations. Traditionally the U.S. Navy had been the first line of defense for the United States, but the military circumstances of the late 1940s elevated the USAF into this role, as the Truman administration placed a greater reliance on strategic bombers. The crisis came to a head in 1949 with the cancellation of the Navy's super-carrier, *USS United States.* The Navy saw the super-carrier as the means of regaining the strategic initiative from the USAF, since the 80,000-ton vessel was capable of launching atomic bomb-laden aircraft directly against the Soviet Union. With the Navy lacking the super-carrier, the USAF would remain the dominant service.

This cancellation launched an incident that came to be known as the “Revolt of the Admirals.” After the navy lost the super-carrier, an anonymous document came from the Department of the Navy that publicly attacked the B-36, the strategic bomber that was to replace the B-29 and B-50. The author of this document called the USAF’s new bomber “a billion dollar blunder,”[36] not only bringing into question its effectiveness but ultimately challenging the strategic doctrine of the United States.[37] How effective would strategic bombing be if the primary means of delivering atomic weapons proved to be highly vulnerable? The deterrent value of SAC, its main *raison d’être*, would take a severe hit.

The controversy culminated in October 1949 in a special Congressional hearing by the House Armed Services Committee that provided a forum to debate publicly the issues dividing the two services. The “Revolt of the Admirals” occurred during the hearings when a number of admirals defied a directive by Secretary of Defense Louis A. Johnson not to criticize the administration’s decision to fund the B-36 bomber. Among those admirals who chose to use the hearing to publicly criticize the Truman administration’s national defense policy, even questioning the entire premise of strategic bombing, were Admirals Arthur W. Radford, Aleigh Burke, and Louis E. Denfeld, CNO.

Cold War historian Michael Joseph Cohen recounted Chief of Naval Operations Admiral Louis E. Denfeld’s testimony in which he stated “that the Navy was being slighted in the defense budget due to an unholy coalition of the Army and Air Force representatives on the JCS.”[38] In the end the USAF continued its primary mission as the nation’s first line of defense and the navy would have to do without, albeit temporarily, with its super-carrier. Underlying issues of the debate were concerns over strategic doctrine, the mission and roles of the services and the relationship between the civilian heads of the services and the military leadership. The fallout from this disagreement was still around in 1953, adding acrimony to the relationship between the services.

Colonel Powell's participation at the JCS meeting was followed by accompanying the new Chairman of the Joint Chief of Staffs, Admiral Arthur W. Radford, to two meetings of the National Security Council over the next three months.[39] Continental defense, specifically the seaward extension of the Mid-Canada Line, was discussed at these meetings on 23 November 1953 and 14 January 1954. During the first meeting President Eisenhower requested "an estimate by the Joint Chiefs of a reasonable patrolling program for the seaward extension of the Southern Canadian early warning system."[40] At the second meeting attended by Colonel Powell, President Eisenhower decided the seaward extensions and the numbers of fighters and anti-aircraft battalions would be finalized as soon as the "Department of Defense has completed its review of cost estimates of the military programs, the Council will consider revisions of NSC 159/4, prepared to reflect the . . . presentation [by Admiral Radford and Colonel Powell] and comments which may be submitted by Council members on such revisions."[41] Hinted at in these minutes was a possible revision of the nation's policy on continental defense, an event that came to fruition a month later, on 17 February 1954, when President Eisenhower approved the new National Security Council policy on continental defense, NSC-5408.

The Navy must have taken exception to the decisions of CUSDPG and its partiality toward the U.S. Air Force. In October 1953, CNO Admiral Robert B. Carney stated that CUSDPG function should "be absorbed into the Joint Staff."[42] This recommendation was approved by the other Chiefs, and effective 1 February 1954, "the Joint Chiefs of Staff disestablished the CUSDPG and transferred its functions for continental defense planning to the Joint Strategic Plans Group." According to JCS 2044/21, the decision to disband CUSDPG was "taken to give the Joint Chiefs of Staff more direct control of continental defense planning."[43] CUSDPG had been a thorn in the side of the U.S. Navy, but with the restructuring of continental defense planning and implementation, the navy's wishes were honored by the other Chiefs, who favored more control over, and a more streamlined approach, to continental defense planning.

Interestingly, despite being a navy man, Admiral Radford must have approved of Colonel Powell and his work with CUSDPG. Eisenhower chose Radford as Chairman of the JCS precisely because his strategic views were comprehensive rather than just focused on his particular military branch. This was not always the case, though; for instance, in 1947 Radford opposed unification. By 1953 his opinion on the matter, as Eisenhower later recalled "had undergone a radical change . . . and . . . he could be extremely useful in Washington." Eisenhower continued about Radford; "he was, as it turned out, that rare combination—a man of tough conviction who would refuse to remain set in his ways."[44] Eisenhower was impressed that Radford had

> the breadth of understanding and devotion to [his] country rather than to a single Service that will bring about better solutions than I get now. Strangely enough, the one man who sees this clearly is a Navy man who at one time was an uncompromising exponent of Naval power and its superiority over any kind of strength. That is Radford.[45]

After the JCS meetings in which they approved the general continental defense plans, Admiral Radford said to Colonel Powell, "I got them [the JCS] to agree to it for you."[46] Powell was impressed with Admiral Radford's understanding of the larger, complex picture and his transcendence of strictly the U.S. Navy point of view. In a letter to General Mathew B. Ridgway, Army Chief of Staff, Radford wrote that Powell "is an outstanding Army officer. He performed his duties so well that . . . he has been a key man in this important national planning field."[47] Ironically, CUSDPG had become defunct as the National Security Council considered a revision to the general continental defense policy.

On 11 February 1954 as CUSDPG's functions were being absorbed by the Joint Chiefs of Staff, the NSC Planning Board sent to the National Security Council a revision of NSC-159/4: NSC-5408[a]. The NSC Planning Board incorporated much of the Bull Report and the Continental Defense Committee report (NSC-159) into its statement on continental defense. By February 1954, Eisenhower's New Look defense policy was beginning to crystallize, and the new policy was contained in the NSC Planning Board's document. A major element of the New Look was a de-emphasis of conventional forces in favor of a greater reliance on strategic forces, specifically SAC. This re-formulation of strategy justified making major cuts in the U.S. Army's budget. The conventional ground forces[b] of the United States would be the military component sacrificed under the New Look.[48]

NSC-5408, using the same opening as NSC-159/4, stated that "in recent years we have emphasized the elements of peripheral defense, offensive capabilities, and mobilization base more than we have emphasized the element of 'continental defense' . . . 'Continental defense' is now clearly inadequate."[49] This conviction should not be surprising in a document whose purpose was to restructure U.S. continental defense policy.

NSC-5408, like its predecessor NSC-159/4, stressed the need for an early warning system, since this report envisioned only an increase in the numbers and destructive potential of Soviet thermonuclear weapons. Under the heading "Financing 'Continental Defense,'" the NSC Planning Board laid out the immediate funding and longer-term funding for continental defense

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[a] From Watson, "a new system [was] adopted by the Council in 1954, under which NSC papers were given four-digit numbers beginning with the last two digits of the current year." (p. 44, fn. 12)

[b] While the United States was able to decrease the size of its conventional forces, a critical component of the New Look was an increased commitment (increased military spending, greater manpower, etc) by NATO members towards European defense.

measures. While the total appropriations for defense were decreasing, the amount provided for continental defense increased:

Programs	Expenditures in Millions		
Continental Defense	FY1953	FY1954	FY1955
Military	2,442	2,939	3,198
Non-military	71	95	97
Total "continental defense" . . .	2,493	3,034	3,295
All other "national security"	47,852	45,781	41,662
Total	50,345	48,815	44,957[50]

This set of data illustrates the growing emphasis that was being placed on continental defense. For FY1953, "Continental Defense" spending was only 4.95% of the total national security budget. Over the next two years, though total "National Security" expenditures decreased, continental defense programs experienced an increase in the percentage of the "National Security" budget but also an absolute increase in funding. The percentage of the total defense funds earmarked for continental defense for FY 1954 was 6.2%, while budgeted continental defense endeavors for FY1955 amounted to nearly 3.3 billion dollars, or 7.3% of the entire "National Security" budget. Estimated expenditures for Project Corrode in FY1953, FY1954 and FY1955 were $2 million, $14 million and $13 million, respectively.[51]

The statements in NSC-5408 dealing with Canada remain essentially the same as in NSC-159/4. In order to deter "Soviet aggression," prevent or minimize an aerial attack, and attain "an effective continental defense system . . . collaboration with Canada" was necessary. To bring the Canadians into line with United States security policy, "U.S. efforts should be constantly directed towards maintaining with Canada a common appreciation of the urgency and character of the threat to U.S.-Canadian security, and reaching prompt agreement on the measures required to meet it." NSC-5408 argued it would encourage Canadian commitment to continental defensive programs to allow Canada to "take leadership in developing parts of the system[a] and contribute to its expense."[52]

The DEW Line did not achieve top priority status in NSC-5408, as had the Mid-Canada Line and its seaward extensions or the need for increased fighter interceptor and anti-aircraft forces. Instead, the DEW Line received secondary priority status with the comment that it "should be developed into a high state of readiness over the next two years, insofar as practical," and in the specific case of the DEW Line, it was not to be implemented unless proven to be "feasible . . . and agreed to by Canada and the United States."[53] Section 16 of NSC 5408, focusing on the Early Warning System, stated that any more warning than what would be provided by the proposed Mid-Canada Line was "presently desirable" and, "in view of anticipated increases in speed of aircraft, will probably be required within the next few years. If a Northern Canadian Early Warning Line is deemed feasible and agreed to by Canada and the United States, it should be installed as soon as practicable. Project Corrode should be carried forward with the greatest feasible speed."[54] Although the DEW Line did not receive the highest priority, it was slated to become a vital part of the early warning component of continental defense when all of the problems of its installation and operation were resolved.

The United States Congress, while having the final say in the defense budget, did not play a major role in the continental defense debate in 1953 and 1954, in spite of its public nature. In early February 1954, during the House of Representatives appropriation hearings for FY 1955, a number of congressmen remarked on the lack of action in improving U.S. defenses. Representatives Clarence Cannon (D-MO) and George H. Mahon (D-TX) grilled Secretary of Defense Charles E. Wilson and JCS chairman Radford over air defense issues. According to

[a] This part of NSC 5408 was implemented when the United States agrees to Canada being the primary contractor and operator of the Mid-Canada Line.

historian Richard F McMullen, Wilson could not be pinned down to provide projected cost figures for the increased commitment to air defense and "continually tried to change the subject," finally deflecting the inquiries to Admiral Radford. Radford did not answer the questions about matters such as the kill probability (enemy bomber losses) of future defenses, which would have put the administration's classified estimates "on the public record" and subject to scrutiny. Instead, Radford elected to provide the answers off the record.[55]

In a few instances, individual members of Congress took continental defense, specifically the need for improved early warning, into a public forum. Representative W. Sterling Cole (R-NY), Chairman of the Joint Congressional Committee on Atomic Energy in 1954, wrote a letter, dated 5 March 1954, to the U.S. State Department questioning the earnestness of the United States and Canada in implementing components vital to continental defense. Representative Cole was particularly interested in attaining a status report of the "negotiations with Canada concerning the establishment of an early warning line." Cole believed that his "inquiries into the problem of continental defense" made him appreciate the "critical importance of advance notice of hostile attack." Cole continued in his letter to the Secretary of State, "I believe that the success of all our other continental defense preparations, and the success of our civil defense program as well, will hinge upon our ability to detect an enemy striking force before it reaches our borders."[56]

Cole wanted the removal of all impediments to the negotiations between the two countries about an early warning line. He did not believe that the United States was solving the problems that hindered the negotiation process "with the full sense of urgency they merit."[57] The State Department did not reply to the letter for a full two weeks because of its sensitive issues. The Canadians received word about the contents of the letter, which set the Canadian

Department External Affairs abuzz, particularly over the issue of whether Americans thought Canada was to blame for the stall in negotiations.

The affair touched off debate in Ottawa about the advisability of making a public statement on the continental defense system. The Canadian Ambassador to the United States, A. D. P. Heeney, agreed with G. Hayden Raynor of the U.S. State Department that it might behoove both countries to issue a joint public announcement on the ongoing continental defense projects.[58] For the next two weeks correspondence among Heeney, Secretary of State for External Affairs Lester B. Pearson, Minister of National Defence Brooke Claxton, and Chiefs of Staff Chairman Lt. General Charles Foulkes explored the issues of a possible public statement.

G. Hayden Rayner, Director of the Office of the British Commonwealth and Northern Europe Affairs within the U.S. State Department, provided Canadian officials with a copy of the reply of the State Department to Representative's Cole's letter. The reply, classified "secret," had been sent to Cole on 19 March, and the Canadians obtained a copy on 25 March. The Canadian Embassy was pleased to see that "most of the suggestions which we made have been taken into account." They were especially satisfied that the delays in the early warning line were not ascribed to U.S.-Canadian negotiations but to technical difficulties. The Canadians were also pleased to read that "the Canadian Government's co-operation in joint continental defence efforts is labeled 'prompt and effective.'"[59]

The State Department reply[a] to Congressman W. Sterling Cole assuring Cole that everything was being done to implement an effective early warning system:

> the problem of safeguarding North America against air attack has been receiving the constant attention of the Department of Defense and other appropriate agencies of this government . . . This Department

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[a] While the letter was signed by the Under Secretary of State Walter Bedell Smith, it was drafted by Wright and cleared by a number of governmental departments. (*FRUS*, 2118, fn. 1)

> [State] has the responsibility, of course, only for carrying out the negotiations with Canada necessary to those parts of the program requiring Canadian cooperation. The United States Government is in close and continuous consultation with the Canadian Government on this and all phases of defense . . . complete agreement was reached between the two governments on the need for effective measures against air attack.[60]

The reply also notes that the two nations approved the experimental phase (Project Corrode) for the DEW Line and that a number of "stations have been established in Alaska and the Canadian Arctic, and tests" were underway. If the tests should demonstrate the DEW Line's viability, and if the Arctic radar chain gained approval for its construction, then the United States would immediately enter into negotiations with Canada concerning implementation.[61]

Congressman W. Sterling Cole continued to keep the continental defense issue in the public forum. On 29 April 1954, in a speech at Colgate University, he intimated again that Canada and the United States were not coming to agreement on important continental defense issues as speedily as the situation warranted. Brooke Claxton, Canadian Minister of National Defence, took exception to Cole's accusations of lethargy in the implementation of joint continental defense programs. Cole asserted that "negotiations with the Canadian government on the subject of where, how, and by whom the first of such early warning lines would be built and operated have been in progress for nearly two years." Claxton disagreed, observing that

> there have been no negotiations between our two countries which "have been in progress for nearly two years" [instead], what have been under way are studies by a number of different agencies in the United States, in Canada, and jointly, with a view to determining what further development of our continental defence system is required and how this can best be carried out. There has been no delay in negotiation of any kind for which the government or services of either the United States or Canada could in any sense be held responsible.[62]

Claxton, who did not agree with the allegations, invited prompt U.S. reaction to the perceived problem stating "that any misinformation or misapprehension may be corrected in the light of the facts."[63] Claxton did not want anything hindering or complicating the relationship of the two nations on defense matters.

By mid-1954, many improvements to the continental defense system were either already in place or being implemented. There was still no final resolution on the DEW Line, though. If the tests underway in Canada and Alaska were to demonstrate the feasibility of an Arctic warning line, then U.S. continental defense policy prescribed that it should be constructed. This, however, was not enough. Canada must also agree to the construction of the DEW Line.

[1]Helen Bailey, *Chronology of Joint Chiefs of Staff Organization, 1945-1984,* Joint Chiefs of Staff Special Historical Study (Washington, DC: Historical Division, Joint Secretariat, JCS, 1984), 44.

[2]Robert J. Watson, *The Joint Chiefs of Staff and National Policy, 1953-1954*, Volume V: History of the Joint Chiefs of Staff (Washington, DC: Joint Chiefs of Staff, 1986), 111.

[3]Summation of Basic Defense Plan, JSC 2086/1 found in Enclosure B of JCS 1899/26, CCS 413.44 (7-1-48) section 4 "Radar Fence Program", Box 154, RG 218 (Records of the U.S. Joint Chiefs of Staff, Central Decimal File, 1951-1953), National Archives II, College Park, Maryland.

[4]Bailey, 49.

[5]Summation of Basic Defense Plan, JSC 2086/1 found in Enclosure B of JCS 1899/26, CCS 413.44 (7-1-48) section 4 "Radar Fence Program", Box 154, RG 218 (Records of the U.S. Joint Chiefs of Staff, Central Decimal File, 1951-1953), National Archives II, College Park, Maryland.

[6]Elmer Russell Powell, interview by author, 15 May 1992, St. Charles, Missouri, tape recorded, transcription by author in possession of the author.

[7]*Ibid.*

[8]Document 668 (JSC 2044/14), Reel 4, *Records of the Joint Chiefs of Staff*: Part II: 1946-1953: The United States. University Publications of America, Inc. Microfilm.

[9]Watson, 123.

[10]Report by the Continental Defense U.S. Defense Planning Group to the Joint Chiefs of Staff on an Early Warning System (JSC 1899/29), CCS 413.44 (7-1-48) section 4 "Radar Fence Program", Box 154, RG 218 (Records of the U.S. Joint Chiefs of Staff, Central Decimal File, 1951-1953), National Archives II, College Park, Maryland.

[11]Report by the Joint Strategic Plans Committee to the Joint Chiefs of Staff on an Early Warning System (JSC 1899/26), CCS 413.44 (7-1-48) section 4 "Radar Fence Program", Box 154, RG 218 (Records of the U.S. Joint Chiefs of Staff, Central Decimal File, 1951-1953), National Archives II, College Park, Maryland.

[12]Enclosures A and B to the Report by the Joint Strategic Plans Committee to the Joint Chiefs of Staff on an Early Warning System (JSC 1899/26), CCS 413.44 (7-1-48) section 4 "Radar Fence Program", Box 154, RG 218 (Records of the U.S. Joint Chiefs of Staff, Central Decimal File, 1951-1953), National Archives II, College Park, Maryland.

[13]Enclosure B to the Report by the Joint Strategic Plans Committee to the Joint Chiefs of Staff on an Early Warning System (JSC 1899/26), CCS 413.44 (7-1-48) section 4 "Radar Fence Program", Box 154, RG 218 (Records of the U.S. Joint Chiefs of Staff, Central Decimal File, 1951-1953), National Archives II, College Park, Maryland.

[14]Elmer Russell Powell, interview by author, 8 January 1992, Lincoln, Nebraska, tape recorded, transcription by author in possession of the author.

[15]Elmer Russell Powell, interview by author, 15 May 1992, St. Charles, Missouri, tape recorded, transcription by author in possession of the author.

[16]Watson, 121.

[17]Information on the Air Force Council retrieved on 24 September 2006 from http://www.archives.gov/research/guide-fed-records/groups/341.html#341.14

[18]C.L. Grant, *The Development of Continent Air Defense to 1 September 1954*, USAF Historical Studies No. 126 (Maxwell AFB: Air University, 1955?), 67.

[19]Alfred Goldberg, ed., *A History of the United States Air Force, 1907-1957* (Princeton, NJ: D. Van Nostrand Company, Inc., 1957), 131 and Kenneth Schaffel, *The Emerging Shield: The Air Force and the Evolution of Continental Defense, 1945-1960* (Washington, DC: Office of Air Force History, 1990), 156.

[20]Watson, 121-3.

[21]Report by the Continental U.S. Defense Planning Group to the Joint Chiefs of Staff on an Early Warning System (JSC 1899/39), CCS 413.44 (7-1-48) section 5 "Radar Fence Program", Box 155, RG 218 (Records of the U.S. Joint Chiefs of Staff, Central Decimal File, 1951-1953), National Archives II, College Park, Maryland.

[22]Enclosure to Report by the Continental U.S. Defense Planning Group to the Joint Chiefs of Staff on an Early Warning System (JSC 1899/39), CCS 413.44 (7-1-48) section 5 "Radar Fence Program", Box 155, RG 218 (Records of the U.S. Joint Chiefs of Staff, Central Decimal File, 1951-1953), National Archives II, College Park, Maryland.

[23]*Ibid.*

[24]*Ibid.*

[25]*Ibid.*

[26]*Ibid.*

[27]*Ibid.*

[28]*Ibid.*

[29]*Ibid.*

[30]*Ibid.*

[31]Watson, 125.

[32]Elmer Russell Powell, interview by author, 15 May 1992, St. Charles, Missouri, tape recorded, transcription by author in possession of the author.

[33]Joseph F. Bouchard, "Guarding the Cold War Ramparts: The U.S. Navy's Role in Continental Air Defense," *Naval War College Review*, LII no. 3 (Summer 1999), 115.

[34]Elmer Russell Powell, interview by author, 15 May 1992, St. Charles, Missouri, tape recorded, transcription by author in possession of the author..

[35]Bouchard, 115.

[36]Kenneth W. Condit, *The Joint Chiefs of Staff and National Policy*,1947-1949, Volume II: *The History of the Joint Chiefs of Staff* (Washington, DC: Historical Division, Joint Secretariat, JCS, 1976), 330.

[37]Michael Joseph Cohen, *Fighting World War Three from the Middle East: Allied Contingency Plans, 1945-1954* (Portland, OR: Frank Cass, 1997), 14-15.

[38]Cohen, 15.

[39]"Minutes of the 172nd Meeting of the NCS", (NSC Agenda and Minutes – 1953) (9), Box 1, Administrative Subseries, NSC Series, White House Office, Office of the Special Assistant for National Security Affairs: Records 1952-1961, Dwight D. Eisenhower Library, Abilene, Kansas; and "Minutes of the 180th Meeting of the NCS", (NSC Agenda and Minutes – 1954) (1), Box 1, Administrative Subseries, NSC Series, White House Office, Office of the Special Assistant for National Security Affairs: Records 1952-1961, Dwight D. Eisenhower Library, Abilene, Kansas.

[40]"Minutes of the 172nd Meeting of the NCS", (NSC Agenda and Minutes – 1953) (9), Box 1, Administrative Subseries, NSC Series, White House Office, Office of the Special Assistant for National Security Affairs: Records 1952-1961, Dwight D. Eisenhower Library, Abilene, Kansas.

[41]"Minutes of the 180th Meeting of the NCS", (NSC Agenda and Minutes – 1954) (1), Box 1, Administrative Subseries, NSC Series, White House Office, Office of the Special Assistant for National Security Affairs: Records 1952-1961, Dwight D. Eisenhower Library, Abilene, Kansas.

[42]Watson, 137.

[43]Bailey, 99.

[44]Dwight D. Eisenhower, *Mandate for Change, 1953-1956: The White House Years* (Garden City, NY: Doubleday & Company, Inc., 1963), 96.

[45]*Ibid.,* 455, fn 11.

[46]Phone interview conducted by author with Elmer Russell Powell on 21 July 1992.

[47]Arthur W. Radford to Mathew B. Ridgeway, Letter, 18 March 1954, in the Official Personal File of Elmer Russell Powell.

[48]Joseph T. Jockel, *No Boundaries Upstairs: Canada, the United States, and the Origins of North American Air Defence, 1945-1958* (Vancouver: University of British Columbia Press, 1987), 71.

[49]"NSC 5408: Continental Defense", (NSC 5408 – Continental Defense) (3), Box 9, NSC Policy Papers Subseries, NSC Series, White House Office, Office of the Special Assistant for National Security Affairs: Records 1952-1961, Dwight D. Eisenhower Library, Abilene, Kansas.

[50]*Ibid.*

[51]*Ibid*.

[52]*Ibid.*

[53]*Ibid.*

[54]*Ibid*.

[55]Samuel P. Huntington, *The Common Defense: Strategic Programs in National Politics* (New York: Columbia University Press, 1961), 337; and Richard F. McMullen, *Air Defense and National Policy, 1951-1957*, ADC Historical Study No. 24 (Ent AFB, CO: Headquarters ADC, n.d.): 46, 58-9.

[56]*Foreign Relations of the United States [FRUS],* 1952-1954, Vol. VI, pt. 2, "The Chairman of the Joint Congressional Committee on Atomic Energy (Cole) to the Secretary of State": 2117.

[57]*Ibid*., 2118.

[58]*Documents on Canadian External Relations*, Vol. 20 (1954), Chapter V: Relations with the United States, Part 1: Defence and Security Issues, Section B: Distant Early Warning System, Mid-Canada Line and Continental Air Defence, Document 448, "10 March 1954, Ambassador in United States to Secretary of State for External Affairs." Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=529.

[59]*Documents on Canadian External Relations*, Vol. 20 (1954), Chapter V: Relations with the United States, Part 1: Defence and Security Issues, Section B: Distant Early Warning System, Mid-Canada Line and Continental Air Defence, Document 458, "25 March 1954, Embassy in United States to Under-Secretary of State for External Affairs." Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=631; and *FRUS,* 1952-1954, VI, pt. 2, "The Under Secretary of State (Smith) to the Chairman of the Joint Congressional Committee on Atomic Energy (Cole)": 2118-2120.

[60]*FRUS,* 1952-1954, VI, pt. 2, "The Under Secretary of State (Smith) to the Chairman of the Joint Congressional Committee on Atomic Energy (Cole)": 2118-2119.

[61]*Ibid*., 2119.

[62]*FRUS*, 1952-1954, VI, pt. 2, "The Canadian Minister of National Defense (Claxton) to the Secretary of Defense (Wilson)": 2125.

[63]*Ibid*., 2126.

CHAPTER 8 - Arctic Testing, Canada-U.S. Relations, and Approval of the DEW Line

The years 1953-1954 had a critical impact on the role and significance of continental defense, specifically the early warning component. Before Canada or the United States committed to an expensive improvement of the early warning system by implementing the DEW Line, both countries needed to have many questions answered. Both wanted a guarantee that an Arctic warning line was viable but not financially prohibitive. The Canadians wanted further assurances that greater commitments to continental defense would not infringe on Canadian sovereignty or force a total restructuring of the Canadian defense posture, both at home and abroad. In 1953, the United States began extensively experimenting with prototypical equipment, designs, and procedures needed for a viable Arctic early warning line. The results of those tests ultimately ended in the joint decision to construct the DEW Line. When the DEW Line became operational, the time was right for a greater unification of continental defense measures. The DEW Line helped contributed to the formation of the North American Air Defense Command (NORAD).

The United States Department of Defense had given the USAF responsibility for overseeing Arctic radar research. When the Eisenhower administration took office, they elected to proceed with NSC-139, President Truman's directive on improving the early warning system. In February 1953, USAF gave Western Electric, whose many functions included being the service organization of Bell Laboratories, the contract for overseeing this phase of development. Originally known as Project Counterchange, the early stage of the project was conducted on

Barter Island[a], located in the Beaufort Sea less than a quarter mile off the coast of northeastern Alaska. In winter months there, temperatures could fall to -60° Fahrenheit with winds up to 100 miles per hour. The construction component of Project Counterchange was awarded to Puget Sound Bridge & Dredging Company operating out of Seattle, and the electronic component was granted to Lincoln Laboratories of MIT, under the direction of Dr. Albert Hill.[1] A few critical cold weather tests were carried out to see if further experiments could proceed.

The first successful test of radar equipment involved an automated alarm, providing an audible alert when the radar acquired a target. (see chapter 3) The audible alarm would free radar operators from constantly monitoring their equipment and provide a "more positive warning of the presence of an intruder."[2] More notably, the number of operators could be reduced, which was a significant consideration for operations in the Arctic. Experience had shown that in the Arctic "it takes two men to support a third, in the sense of providing the living conditions necessary to make a long-term assignment feasible."[3] Considering that everything people need to consume except water must be imported, the fewer people involved, the less strain and problems there were on supply and logistical systems, not to mention the cost savings.

The other critical test was for communications. In the Arctic unpredictable magnetic influences, fierce weather, terrain, and ground interference prevented conventional radio signals from normal operation. The answer was an entirely new concept in radio communication, the Forward Propagating Tropospheric Scatter radio. Western Electric first experimented with this system in its prototype DEW Line station in Streator, Illinois, then tested it at Barter Island. The system worked on the ultra-high frequency (UHF) band. The waves were sent out from large parabolic-shaped antennae in a straight line towards the horizon, where they encountered the

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[a] Barter Island is located at approximately 70° 08' N and 143° 34' W.

troposphere layer of the atmosphere. The waves bounced, or "scattered," off the troposphere, and then were collected by a relay station. At the relay station, the signal was amplified until it became a powerful radio signal. The process could be repeated. The range of the Tropospheric Radio was 400 miles.[4]

A similar process was used for communicating over longer distances. In this case, Very High Frequency (VHF) signals were deflected off the ionosphere. The Frequency Propagation Ionospheric System (FPIS) utilizing VHF could send a signal nearly four times the distance of the Frequency Propagation Tropospheric System (FPTS). But VHF and UHF, while exceptionally reliable and "characteristically immune to atmospheric disturbances," could only operate with line-of-sight transmissions until the development of these "scatter systems."[5]

In addition, two radars already in the pre-production stage were adapted for use in the Arctic. The AN/FPS-19 was a conventional line-of-sight radar that could detect targets as high as 65,000 feet and had a 160-mile range. But it could not pick up targets flying lower than 5,000 feet. To compensate for this problem, scientists designed the AN/FPS-23 specifically to detect low-altitude targets (down to 200 feet over land or 50 feet over water). Both radars had to be powered locally by diesel generators.[6] The use of diesel fuel and equipment was preferred in the Arctic because of better reliability under extremely cold temperatures.

There was some discussion about other means to provide power to the DEW Line sites. One proposition was atomic power. The United States and Canada had already agreed to share information for the "development of atomic energy for peaceful purposes." The one big advantage of atomic energy was a tremendous reduction in the amount of conventional fuels needed to operate the sites, thus significantly reducing the high transportation costs. One of the largest problems of the DEW Line was the annual summer re-supply operation. Petroleum, Oil and Lubricants (POL), especially diesel fuel, made up the bulk of materials shipped by sea during these supply missions.[7]

One must wonder how seriously atomic energy was considered for use on the Arctic early warning line. Finding enough skilled personnel to operate a large number of atomic reactors in the isolated Arctic would have been difficult enough. Also Canada could not be pleased on any level by the prospect of dozens of nuclear reactors on their territory, especially in areas that would be nearly impossible to reach in the event of an accident. The increase in American personnel on Canadian soil to operate the reactors would only aggravate Canadian concerns over sovereignty. And the environmental impact of atomic power plants would have on the Canadian Arctic was unknown. Not surprisingly, the decision was taken to utilize conventional power sources.[a]

The Alaska test system became a microcosm of the full-scale DEW Line. Project Counterchange featured three types of stations (main, auxiliary and intermediate) placed roughly fifty miles apart. The main station at Barter Island was at the center of the proposed test line, having the functions of detecting and collecting information from the other stations. The Barter Island site contained the AN/FPS-19 search radar, as did two auxiliary test sites. These high-altitude radar stations were 150 miles from each other, allowing for total overlapping radar coverage. Intermediate stations utilizing the AN/FPS-23 "gap filler" radar were placed equidistant from the main station and auxiliary high-radar stations, thus achieving one type of station every 50 miles. Theoretically, this arrangement would provide a solid radar barrier without any holes or gaps. All of the stations were equipped with the tropospheric scatter

[a] The early to mid 1950s was an interesting time regarding atomic weapons and atomic energy, more broadly, which in some ways were seen as a novelty. Use of atomic weapons use was contemplated for aerial bursts to destroy large numbers of enemy bombers, atomic weapons were adapted for tactical use on the battlefield, especially the use of the "atomic cannon," and USAF spent a lot time and money trying to develop and harness atomic power for use in aircraft.

communication system for transmission laterally along the line, while the main station at Barter Island also had an ionospheric scatter communication system for relaying messages and data to a rearward position at Anchorage, nearly 720 miles to the south.[8]

When these initial tests were well under way, the USAF sought to create an experimental radar chain from northern Alaska to northwest Canada for further testing of "equipment, operational techniques, and concepts and [to] develop logistics information."[9] The United States thus needed Canadian approval for this stage of the experimentation. The United States offered to assume all the costs for the experimental line, and the Canadian government approved the plan on 27 February 1953 in Canadian Note No. 163. The note contained a couple significant provisos: one, that Project Counterchange (hereafter called Project Corrode) "would involve no commitment on the part of the Canadian Government to authorize a subsequent operational early warning chain and [two], that a Joint Military Study Group . . . be established."[10] The Canada study group's major responsibilities were to evaluate the results of Project Corrode along with studying air defense in general.

By May 1953 the materials needed for Project Corrode were awaiting transportation in Seattle. Project Corrode involved the building of eighteen stations (including the seven Alaskan stations planned under Project Counterchange) along a 400-mile route. By July 1953, equipment arrived at Barter Island and the other sites adjacent to the Beaufort Sea. Working quickly throughout the summer, the buildings were erected on all of the sites by September, and by the following February "the radar and forward-scatter systems were in full operation."[11] The tonnage of supplies needed made sealift necessary, since transporting all the cargo by air would be expensive, dangerous, and time consuming. In order for the sealift to work, supplies had to reach points along the northern shore during the short open-navigation season in the Arctic

(August and September). A large number of ships, including icebreakers, victory ships (originally built as cargo vessels for use in WWII, but after the war the U.S. Navy converted many of them for a variety of postwar uses), and Landing Ship Tanks (LSTs) were used in the initial venture into the Beaufort Sea. This would be a trial run for the more complex and sophisticated sealift that would occur along the whole length of the DEW Line during the summers of 1955 and 1956. Project Corrode demonstrated that logistics, engineering, and construction would be difficult but not insurmountable.

The Americans had little experience in building and operating sites in the Arctic, and knowledge of topography and terrain was seriously incomplete. Thus, some stages of this project were largely trial and error. Things generally went well, as the scientists and engineers did a commendable job of anticipating the construction and operational requirements and solving problems as they arose.

The primary concern in all phases of the project was the climatic conditions inherent to the Arctic. Equipment, buildings, and antennas had to be able to function in extreme cold, rain, sleet, snow, ice and high-velocity winds. Winter temperatures in these northern latitudes could reach –60° to –80°F, and wind speeds could hit 130 mph.[12]

The extreme climatic conditions put a premium on time. There was a relatively brief period of "temperate" weather, so prolonging any phase of construction might force personnel to contend with deteriorating conditions. Methods were needed to make the best use of the small window of optimal weather the Arctic provides. One area where this lesson was adopted was in the construction of the buildings. To speed up building construction, a less complicated assembly process was needed. Prefabricated items or those requiring little or no modification were significant time-savers.

Transportability was another important feature of any construction materials employed in the Arctic. Everything needed for construction in the Arctic, excluding water and gravel, had to be imported. Prefabricated components had to be of a size able to be transported across the Arctic tundra. Building modules placed on skids could be pulled over snow, often several at a time, by caterpillar tractors.[13]

The construction of the actual buildings was a typical example of the learning curve required for adjustment to the Arctic climate. The first buildings tested were essentially the same ones that the USAF had used for its northern stations. Problems with these structures soon appeared under the more extreme Arctic conditions. The shape of the standard building was troublesome: a long central core with extensions jutting at right angles. This permitted blowing snow to form drifts that threatened to bury or crush parts of the building. The prefabricated metal-clad panels also interfered with the performance of the electronic equipment.[14] Western Electric experimented with various types of materials, such as concrete, metal, and metal-clad wood, before finally deciding on the last for the structure.

The buildings had to meet three important requirements. Arthur B. Goetze, president of the Western Electric Company, discusses the plywood and aluminum-sided structures in "The DEW LINE Story" in *Signal*. The modules:

1) had to be adaptable in order to meet the needs of equipment and personnel;
2) needed to be exceptionally resistant to the elements (cold, wind, snow, and water), slow to deteriorate, and fire-retardant; and
3) had to be "simple and economical to transport, construct, and maintain in Arctic sites."[15]

Western Electric adopted a modular unit of insulated plywood panels. The rectangular, box-like shape measured 28 feet long by 16 feet[a] wide by 10 feet high. These modules were

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[a] Thomas W. Ray in *A History of the DEW Line* gives the width and length dimensions as *19* x 28 feet.

fitted end to end, helping to ensure waterproof joints.[16] The type of site determined the number of modules needed.

The modules were designed with fire-eradication features[a], critical for operating in the Arctic. A fire could not only injure or kill those in these modules but could leave survivors vulnerable to the elements. Another important characteristic for choosing Arctic building materials was the ability to withstand the hostile elements. The building had to be able to endure winds up to 125 mph. The ubiquitous snow and ice required the modules to be able to withstand "coatings of ice up to two inches thick, and upwards of 30 pounds per square foot of snow." Other features of the modules were a "vapor barrier and, for those used for housing electronic equipment, an envelope of copper shielding."[17]

A problem arose at some test sites, not because of bitter cold conditions, but because of warming temperatures. Engineers noticed that buildings in place for awhile began to tilt as their foundations softened. The heat from the buildings radiated into the ground, causing the top layer, known as muskeg, to thaw. Arctic muskeg can range from two to six feet thick. Building directly on this surface proved troublesome. The answer was to raise the structure off the ground, and lay gravel for the foundation. The gravel provided an insulating layer and a more reliable base. Western Electric solved the problem with "steam guns," which forced steam down a pipe that emitted steam through nozzles along its length. The steam would melt a path through both the frozen muskeg and the hard permafrost layer beneath. Next, metal pylons were inserted into the holes. Soon the permafrost re-congealed around the pylons, holding them in a "frozen vice" equivalent to a concrete foundation. The modules were then built on top of the pylons.[18]

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[a] Some of these fire-retardant features helped to contribute to the current problems of pollution at the former DEW Line sites by various chemicals leeching into the environment.

Experience also proved that raising the modules off the ground had another benefit, as did aligning the structure with the prevailing winds; these innovations positioned the structures in the path of least wind resistance. This helped to prevent snowdrifts from accumulating, lessening the threat of damage from the weight of falling, drifting or blowing snow.

All of the buildings in the original DEW Line sites (Alaska and Canada) utilized these modular units and the siting and construction methods. These structures served all the needs of the personnel buildings on the DEW Line for working, living and storage.[19]

Another major structure tested on the experimental line and later adopted by the DEW Line was the radar housing, necessitated by the extreme climatic conditions. First the engineers tried to encapsulate the rotating radar antennae "in a rubber radome, inflated like a balloon by warm air at two pounds' pressure." This proved unable to withstand the extreme conditions, as the radomes was battered by powerful winds and "leaks were chronic."[20] Next, a rigid radome of prefabricated parts was designed. It was sturdy plastic, fifty-five feet in diameter, and consisted of 361 pieces in five different shapes. The highly skilled work crews could put together the outer shell of a radome in twelve hours.[21]

Figure 8.1 Radome example (http:www.ll.mit.edu/about/History/dewline.html

Figure 8.2 A radome under construction on the DEW Line (http:www.porticus.org/bell/images/ollie/ollie27.jpg

Another logistical challenge was supplying hot water and power to these self-contained sites. The heat and exhaust from the generator were harnessed to heat water, while electric power was generated by a reliable diesel plant. Tractor-drawn sleds, or caterpillar trains (cat trains), transported equipment and the completed modules overland.[a] These materials often traveled hundreds of miles by this method. Although effective for this part of the western line, the use of cat trains would be more limited in the central and eastern sectors of the DEW Line because of the uneven terrain. The tractors pulling these trains broke down at a high rate, from the strain of continuously pulling heavy loads in the bitter cold. There had to be a reliable supply of spare parts to avoid delays in construction timetables.[22] Construction crews acquainted themselves with other surprises of the Arctic along this experimental line: the arrival of polar bears around sites and, in the short summer, the extremely annoying black flies[b] and mosquitoes.

[a] Wherever possible, modules were not constructed on each site, but were constructed in central locations and transported by cat train to their designated location.
[b] The black fly is a member of the family Simuliidae (Diptera), which includes more than 1,000 known species. Theses insects tend to range from one to five mm. in length.

The Continental United States Defense Planning Group (CUSDPG) reported that by December 1953 “full-scale testing” would be able to commence and would continue throughout the following year. An entire year’s worth of extensive testing was crucial in the experimental stage for determining the feasibility of both the technical and structural components of Arctic radar stations. CUSDPG reported also that Western Electric had completed the first series of site surveys for the proposed DEW Line in November 1953, with the results to be given to the Canada-United States Military Study Group (MSG) for evaluation.[23]

These site surveys had actually been conducted by Western Electric in mid-1953, accompanied at various times by members of CUSDPG. The Western Electric personnel used low-level aerial flights to reconnoiter possible DEW Line sites. Along with these flights, “maps, hydrographic charts and RCAF photographs were studied” to aid in finding appropriate sites that “from the standpoint of strategic location and topography, were readily accessible to logistical supply routes via water, land and air, and best lent . . . to DEW Line Operations.”[24]

By early 1954, the experimental line was operational, and thorough testing on the feasibility of an Arctic line was underway. The new security policy of the United States was implemented in February 1954. As noted above, NSC 5408 acknowledged the significance of Project Corrode and stated that, if “a Northern Canadian Early Warning Line is deemed feasible and agreed to by Canada and the United States,” then it should be executed at the earliest date. Project Corrode, NSC-5408 continued, should be “carried forward with the greatest feasible speed.”[25]

A report submitted in June 1954 to the National Security Council by the Department of Defense examined the progress of Project Corrode now referred to as Project 572. Western Electric, under contract with the USAF, had completed or was far along in its initial tasks. The authors of the "Department of Defense Progress Report to the NSC on Status of Military Continental U.S. Defense Programs as of 1 June 1954" described what needed to be done to help in the implementation of NSC-5408. The "specific tasks" that needed to be accomplished by Project 572 were:

1) [An] accelerated development of necessary equipment that could be used in a Distant Early Warning (DEW) Line.
2) Installation, test, and evaluation of several test stations in the Far North, and,
3) Site survey of suitable route for a DEW Line.[26]

As mentioned earlier, all test sites had been installed by June 1954, and Western Electric engineers and scientists were in the process of conducting a barrage of tests. They evaluated the performance of the equipment in a series of low, medium, and high altitude tests by USAF planes. In addition, a prototype of the radar sites comprising the experimental Arctic radar chain had been built outside of Streator, Illinois. The Streator unit provided a quicker way to test improvements of the equipment than the more remote locations of the Alaskan and Canadian Arctic. In general the tropospheric-scatter communication system performed admirably, although in the summer and fall of 1954, further testing was necessary to work out some of the final glitches. While it was proven that the "modified AN/TPS-1D search radar and McGill Doppler radar can be operated in the Arctic," the audible alert systems were not yet foolproof. The report concluded that the detection and communication systems problems could be solved by December 1954, near the deadline by which problems had to be solved if the DEW Line was to be implemented in 1955.[27]

Figure 8.3 The experimental DEW Line station: Streator, Illinois

The Air Force conducted high-altitude radar tests with a B-47. The Alaskan Air Command flew a variety of low and medium test flights to complement the high altitude experiments.[28] While some bugs still needed to be worked out, the radars proved they could operate effectively under the extreme conditions of the Arctic. USAF officials by the end of 1954 "were sufficiently impressed by their performance to approve their adoption."[29]

It was about this time, mid-1954, that the United States Air Force (USAF) became more of a proponent of the DEW Line.[30] Part of Eisenhower's New Look strategy emphasized strategic air power (the means to deliver nuclear weapons) *and* a significant improvement in continental defense. Taken together, both elements strengthened U.S. deterrent strategy. With appropriations available for both programs, USAF opposition began to diminish. Seeing that the DEW Line was no longer competing with the USAF for defense dollars, they saw the benefits of the early warning line for the protection of the bases of the Strategic Air Command (SAC) and for continental defense in general. As the agency assigned to organize and operate the test phase of the DEW Line, the USAF could place a substantial "fingerprint" on its overall structure.

The United States-Canadian Military Study Group (MSG) was established in 1953 as a condition for Canadian approval of Project Counterchange. The MSG was given the task of studying the feasibility of a DEW Line and continental defense in general. The MSG submitted their First Interim Report on 3 October 1953. After nearly nine months of scouring documents on the air defense of North America, comparing Canadian and American intelligence assessments of Soviet capabilities and military posture, and examining the recommendations of both nation's Air Defense Commands' estimates of the requirements for effective early warning, the MSG recommended that "there be established at the earliest practicable date an early warning line located generally along the 55th parallel between Alaska and Newfoundland." Two minimum operational requirements of this line, called the Mid-Canada Line, were "a high degree of detection capability against all forms of penetration by hostile aircraft [and a] capability of discrimination between incoming and outgoing aircraft."[31] While providing only basic early warning, the Mid-Canada line would significantly improve the entire early warning system.

The need for an early warning line along the 55th parallel line was not a difficult conclusion to reach. The Air Defense Command of both countries essentially agreed on the Mid-Canada Line based on the report by the Canada-United States Scientific Advisory Team (CUSSAT), which had confirmed earlier assessments that the amount of early warning provided by the current air defense system was "inadequate to . . . permit maximum utilization of the available active air defense forces, . . . meet the needs of the strategic air forces, and . . . provide for the implementation of civil and other military defense measures."[32]

The Mid-Canada Line utilizing Doppler technology was not a true "radar line"; instead, it was more an "unmanned microwave fence." The Mid-Canada Line could not determine the altitude, speed, direction or number of an attacking force, but signaled when a target crossed its path, “providing a rudimentary first warning.”[33] Although the Mid-Canada Line was not as sophisticated as the later DEW Line, it was a critical step in improving the early warning component of the North American continental defense system.

Figure 8.4 Sector control stations of the Mid Canada Line (http://www.lswilson.ca/mcl.htm)

In the First Interim Report by the MSG, which discussed the status of continental defense programs, the rationale for selecting the location of the Mid-Canada Line along the 55th parallel, besides providing more warning time was:

> (1) it would be far enough south to limit enemy penetration with the object of causing false alerts;
> (2) it would be far enough north to be beyond existing heavy air traffic. This would simplify the problem of identifying aircraft and increase raid recognition capability; [and]
> (3) such a line would be logistically feasible. It would also be economically efficient in that considerable advantage could be obtained from existing lines of communication and transportation facilities.[34]

The First Interim Report ambitiously pressed for the incorporation of aircraft identification capability along with the Mid-Canada Line’s detection capacity. CUSSAT believed the lack of such ability was “a major deficiency which must be resolved” and that aircraft identification capability was "an essential operational aspect of an effective early warning system." However, they made it clear that the present lack of identification ability should not prevent the construction of such an important element to the early warning system.[35] While the Mid-Canada Line did go into operation without such an identification element, the DEW Line would have an IFF (Identify, Friend or Foe) feature incorporated into its specifications.

The Canadian delegation believed that a "McGill Fence[a]" was "very much more reasonable than the Lincoln Project[b]." Brooke Claxton, Canadian Minister of National Defence, believed that "U.S. defence authorities will wish to see it [Mid-Canada Line] implemented at the earliest possible moment."[36] As a further prescient reading of U.S. policy, Claxton wrote to the Canadian prime minister that he (Claxton) "feel[s] quite certain that the Americans will not remain content with a line along the 55th parallel but will ultimately want to go for something like the Lincoln Project or even more." The Minister of National Defence also seemed to be quite certain that if the United States came to the conclusion that a DEW Line was essential, Canada would have no recourse but to let the United States build it. Claxton believed that Canada should take the initiative in the early warning negotiations with the United States if Canada decided to implement the Mid-Canada Line. "It would put us in a better position to say," wrote Claxton, "'Well, we think we have done what we thought was necessary for continental defence. If you want to go on and do more we are not going to stand in your way.'" Claxton finished his thought by stating that the Canada Government "could keep our self-respect without having to put too great an expenditure of materials, manpower and money."[37] On one hand,

[a] The McGill Fence is another name for the Mid-Canada Line, since much of the research for its Doppler radar was conducted at McGill University by noted physicist John S. Foster.
[b] Lincoln Project was the DEW Line study.

Claxton's statement revealed a sense of Canadian independence in his assertion that Canada would not have to contribute to a far northern radar line if it did not choose to do so. However, implicit in the declaration was a hint of resignation that, if push came to shove, it would be difficult, if not impossible, to prevent the construction of an Arctic radar line if the United States insisted on it.

Claxton also hinted to the Prime Minister that Canada should approach the Mid-Canada Line as an "exclusively Canadian project." This would allow the Canadians to have complete say on the project from controlling the manufacturing of the equipment (and using primarily Canadian goods) to exerting complete control over the construction of the sites and perhaps providing all the manpower for operating the system. Claxton argued that it would be cheaper for Canada in the long run, even if the Mid-Canada Line became a joint project, implying that the United States might not put a cap on the cost of constructing the DEW Line. Even if Canada was responsible for only a fraction of the total cost of the DEW Line, the share required from Canada might still be an overwhelming amount for the country's limited financial means. He correctly gauged the difficulty of undertaking a joint project with the United States and "still tak[ing] the initiative in going right ahead along the lines we want."[38] Though most of these issues would not be resolved for over a year, Claxton's wishes became the blueprint of Canadian defense planning with the United States.

Another U.S.-Canadian consultation meeting was held in Washington, D.C. on 6 November to follow up on the 27 October meeting. The Canadians surprised the American delegates by informing them, on 3 November 1953, that the Cabinet Defence Committee had decided to propose that Canada be responsible for constructing the entire Mid-Canada Line "without prejudice to any financial arrangement which may, in due course, be made between the two Governments." Contrary to views held by some in the press and the U.S. government, Canada was not delaying efforts to improve continental defense and would take charge of constructing the Mid-Canada Line to assure that "the project [would] be carried through with the greatest possible rapidity and administrative convenience." The Canadians went on to say that, "because of the importance it attaches to the problem of continental defence, the Canadian Government has acted with the greatest possible speed in order that the measures considered necessary by the two Governments might be instituted as rapidly as possible."[39] Canadian officials wanted to make absolutely clear that any delays in erecting an effective early warning system could not be traced back to Canadian procrastination or an underestimation of the growing threat posed buy the Soviet Union.

During the Canadian Cabinet Defence Committee meeting, there was further discussion about the justification for Canada building the Mid-Canada Line as a unilateral project. First was Canadian public opinion; if Canada bore the entire costs of the Mid-Canada Line, then the government would not have to fend off questions about large amounts of United States defense spending on Canadian territory "while Canada was maintaining substantial forces abroad."[40] Second, if the construction process and/or the operation of the sites brought too many U.S. personnel to Canadian territory, then sovereignty issues might again emerge as they had during and immediately after World War II. Third, the Canadians reasoned that, since construction of the DEW Line was starting to appear inevitable, Canada could avoid exorbitant future expenditures, as "the problems of northern construction would likely make the final charges very high; nevertheless, the cost of Canadian construction [along the Mid-Canada-Line] would probably be substantially lower than of US construction."[41] By undertaking the Mid-Canada Line, Canada would likely be absolved from contributing to the more expensive DEW Line.

Note the familiar resignation in Canadian thinking that the DEW Line in the Canadian Arctic was inevitable if United States continental defense policy warranted its existence. It was important that, ultimately, Canadian and the U.S. views on continental defense were complementary, not only the DEW Line, but for Canada-U.S. relations in general. While Canada and U.S. leaders often differed on the specifics of defense plans, they were in general agreement on improvements necessary for a more comprehensive continental defense.

Contributing to Canada's willingness to go ahead with the Mid-Canada Line was a proposal advocating its construction from the Canada-United States Military Study Group. Since the formulation of this bi-national group was at Canada's insistence, the Canadian government might hold its recommendations to a higher degree than proposals coming from a committee solely composed of U.S. personnel. At least the CUSMSG's recommendations incorporated the opinions of *both* Canadian and U.S. officials in its proposal. Another factor in encouraging Canadian authorization of the Mid-Canada Line was the Soviet detonation of a hydrogen bomb, scarcely three months before their decision for adopting the early warning line. As Joseph T. Jockel, noted Canadian Cold War historian put it, "Canadian officials had been sobered by the explosion of the Soviet hydrogen bomb."[42]

The Second Interim Report presented to the PJBD in March 1954 did not present or recommend anything new, but offered some basic refinements of the MSG's first recommendation for the Mid-Canada Line. However, at the beginning of June 1954 the MSG submitted its Third Interim Report, which recommended building a warning system as far north as practical. The additional warning time it would provide was indispensable for continental air defenses to counter the improving quantitative and qualitative capabilities of the USSR's nuclear strike forces. Even though some of the final tests for Project Corrode were not yet completed, the MSG asserted that the construction of an Arctic early warning line was necessary to:

> 1) Meet the warning needs of the Strategic Air Command.
> 2) Permit more effective employment of forces in active air defense.
> 3) Provide for the timely implementation of other military and civil defense measures.[43]

The Third Interim Report continued by stating that the Mid-Canada Line was still a vital component of the early warning system, despite its current proposal of building the DEW Line. Further recommendations of the MSG were:

> (1) [T]he two Governments agree in principle to the need for the establishment of a distant early warning line across the most northerly practicable part of North America;
> (2) Mutually acceptable military characteristics for such a line be developed;
> (3) Appropriate systems studies be initiated for the purpose of developing detailed recommendations on the specifications, types of equipment, overall system composition, cost estimates, manpower requirements and the exact location of such a line.[44]

With the MSG's recommendation for the implementation of the DEW Line, concern spread in Ottawa. Once they were convinced that the United States would pressforward with its construction, the Canadian government "put its full cost-avoidance strategy into effect."[45] By the end of June, the Cabinet Defence Committee had agreed to the Canadian Chiefs of Staff's recommendation that Canada should assume all costs for building and operating the Mid-Canada Line.[a] This was especially important because the final monetary outlay for the DEW Line was still unknown.

On 30 June, Minister of National Defence Brooke Claxton wrote to Secretary of Defense Charles E. Wilson "that the construction of this Mid-Canada Line would be undertaken as a Canadian project at Canadian expense."[46] Chairman of the Canadian Chiefs of Staff General

[a] In the middle of 1954, the estimated cost of the Mid-Canada Line was $150 million (Canadian).

Charles Foulkes passed the news to Admiral Arthur W. Radford, the Chairman of the Joint Chiefs of Staff. Radford responded to Foulkes's letter on 8 July 1954, stating that "the decision of the Canadian Government to undertake this project offers still further concrete evidence of the determination of our two governments to provide for North America the best possible mutual air defense system." Claxton and other Canadian officials had foreseen the commitment by the United States to push ahead with the DEW Line. Radford concluded his letter with the conviction that "a request for intergovernmental agreement to proceed with a far northern line will probably be presented at the meeting of the Permanent Joint Board on Defense this month."[47] For the advocates of the DEW Line, Canadian approval of the Mid-Canada Line was a step in the right direction for the eventual authorization for the Arctic radar chain. In fact, the United States had not been content with only a radar line along the 55th parallel.

The Mid-Canada Line was a critical component of the Early Warning System of North America. Without the Mid-Canada Line, it is doubtful that the DEW Line would have been constructed when it was. Many scientists and military officials did not see any value to an early warning line in the extremities of North America without a "defense in depth," meaning other radar lines for continuous tracking of hostile targets and the means necessary to intercept and destroy. Without these features, an Arctic early warning line would be nearly useless. So the Canadian initiative on the Mid-Canada Line was crucial to the establishment of a radar line significantly farther to the north.

The recommendations of the MSG's Third Interim Report led to the creation of two new bilateral study groups. Almost a year after the initial site surveys had been conducted by Western Electric, in August 1954, the MSG created two groups to aid in matters concerning the DEW Line. The first was the Location Study Group (LSG) to help make the decision on the final sites of the continental portion of the DEW Line. The LSG was comprised of representatives of the Air Force and Navy from both countries, along with members of the "appropriate civil departments of the Canadian Government."[48] Another group, the USAF-RCAF Military Characteristics Committee, while specifically created to formulate mutually acceptable attributes of the DEW Line, however, also "applied itself to the DEW Line location problem."[49]

The Military Characteristics Committee (MCC), made up by representatives of the air forces of both countries, presented their findings on 7 September 1954. Like the MSG, the MCC stated that in the near future the USSR would have the ability to inflict tremendous damage on both the United States and Canada. Increased warning and more sophisticated technology would be crucial to deflecting this threat. The MCC presented optimal specifications for DEW Line performance. These included the ability to have a 100% detection rate for targets over land from 200 feet to an altitude of 100,000 feet and for targets over water, from the water's surface to 100,000 feet. The expected reliability rate for the DEW was 100%. These specifications were beyond the technology at the time and into the foreseeable future. Thus, the committee, while keeping the 100% reliability in place as the ultimate goal for the DEW Line, lowered the minimum acceptable characteristics through the period ending in mid-1958. The temporary specifications included a 95-98% detection ability between the altitudes of 200 feet to 65,000 feet for the larger, bomber-sized aircraft[a] and an overall system reliability of 95%.[50]

Other attributes considered necessary were the ability to identify position, speed, approximate altitude, and direction of targets along with the capacity to distinguish single planes from aircraft flying in tight formations. In addition, a strong immunity against electronic

[a] The report uses the size and characteristics of the B-47 and B-52 for developing the characteristics of the DEW Line.

countermeasures was desirable. Speedy transmission of data was crucial to get the active air defenses deployed as soon as possible. Finally, automatic detection alarms were required for targets, along with automatic alarms for faulty systems. All would increase the reliability and effectiveness of the DEW Line.[51] Weapons systems, although discussed, were never part of the DEW Line. The designers of the DEW Line believed that, in the event of rising tensions between the United States and the Soviet Union in which an attack seemed imminent, a non-responsive DEW Line site would be assumed to have been compromised or destroyed, which would be interpreted as the commencement of hostility towards the United States. As far as weapons, each station was allotted a rifle, not to fight off Soviets, but to ward off errant polar bears.

The Location Study Group carried out site surveys utilizing both aerial and ocean reconnaissance conducted by the U.S. Navy and the Royal Canadian Air Force (RCAF). In November 1954, the combined Canada-U.S. Location Study Group came up with three criteria for determining the sites of the line. They were as follows:

1) The Line should be located as to provide a minimum of two hours of reliable and effective warning of hostile aircraft penetrating the Line enroute to target areas in Canada and the continental United States.
2) The logistic support of land-based portions should be made by land, sea, or air as most appropriate, and not limited only to sea support.
3) The Line should be located so as to permit it to be constructed and be operational at the earliest practicable date consistent with the warning factor stated in (1) above.[52]

There are some curious aspects to this list. One is that the line should provide "a minimum of *two hours* effective warning." [emphasis added] This was a considerable reduction from the three to six hours of warning advocated only a few years earlier and it did anticipate the later appearance of Soviet jet bombers. The second was the condition that sites were not to be determined only by sea support. The Location Study Group emphasized effective early warning over logistical convenience. This was the main reason that the Group rejected Western Electric's original site recommendations, which were so far south that they would have provided only a barely perceptible increase of warning time over that offered by the Mid-Canada Line, which at most might afford an hour of warning.

The route recommended by the Location Study Group for the land portion of the DEW Line was between the Arctic Circle and latitude 70^{o}, from the northwestern coast of Alaska (Cape Lisburne) to "Herschel Island [to] north coast of Canadian mainland to Dolphin and Union Strait north of Coppermine [to] south shore of Victoria Island [to] Hat Island [to] King William Island [to] Boothia Peninsula [to] Simpson Peninsula [to] Melville Peninsula [to] Foxe Basin islands across Baffin Island to the Cape Henry Kater area [to] Cape Dyer area "[53] The report also already referred to the possible westward and eastward extensions of the DEW Line.

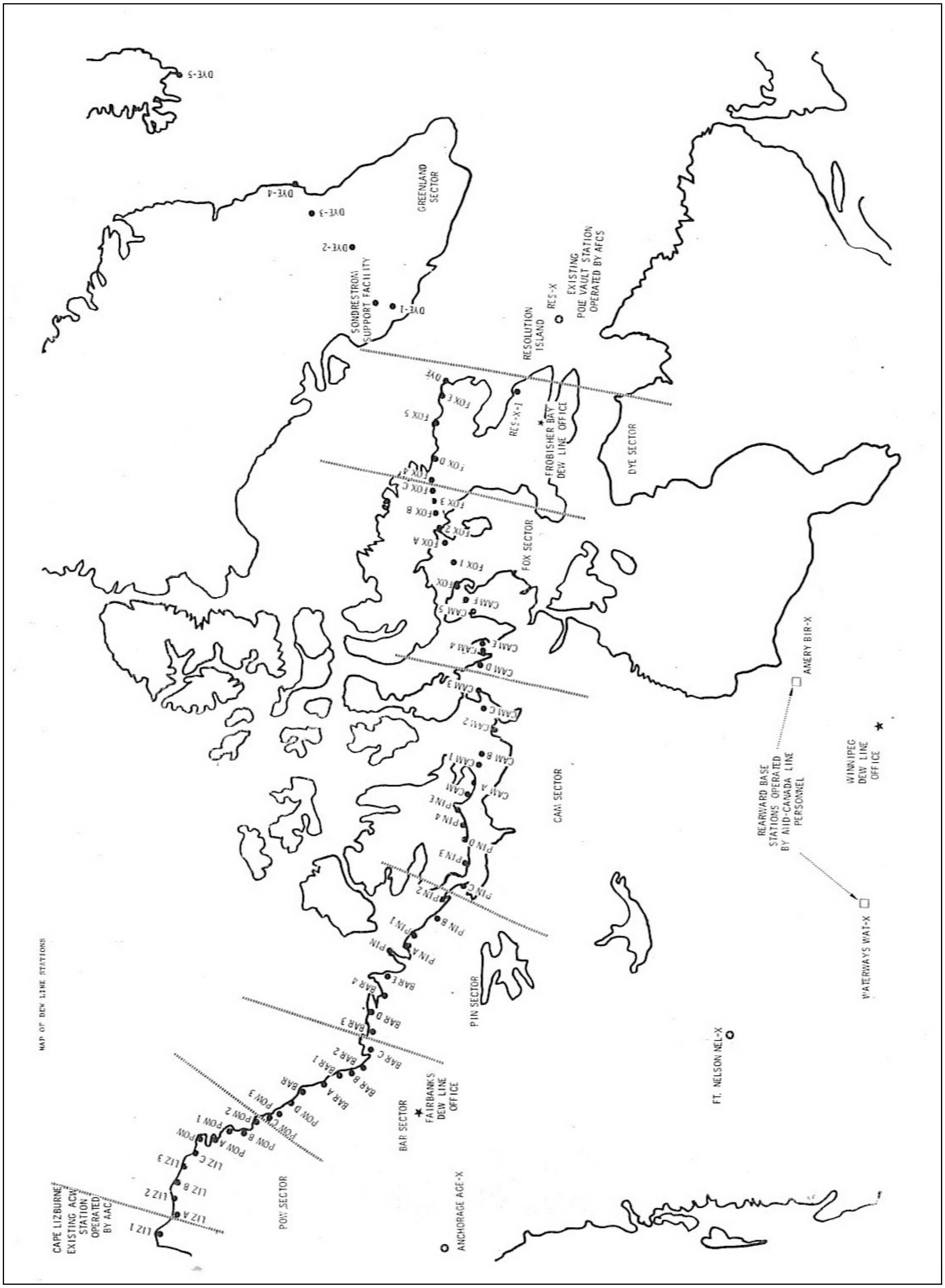

Figure 8.5 The DEW Line (Ray, Thomas *A History of the DEW Line, 1946-1964*)

All of these study groups shared a similar feature: they recommended that top priority be given to the DEW Line as soon as tests proved it feasible. The Eisenhower administration granted its approval, and Canada gave its consent. By the end of 1954, it was confirmed that an Arctic early warning radar system would in fact be workable. In January 1955, the JCS approved the land segment of the DEW Line: from the western terminus at Cape Lisburne to its eastern end at Cape Dyer.

The results of the Location Study Group differed only slightly from the initial site surveys conducted by Western Electric in 1953. The only major difference was in the eastern sector near the terminus of the proposed site. Western Electric planned an Arctic radar chain from Cape Lisburne, Alaska, to Resolution Island in the Hudson Strait, which meant the Line would take a decided turn to the southeast. Canadian officials were particularly aware that this southward dip would reduce the amount of warning available for attacks on their eastern industrial areas.[54]

The primary reason Western Electric chose the more southerly route was that the terrain in northeastern Canada presented far more challenges. Canadian officials recommended Padloping Island or Frobisher Bay for the northeastern terminus of the land section of the DEW Line. In order for this change to be practical, the western end of the eastern seaward extension would be moved from Argentia to Greenland. This would allow the eastern terminus to be farther north. Despite the added expense of the more northerly route, Canadian officials ardently supported the change.[55] In the end, the Canadians persevered, and Frobisher Bay became the eastern terminus of the land portion of the DEW Line.

In the wake of the Canada-United States Military Study Group's Third Interim Report, the Canadian government burst into a frenzy of activity in anticipation of the problems resulting from the United States building a chain of radar stations on Canadian territory. The Canadian government was not as convinced about the need for a DEW Line as the United States. A number of elements, including the relationship between the two governments and the potential financial burden, troubled Canadians. Making the situation worse was the Eisenhower administration's way of "reach[ing] major decisions on continental defense without first consulting Canada."[56] The Eisenhower administration, like the Truman administration before it, did not always bring Canada completely into the decision-making process, despite the necessity of placing critical parts of the continental defense system on Canadian territory.

With the construction of the DEW Line all but a foregone conclusion by mid-1954, Canadian officials spent a lot of time preparing for it. There could never be an even split in what each nation could contribute materially to continental defense, but what was more realistic and even expected was parity in the formulation of policy. The Canadian goal was to prevent Canadian forces from becoming merely an appendage of the U.S. military in matters of continental defense. Canadians could not in good conscience turn over the defense of their country to the United States.

Canada's role in the financing, construction, and operation of the DEW Line remained to be resolved. Other problems surrounding the issue of Canadian sovereignty also required attention.

Just a day after the MSG meeting, W. H. Barton,[a] who represented the Department of External Affairs on the Canada-United States Military Study Group, provided Canadian Secretary of State for External Affairs Lester B. Pearson his perspective on the MSG's

[a] W. H. Barton main position was as Defence Liaison (1) Division, but in June he was serving also as Acting Under-Secretary for External Affairs. Barton also served as the Canadian Secretary of the Permanent Joint Board on Defense.

conclusions along with some advice for future agreements. If each nation would be responsible for one of the early warning lines, then Canada would have minimal participation and/or commitment in the DEW Line. Barton, because of sovereignty issues, did not think the unilateral approach to building each of the warning lines would be in the Canadian interest. According to Barton, the RCAF would agree with this policy, since it was "concerned about the rapid increase in the size of its continental defence commitments." He believed that the Minister of Defence Production would also concur.[57]

The other choice, albeit more far-fetched, since it probably would not have the support of the United States, was to bring both lines into a single system and share the costs, with a Canadian officer in command of construction. This would have political advantages for Canada, including "the obvious political attractions" and "strengthen[ing] Canadian operational control over the system." It would be necessary to provide the United States with a sufficient enough role "to avoid recriminations as to the adequacy of the system in the event of penetration by an enemy force." While the latter option was unlikely to occur, Barton warned that if the Department of External Affairs did not take the lead and get other departments of the Canadian Government involved, the probable result would be a Mid-Canada Line built and operated by Canada and a DEW Line built and operated by the United States.[58]

The Acting Head of the Defence Liaison (1) Division, Benjamin Rogers expressed concern with Canada assuming all costs and responsibility for the Mid-Canada Line. Taking this route, Rogers stated, would dramatically curtail Canada's choices regarding the DEW Line, in essence restricting its freedom of action. Rogers argued:

> If Canada undertakes sole responsibility for the construction of the mid-Canada line, all the available logistic resources, engineering skills, etc., will be fully absorbed in meeting this commitment and

> Canadian participation in the distant early warning line could therefore be no more than nominal.[59]

This meant the problem of large numbers of Americans working and living in Canada would appear. The political fallout of this would be most objectionable.[60]

At the 100th Meeting of the Cabinet Defence Committee, on 23 June 1954, trepidation arose similar to that expressed in the Department of External Affairs correspondence. The representatives of that department were partly assuaged when General Foulkes said that the DEW Line should be constructed "as a joint project with active Canadian participation."[61] It was not the intention of the Chiefs of Staff to allow the United States a free hand in the Canadian Arctic.

At the beginning of July 1954, word reached the Department of External Affairs and General Foulkes that the Joint Chiefs of Staff and the Department of Defense had accepted the conclusions of the Third Interim Report by the Military Study Group.[62] Now it was just a matter of when the issue would be brought up for discussion in the PJBD or through other governmental channels. Within a week the U.S. members of the PJBD informed their Canadian colleagues that implantation of the DEW Line would be on the agenda of the July meeting.

General Guy V. Henry, Chairman of the U.S. Section of the PJBD, informed the Board that the JCS had approved the recommendation of the MSG and the JSC "specifically requested the U.S. Section to seek the cooperation of the Canadian Section in obtaining agreement of the Canadian Government on the need for the far northern early warning line." This initiated the formal process of obtaining joint-Canadian agreement on the implementation of the DEW Line. To underline the weight of this request, General Henry wanted the Canadian Section to realize the United States considered the DEW Line "of the highest priority." What the United States wanted to avoid at this stage, after finally coming to terms internally about the construction of the DEW Line, was any unnecessary delays in reaching agreement, which would in turn postpone the DEW Line's implementation.[63]

Henry explained that the Canadian government's decision to bear all responsibility for the construction and implementation of the Mid-Canada Line:

> was most gratifying to the United States. In light of this heavy responsibility . . . the United States was willing to carry all or any part of the burden involved in constructing and operating the far northern DEW line, depending upon the wishes of the Canadian Government as to the extent of Canadian participation.[64]

The Air Force member of the U.S. Section emphasized the necessity for alacrity, calling for the studies authorized in the Third Interim Report to go forward even if a definite answer on the DEW Line was not ready.[a] Any significant delays would hurt the chances to begin the construction of the DEW Line at the earliest feasible date. Such a large and complex project required much time to organize and arrange funding.[65]

Despite many unanswered questions, on 18 August the Cabinet Defence Committee agreed that the Ambassador to the United States should notify the U.S. government:

> that the Canadian Government agreed, in principle, to the need for the establishment of a distant early warning line across the most northerly practicable part of North America. Without prejudice, however, to the extent of Canadian participation and subject to further review when preliminary studies had been completed and the details and cost of the undertaking were available.[66]

The decision by Canadian officials was made easier when it was agreed that the Americans would pay for the entire cost of the DEW Line, since the Canadians were picking up the complete cost of the less expensive Mid-Canada Line. In a formal diplomatic note, No. 580, sent on 2 September 1954, Canada approved the DEW Line in principle. To help balance Canadian fears of sovereignty encroachment, the United States agreed to hire over 50% of the

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[a] The studies referred to here were those of the Military Characteristics Committee and the Locations Study Group.

workers from Canada and purchase over 50% of the materials for the DEW Line from Canadian businesses, and the "extent to which the Canadian firms [were] tendering contracts and participation" was not to be made public.[67] Other problems and concerns awaited resolution over the ensuing months.

On 27 September 1954, Canada and the United States issued simultaneous press releases announcing their agreement on the need for the DEW Line and "that detailed planning for such a line should be initiated at once." The press release intimated that the DEW Line would become a third component of a "complete system for warning of the approach of hostile aircraft and for the control of interceptor forces," along with "the main control and warning radar installations in the continental United States . . . [and] the Mid-Canada Line." The press release concluded by stating the DEW Line was critical for the security of both nations and detailed how the United States and Canada were working together in this endeavor.[68]

A note from Canadian Ambassador Arnold D. P. Heeney to Secretary of State John Foster Dulles dated 16 November, stated that a joint effort to establish "a comprehensive warning and control system against air attack" had been approved by the Canadian government. The key part of the note, emphasizing that the United States had the financial obligation for the DEW Line and that Canada was leaving the door open on how it would participate in the Arctic warning line in the future, follows:

> The Canadian Government has now considered a proposal put forward through the Permanent Joint Board on Defence that the construction of the Distant Early Warning element of the over-all joint Canada-United States warning system should be the responsibility of the United States Government. The Canadian Government concurs in this proposal subject to the conclusion as an early date an agreement as to the terms which shall govern the work. At the same time, however, the Canadian Government wishes to state its intention to participate in the project, the nature and extent of such participation to be determined in the future.[69]

U.S. and Canadian officials consented to making the agreement public, emphasizing the joint nature of the North American early warning system.

On 19 November 1954, Canada and the United States jointly announced advances from the conception and prototype stage to agreement to construct the DEW Line. Again, the press release was drafted with sensitivity to Canadian fears about an increase in the American presence in Canada. The statement indicated "that projects of this nature can be carried out most effectively by vesting responsibility for all phases of the work of construction and installation in a single authority;"[70] nonetheless, it "was not an isolated project, but part of an overall [joint] continental system."[71] Next, the announcement reminded its readers that Canada had assumed all responsibility for the Mid-Canada Line, and concluded "in the case of the Distant Early Warning Line it has been agreed that, although both Canada and the United States will participate in the project, responsibility for the work of construction and installation should be vested in the United States."[72] Members of the Cabinet Defence Committee wanted it made explicitly clear that, despite the DEW Line being constructed by the United States, "Canada reserved its rights in respect of control and ultimate participation in the system." The press release thus made it clear that the DEW Line would not be an exclusive domain of the United States.

The final step in the process was a formal exchange of notes on the terms and conditions of the construction and operation of the DEW Line. The agreement titled "Establishment in Canada of Warning and Control System Against Air Attack" formalized American and Canadian commitment of the DEW Line, effective 5 May 1955.[73] The agreements covered items such as site control, liaison arrangements, provision and construction of the stations, operation and manning, financing, and the use of air strips. It provided guidelines for dealing with the Canadian Inuits.[a]

Some points in the agreement are worth specific mention. There was explicit acknowledgment that "Canada will acquire and retain title to all lands required for the system."[74] A DEW Project Office[b] was to be established to provide liaison between both governments and the primary contractor (Western Electric). The agreement, speaking to the sensitive issue of equipment procurement, "reaffirms the principle that electronic equipment at installations on Canadian territory should, as far as practicable, be manufactured in Canada."[75] This was the source of particularly heated debate, due to the advanced technical level of the radar equipment. There was some question that Canadian firms would be able to produce the equipment to the needed specifications. Also, the phrase "as far as practicable" might mean absolutely nothing, as it encouraged Canadian contracts for equipment, but did not obligate the United States to purchase said equipment from Canadian firms. The agreement declared that Canadian businesses were to be given "equal consideration" in obtaining construction contracts. Manning, operation and logistical support for the DEW Line would be defined in later agreements. The United States assumed all responsibility for costs.[76]

President Eisenhower approved a recommendation by Dr. Lee A. Dubridge, Science Committee Chairman, which was supported by a number of government departments, to assess the threat of a surprise atomic attack on the United States over the coming years. On 26 July

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[a] The twenty-one headings of the "Statement of Conditions to Govern the Establishment of a Distant Early Warning System in Canadian Territory" are Sites, Liaison Arrangements, Plans, Provisions of Electronic Equipment, Construction and Procurement, Canadian Law, Operation and Manning, Financing, Period of Operation of the System, Ownership of Removable Property, Telecommunications, Scientific Information, Matters Affecting Canadian Eskimoes, Use of Air Strips, Landing Facilities, Transportation, Resupply Arrangements, Taxes, Status of Forces, and Supply Arrangements and Administrative Agreements.
[b] The DEW Project Office would eventually be located in New York City.

1954, Eisenhower appointed Dr. James R. Killian[a] to head the Technological Capability Panel of the Science Advisory Committee of the Office of Defense Mobilization to evaluate the threat of surprise attack. Between 13 September 1954 and 1 February 1955, the members of the Technological Capabilities Panel held numerous meetings and conferences, made field trips to many military headquarters and commands, and met with numerous governmental and civilian officials to get a better understanding of the developing threat posed by the Soviet Union.[77] The panel members thus went "into the field" to interview military officers who were not part of the highest echelons in Washington to obtain a wider sampling of viewpoints. The Panel turned in its 190-page report to the president on 14 February 1955.

The Killian Report began by discussing the horrendous nature of thermonuclear weapons and stated "that today few parts of the world are beyond the reach of aircraft capable of delivering nuclear weapons." It added that "a one-megaton bomb on a major U.S. city could be the most catastrophic military-social setback in American history . . . .Technology thus ha[d] magnified the power and potential of the United States and, by implication, of her enemy."[78] But, the report continues, technology can also help to minimize the threat. While the DEW Line was already approved by the time the Killian Report had been submitted, the report provided further testimony that the Line was critical to the nation's continental air defense efforts.

Because of the destructiveness of the hydrogen bomb, the United States needed "to minimize the possibility of surprise attack. Clearly the consequences of surprise are so great that every effort to eliminate it is justified."[79] Accordingly, the report endorsed the planned DEW Line and stated that it should be implemented immediately, without any delays "for technical or

[a] James R. Killian was president of the Massachusetts Institute of Technology and would eventually become the first Scientific Advisor to a president.

geographic refinements." The DEW Line was essential for producing the minimal warning time of two hours necessary to implement the various military and civilian plans.[80]

The DEW Line extensions were also endorsed by the report. The DEW Line "should be extended from Greenland across the Atlantic by way of Iceland and the Faroes, and its planned Pacific extension should ultimately be moved north from the line Alaska-Hawaii to the line Aleutians-Midway."[81] This change of the Atlantic extension to Greenland instead of Argentia coincided with the Canadian position and would allow the DEW Line to follow the more northern route terminating at Cape Dyer Bay. The Atlantic seaward extension would then run from Greenland to the Azores. The Killian Report reaffirmed what many had argued for over the past two years, the improved early warning was necessary and that the DEW Line was the most essential component of the early warning system. In April 1955, the Joint Chiefs of Staff approved most of the recommendations of the Killian Report.

In December 1954, Western Electric renewed its partnership with the USAF when they were awarded the contract for the entire DEW Line. Vernon B. Bagnell, a Bell System manager who supervised the tests at Barter Island, coordinated the construction of the DEW Line.[82] The contract stipulated that the DEW Line was to be completed in only 32 months, by July 1957.

In order to meet the deadline, a tight schedule would have to be maintained. If any phase was incomplete when the next stage was due to begin, the whole project would be delayed. A delay at a critical period could postpone the completion of the DEW Line by a year. A finely tuned logistical system was developed to meet the 32-month schedule. Difficulties inherent in this Arctic project included a lack of dependable surface or terrain maps in the area of the proposed sites and an incomplete knowledge of the hydrography and oceanology of the waterways that were to be used. Further, the summer season for using much of the Arctic Ocean was a short, two-month period. A major problem was how to transport the tons of materials needed for the construction and operation of the DEW Line. These and other problems would have to be resolved in order to meet the exceptionally strict timetable for completing the DEW Line by mid-1957.

The decision to go ahead with the DEW Line had other ramifications than just an improvement in the continental defense system. The DEW Line was a major step towards formalizing closer defense relations between Canada and the United States. As the two nations debated the DEW Line, realities of the Cold War were bringing them closer together defensively—a process that had begun during World War II. Canada could have staked out a unilateral approach to defense, but financially, as historians John Herd Thompson and Stephen J. Randall point out, "defense cooperation with the United States was much cheaper than unilateralism."[83] They argue that Canada could have mustered up the necessary finances "to create on its own the military infrastructure that would have made American bases on Canadian soil and a cooperative system of air defense unnecessary."[84] This approach would have stretched the limited Canadian resources dangerously thin. Instead of taking Canada to the brink of bankruptcy, Canadian leaders chose cooperation in defense matters with their more powerful southern neighbor. Canadians, during their nearly 350-year colonial history, had accepted aid for their security from their parent nation, either France or Britain. Thompson and Randall argue that "it did not require too extensive a rationalization to enjoy from the United States the security they had formerly accepted from France and Britain."[85] It was this growing interdependency that would eventually lead to the creation of a cooperative air defense system—NORAD.

Canadian involvement in the DEW Line's construction and operation would curtail the public outcry over sovereignty issues in the Canadian north as well. It would weaken the public impression that if the United States had the full responsibility for constructing and operating the DEW Line, the U.S. had vested rights in the northern half of the continent."[86] Canada must participate in some capacity in the DEW Line.

The Canadians leaders also tied the continental defense issues of North America together with the defense of Europe. According to Canadian officials, for the United States to continue its significant participation in defending Europe, the American people must believe they were secure at home and everything was being done for the defense of North America. Members of the Cabinet Defence Committee believed that if the American public wanted the DEW Line and Canada stood in the way of its creation, then the fallout could be the United States lessening its commitment to the North Atlantic Treaty Organization (NATO) and thus to European defense.[87]

Thus, by contributing to the establishment of the DEW Line, Canadian officials sought beneficial results besides improved continental defenses. First, it would counter the argument that Canada was losing its sovereignty over its Arctic territory with the growing U.S. presence. Second, Canadian participation in the DEW Line would secure positive results for European defense and NATO. The Cabinet Defence Committee believed that:

> to protect Canadian interests in the north, Canada had to contribute to the development of the overall warning system. This might mean that the Canadian contribution to European defence would not be so great as might otherwise have been the case, but it would also mean that if the United States were satisfied that it was properly protected, it would continue to carry a large share of the burden of defending Europe. In consideration of all these factors, it would be desirable for Canada to make some contribution to the establishment of a distant early warning line.[88]

Canada was looking towards NATO as counter-balance to its bilateral relations with the United States. Thompson and Randall argue that Canada "sought safety in numbers."[89] Canadian diplomat Escott Reid stated that Canada must "avoid being left alone with the United

States . . . because of the great disparity in power between the two countries." Organizations such as NATO, the United Nations and even the British Commonwealth provided the capacity "to redress the balance of North America."[90]

The completion of the DEW Line also brought about a greater coordination, if not unity, in the continental defense of North America with the American establishment of the Continental Air Defense Command (CONAD) on 1 September 1954. The completion of the DEW Line (July 1957) and the full operation of the Mid-Canada Line the following year necessitated a greater cooperation in the joint defense of North America. As the defense network grew more complex, questions were raised about intercepting hostile craft in Canadian air space, and a solution had to be found. In order for the air defense network to become the most efficient, the Royal Canadian Air Force (RCAF) and the USAF agreed air defense integration was necessary. Michael William Evans, in his Master's thesis, affirms that "the mutual use of a radar network represented a degree of cooperation impossible in any interstate relationship other than alliance."[91] The DEW Line, a key component of the continental defense system, and the improved interception ability (SAGE, or Semi-Automatic Ground Environment) linked to it (Cheyenne Mountain), were the final elements in the establishment of NORAD.

[1]Charles J. V. Murphy, "The Polar Watch," *Fortune* (December 1957): 246.

[2]Richard Morenus, *DEW Line, Distant Early Warning: The Making of America's First Line of Defense* (New York: Rand McNally & Company, 1957), 28-9.

[3]Francis H. Lanahan, "Interim Report on Operating and Maintaining the DEW Line," *Signal* 12 No. 7 (March 1958): 27.

[4]Marian Talmadge and Iris Gilmore, *NORAD: The North American Defense Command* (New York: Dodd, Mead & Company, 1967), 34-5; and Howard La Fay, "DEW Line, Sentry of the Far North," *The National Geographic Magazine* 114 No. 1 (July 1958): 131.

[5]Thomas W. Ray, *A History of the DEW Line, 1946-1964* (ADC Historical Study No. 31), 14.

[6]Kenneth Schaffel, *The Emerging Shield: The Air Force and the Evolution of Continental Air Defense, 1945-1960* (Washington, DC: Office of Air Force History, 1991), 212.

[7]"Canada -Atomic Power," *Military Review* 35 No. 6 (September 1955), 69.

[8]Murphy, 246.

[9]Memorandum for Chairman, United States Section, Permanent Joint Board on Defense, Canada-United States, 23 January 1953, Permanent Joint Board on Defense Canada-United States -- United States Section: Top Secret General Correspondence 1941-56, Folder 19, Box 4, Records of International Military Agencies, Record Group 333, National Archives.

[10]Briefing Sheet for Chairman, Joint Chiefs of Staff, 9 April 1953, Permanent Joint Board on Defense Canada-United States-United States Section: Top Secret General Correspondence 1941-56, Folder 19, Box 4, Records of International Military Agencies, Record Group 333, National Archives.

[11]Murphy, 250.

[12]LaFay, 134; and Nielson, 188.

[13]Ray, 15.

[14]LaFay, 134.

[15]Arthur B. Goetze, "The DEW Line Story," *Signal* 11 No. 5 (January 1957): 12.

[16]Morenus, 41-42; Schaffel 212; and La Fay, 136.

[17]Ray, 15.

[18]Morenus, 48.

[19]Murphy, 250; and Ray, 14-16.

[20]Murphy, 250.

[21] LaFay, 136; and Goetze, 10.

[22]Morenus, 45.

[23]Document 929 (JSC 1899/76), Reel 4, *Records of the Joint Chiefs of Staff*: Part II: 1946-1953: The United States. University Publications of America, Inc. Microfilm.

[24]Ray, 16.

[25]Note by the Executive Secretary to the National Security Council on Continental Defense, 11 February 1954, NSC 5408 — Continental Defense, Folder 3, Box 9, NSC Series, Policy Papers Subseries, White House Office, Office of the Special Assistant for National Security Affairs: Records 1952-1961, Dwight D. Eisenhower Library.

[26]Department of Defense Progress Report to National Security Council on Status of Military Continental U.S. Defense Programs, as of 1 June 1954, NSC 5408 —Continental Defense, Folder 2, Box 9, NSC Series, Policy Papers Subseries, White House Office, Office of the Special Assistant for National Security Affairs: Records, 1952-1961, Dwight D. Eisenhower Library.

[27]*Ibid.*

[28]Department of Defense Progress Report to National Security Council on Status of Military Continental U.S. Defense Programs, as of 1 June 1954, Folder 6 "Continental Defense, Study of, by Robert C. Sprague (1953-1954), NSC Series, Subject Subseries, White House Office, Office of the Special Assistant for National Security Affairs: Records, 1952-1961, Dwight D. Eisenhower Library.

[29]Ray, 16.

[30]Murphy, 250.

[31]Interim Report, Enclosure to Memorandum for the Chairman, U.S. Section, Permanent Joint Board on Defense, Canada-United States, 20 October 1953, Records of the United States Joint Chiefs of Staff Central Decimal File, 1954-56, CCS 413.44 (7-1-48) Sec. 8, Box 129, Records of the United States Joint Chiefs of Staff, Record Group 218, National Archives.

[32]*Ibid*.

[33]Schaffel, 210.

[34]Interim Report, Enclosure to Memorandum for the Chairman, U.S. Section, Permanent Joint Board on Defense, Canada-United States, 20 October 1953, Records of the United States Joint Chiefs of Staff Central Decimal File, 1954-56, CCS 413.44 (7-1-48) Sec. 8, Box 129, Records of the United States Joint Chiefs of Staff, Record Group 218, National Archives.

[35]*Ibid.*

[36]*Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII: Relations with the United States, Part 4: Defence Issues, Section I: Distant Early Warning System and Mid-Canada Line, Document 718, "21 October 1953 Letter, Minister of National Defence to Prime Minister" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2349

[37]*Ibid.*

[38]*Ibid.*

[39]*Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII: Relations with the United States, Part 4: Defence Issues, Section I: Distant Early Warning System and Mid-Canada Line, Document 723, "5 November 1953 Telegram, Secretary of State for External Affairs to Ambassador in United States" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2354

[40]*Documents on Canadian External Relations*, Vol. 19 (1953), Chapter VIII: Relations with the United States, Part 4: Defence Issues, Section I: Distant Early Warning System and Mid-Canada Line, Document 724, "5 November 1953 Telegram, Secretary of State for External Affairs to Ambassador in United States" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=2355

[41]*Ibid*.

[42]Joseph T. Jockel, *No Boundaries Upstairs: Canada, the United States, and the Origins of North American Air Defence, 1945-1958* (Vancouver: University of British Columbia Press, 1987), 81.

[43]Interim Report by the Canada -United States Military Study Group, 3 June 1954, Permanent Joint Board on Defense Canada-United States -United States Section: Top Secret General Correspondence 1941-56, Folder 6, Box 1, Records of International Military Agencies, Record Group 333, National Archives.

[44]Enclosure "Third Interim Report" to Memorandum for the Chairman, U.S. Section, Permanent Joint Board on Defense, Canada – U.S., 9 July 1954," Records of the United States Joint Chiefs of Staff Central Decimal File, 1954-56, 413.44 (7-1-48) Sec. 8, Box 129, Records of the United States Joint Chiefs of Staff, Record Group 218, National Archives.

[45]Jockel, 83.

[46]*Ibid.*

[47]Letter, Admiral Radford to General Foulkes, 8 July 1954, Folder 8, Box 2, Top Secret General Correspondence, 1941-1956, Permanent Joint Board on Defense, Canada - United States, United States Section, RG 333: Records of International Military Agencies, National Archives.

[48]Robert J. Watson, *The Joint Chiefs of Staff and National Policy, 1953-1954*, Volume V: History of the Joint Chiefs of Staff, (Washington, DC: Joint Chiefs of Staff, 1986), 143.

[49]*Ibid.*; and Ray, 17.

[50]Report from the USAF-RCAF Military Characteristics Committee, 7 September 1954, Records of the United States Joint Chiefs of Staff Central Decimal File, 1954-56, 413.44 (7-1-48) Sec. 9, Box 129, Records of the United States Joint Chiefs of Staff, Record Group 218, National Archives; Watson, 143; and Enclosure B to "Memorandum by the Chief of Naval Operations for the Joint Chiefs of Staff on Military Characteristics of Distance Early Warning Line at Sea (JCS 1899/175)", Records of the United States Joint Chiefs of Staff Central Decimal File, 1954-56, 413.44 (7-1-48) Sec. 9, Box 129, Records of the United States Joint Chiefs of Staff, Record Group 218, National Archives.

[51]Memorandum by the Chief of Staff, U.S. Air Force for the Joint Chiefs of Staff on Mutually Acceptable Military Characteristics for the Distant Early Warning System, Records of the United States Joint Chiefs of Staff Central Decimal File, 1954-56, 413.44 (7-1-48) Sec. 9, Box 129, Records of the United States Joint Chiefs of Staff, Record Group 218, National Archives; and Enclosure B to "Memorandum by the Chief of Naval Operations for the

Joint Chiefs of Staff on Military Characteristics of Distance Early Warning Line at Sea (JCS 1899/175)", Records of the United States Joint Chiefs of Staff Central Decimal File, 1954-56, 413.44 (7-1-48) Sec. 9, Box 129, Records of the United States Joint Chiefs of Staff, Record Group 218, National Archives.

[52]First Report of the Location Study Group, Distant Early Warning (DEW) Group, Records of the United States Joint Chiefs of Staff Central Decimal File, 1954-56, 413.44 (7-1-48) Sec. 10, Box 129, Records of the United States Joint Chiefs of Staff, Record Group 218, National Archives.

[53]*Ibid.*

[54]*Documents on Canadian External Relations*, Vol. 20 (1954), Chapter V: Relations with the United States, Part 1: Defence Issues, Section B: Distant Early Warning System and Mid-Canada Line, Document 479, "6 November 1954 Memorandum from Assistant Under-Secretary of State for External Affairs to Under-Secretary of State for External Affairs" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=653

[55]*Ibid.*

[56]Jockel, 79.

[57]*Documents on Canadian External Relations*, Vol. 20 (1954), Chapter V: Relations with the United States, Part 1: Defence Issues, Section B: Distant Early Warning System and Mid-Canada Line, Document 462, "4 June 1954 Memorandum from Acting Under-Secretary for External Affairs to Secretary of State for External Affairs" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=635

[58]*Ibid.*

[59]*Documents on Canadian External Relations*, Vol. 20 (1954), Chapter V: Relations with the United States, Part 1: Defence Issues, Section B: Distant Early Warning System and Mid-Canada Line, Document 464, "21 June 1954 Memorandum from Head, Defence Liaison (1) Division, to Acting Under-Secretary of State for External Affairs" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=641

[60]*Documents on Canadian External Relations*, Vol. 20 (1954), Chapter V: Relations with the United States, Part 1: Defence Issues, Section B: Distant Early Warning System and Mid-Canada Line, Document 466, "25 June 1954 Extract from Minutes of Meeting of Cabinet Defence Committee" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=637

[61]*Documents on Canadian External Relations*, Vol. 20 (1954), Chapter V: Relations with the United States, Part 1: Defence Issues, Section B: Distant Early Warning System and Mid-Canada Line, Document 465, "23 June 1954 Memorandum from Acting Under-Secretary of State for External Affairs to Secretary of State for External Affairs" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=642

[62]*Documents on Canadian External Relations*, Vol. 20 (1954), Chapter V: Relations with the United States, Part 1: Defence Issues, Section B: Distant Early Warning System and Mid-Canada Line, Document 467, "9 July 1954 Letter Acting Under-Secretary of States for External Affairs to Chairman, Chiefs of Staff Committee" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=638

[63]*Documents on Canadian External Relations*, Vol. 20 (1954), Chapter V: Relations with the United States, Part 1: Defence Issues, Section B: Distant Early Warning System and Mid-Canada Line, Document 468, "17 July

1954 Memorandum from Acting Under-Secretary of States for External Affairs to Secretary of State for External Affairs" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=643

[64]*Ibid.*

[65]*Ibid.*

[66]*Documents on Canadian External Relations*, Vol. 20 (1954), Chapter V: Relations with the United States, Part 1: Defence and Security Issues, Section B: Distant Early Warning System, Mid-Canada Line and Continental Air Defence, Document 474, "18 August 1954 Extract from Cabinet Conclusions" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=648

[67]Note by the Secretaries to the Joint Chiefs of Staff on Security Policy Statement Distant Early Warning Line, 11 January 1956, Records of the United States Joint Chiefs of Staff Central Decimal File, 1954-56, 413.44 (7-1-48) Sec. 12, Box 129, Records of the United States Joint Chiefs of Staff, Record Group 218, National Archives.

[68]Press release of September 27, "U.S., Canada Agree on the Need for Distant Early Warning Line" *Department of State Bulletin* 31 No. 798 (11 October 1954), 539.

[69]TIAS 3218 Letter, A.D.P Heeney to John Foster Dulles (May 5, 1955) in *United States Treaties and Other International Agreements* vol. 6 pt. 1 (Washington, DC: GPO, 1955), 763.

[70]Press release of November 19, "Distant Early Warning Line Authorized by U.S., Canada," *Department of State Bulletin* 31 No. 805 (29 November 1954), 813.

[71]*Documents on Canadian External Relations*, Vol. 20 (1954), Chapter V: Relations with the United States, Part 1: Defence and Security Issues Issues, Section B: Distant Early Warning System, Mid-Canada Line and Continental Air Defence, Document 482, "12 November 1954 Extract from Minutes of Meeting of Cabinet Defence Committee" Retrieved 3 March 2008 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=656

[72]Press release of November 19, "Distant Early Warning Line Authorized by U.S., Canada," *Department of State Bulletin* 31 No. 805 (29 November 1954), 813.

[73]Nathaniel French Caldwell, Jr., *Arctic Leverage. Canadian Sovereignty and Security* (New York: Praeger, 1990): 35; and TIAS 3218 "Establishment in Canada of Warning and Control System Against Air Attack (May 5, 1955) in *United States Treaties and Other International Agreements* vol. 6 pt. 1 (Washington, DC: GPO, 1955), 763.

[74]"Establishment in Canada of Warning and Control System Against Air Attack (May 5, 1955) in *United States Treaties and Other International Agreements* vol. 6 pt. 1 (Washington, DC: GPO, 1955), 765.

[75]*Ibid*., 766.

[76]*Ibid.*, 767, 769. 771.

[77]"The Report to the President by the Technological Capabilities Panel of the Science Advisory Committee" Document 2972 (1993), *Declassified Documents*. Microfiche: 185.

[78]"The Report to the President by the Technological Capabilities Panel of the Science Advisory Committee" in Marc Trachtenberg, ed., *The Development of American Strategic Thought: Basic Documents from the Eisenhower and Kennedy Periods, Including the Basic National Security Policy Papers from 1953 to 1959* (New York: Garland Publishing, Inc., 1988), 335.

[79]"The Report to the President by the Technological Capabilities Panel of the Science Advisory Committee" in Trachtenberg, 336.

[80]"The Report to the President by the Technological Capabilities Panel of the Science Advisory Committee" in Marc Trachtenberg, 351.

[81]Kenneth W. Condit, *The Joint Chiefs of Staff and National Policy, 1955-1956*, Volume VI: History of the Joint Chiefs of Staff (Washington, DC: Joint Chiefs of Staff, 1992), 272.

[82]Murphy, 250.

[83]John Herd Thompson and Stephen J Randall, *Canada and the United States: Ambivalent Allies* (Athens: The University of Georgia Press, 1994), 190.

[84]*Ibid.*

[85]*Ibid.,* 191.

[86]*Documents on Canadian External Relations*, Vol. 20 (1954), Chapter V: Relations with the United States, Part 1: Defence and Security Issues Issues, Section B: Distant Early Warning System, Mid-Canada Line and Continental Air Defence, Document 482, "12 November 1954 Extract from Minutes of Meeting of Cabinet Defence Committee" Retrieved 3 March 2008 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=656

[87]*Ibid.*

[88]*Ibid.*

[89]Thompson and Randall, 192.

[90]Escott Reid quote taken from, Thompson and Randall, 192.

[91]Michael Williams Evans, "The Establishment of the Distant Early Warning Line, 1952-1957: A Study of Continental Defense Policymaking" (M.A. thesis, Bowling Green University, 1955), 105.

CHAPTER 9 - Construction and Operation

The Distant Early Warning (DEW) Line finally received official approval from the Canadian and U.S. governments in November 1954. While approval was a victory for those in favor of the Arctic early warning line, the prospect of constructing such an expansive line of radar sites was daunting. A whole new series of challenges with American-Canadian leadership roles, Arctic timetables, and multi-branch support awaited the architects of the Line. When everything was completed and the DEW line became operational, the United States had strengthened its continental defenses by providing the maximum amount of tactical warning against approaching Soviet aircraft. Although the United States chose not to appropriate large amounts of money for a sophisticated civil defense program, it is debatable what type of impact the DEW Line would have had in actually saving the lives of Canadian and U.S. citizens even with an expanded civil defense commitment. What the DEW Line accomplished was an improvement of the U.S. deterrence strategy. Improved continental defense measures, including the critical component of early warning, were a cardinal feature in Eisenhower's New Look policy. The primary significance of the DEW Line, though, was the protection of the main element of U.S. deterrence in Eisenhower's New Look— the bombers of SAC. By providing a sufficient amount of warning, the U.S. retaliatory force would be better protected and able to launch a devastating nuclear counter attack on the Soviet Union.

In December 1954 the Office of the Secretary of Defense awarded Western Electric, the company responsible for overseeing the various stages of the testing phase of the DEW Line (Projects Counterchange, Corrode, and 572), the contract for the installation of the continental portion of the DEW Line. Western Electric was made responsible for design, engineering, procurement, construction, and installation.[1] The supervisory agency was the

United States Air Force (USAF). The planned completion date of 31 July 1957 allowed only thirty-two months to erect the most ambitious project ever constructed in the Arctic, a construction endeavor that would have been impressive even under ideal conditions.

The problems of operating in the Arctic were numerous. The difficulties included difficult weather conditions, such as ice, snow, temperature extremes ranging from -70° F to +60° F, and "white out" or blizzard-like conditions caused by wind speeds often in excess of 100 mph. Adding to the problems of Arctic construction, especially on the eastern section of the DEW Line, was the isolation of the proposed radar sites and exceptionally difficult terrain, such as deep gorges and precipitous cliffs. Incomplete oceanographic and hydrographic information for the Arctic Ocean also complicated the summer sealifts. The difficulties were exacerbated by the compressed timetable, which in some instances allowed only a few months of planning before the actual operation was to begin.

Western Electric also had to develop "precise concepts for DEW Line operations, defining and spelling out the mission, techniques for accomplishment, supply channels, and intricate chain-of-command relationships best suited to fulfill its early warning function." The DEW Line must become "a tightly integrated component" in the developing continental defense system.[2] The DEW Line had to be not only operational but operational *and* effectual in a mere thirty-two months.

The Arctic year is quite different from that of the continental United States. Instead of four seasons, the Arctic has only three, lacking a "true summer." An Arctic "summer," more reminiscent of spring, occurs in June and July, with temperatures seldom topping 60° F. The sun never sets throughout a 30-day period during the Arctic summer. The autumn months in the Arctic are August and September. Winter is quite long, beginning in October and lasting through May. During the middle of the Arctic winter, the sun never rises above the horizon, contributing to temperatures often around forty or fifty degrees below zero; even -65° F is not out of the ordinary.[3]

The DEW Line was to be constructed generally along the 69th parallel,[a] about 200 miles north of the Arctic Circle. The topography of DEW Line varied greatly across its 3000-mile length. Along the Alaskan and Western Canadian shoreline, the land was mostly relatively "flat, treeless tundra." Further east, the terrain was more inhospitable. Gently sloping beaches gave way to more rugged, craggy features, until at the eastern end of the land segment of the DEW Line, Baffin Island, the coastline was nothing but alternating steep cliffs and deep chasms.[4] Some of the DEW Line sites on the eastern sector were as high as 2500 feet above sea level, making logistical support exceptionally difficult.

When Western Electric was awarded the DEW Line contract[b], the Line's eastern sector was still under discussion. But the contract could not be delayed, because necessary tasks had to begin, such as distributing numerous sub-contracts, placing tens of thousands of purchase orders, and formulating logistic and operations procedures. Under the pressure of time, the conundrum concerning the eastern sector of the DEW Line was resolved in Canada's favor in January 1955. The Joint Chiefs of Staff (JCS) approved a plan terminating the eastern sector at Cape Dyer on Baffin Island the more northern, and more costly, alternative. This choice allowed more warning for the industrial areas of Canada and the northeastern United States. This choice of route for the

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[a] The actual variation of the DEW Line sites ranged from the southernmost station at 67°06' N to the northernmost station at 71°19'36" N. The westernmost station was located at 163°50'45" W longitude, while the easternmost DEW Line site was at 61°23'15" W longitude.
[b] "Air Force contract AF18(600)572 with the Western Electric Co., (Prime contractor for construction and test of the DEW Line) provided for delivery to the Air Force of a complete operational major support system by 1 July 1957 to include all supplies, equipment, and facilities required for one year's operation subsequent to 1 July 1957." From p. 7, "Logistic Plan Land-Based Segment Distant Early Warning System (DEW Line) 1 December 1955" in *History of Alaskan Air Command: July-December 1955, Supporting Documents*, K484.01 Jul – Dec 1955 vol. II, 00507978, AFHRA, Maxwell, AFB.

eastern terminus was not yet reflected in all of the paperwork involving the DEW Line. In the 14 March 1955 "Preliminary Operational Plan for the Distant Early Warning System," some parts made no mention of the new route and still provided data on the now outdated station sites.[5]

The planned land segment of the DEW Line had fifty-seven radar stations scattered across Canada from Cape Lisburne, Alaska, to Cape Dyer. Projects Counterchange, Corrode, and 572 had experimented with three types of stations (main, auxiliary and intermediate), placed roughly fifty miles apart. This pattern was generally adopted for the DEW Line. The Western Electric plan, approved by USAF and the Joint Chiefs of Staff, called for six main, twenty-three auxiliary, and twenty-eight intermediate radar stations.

The six main stations were placed approximately 500 miles apart. Each was planned as the administrative and communication center for a sector of the DEW line. The place names for these sites were as follows (west to east): Point Barrow (POW)[a], Barter Island (BAR), Cape Perry (PIN), Cambridge Bay (CAM), Hall Beach (FOX), and Cape Dyer (DYE). The two western-most stations were in Alaska, and the four others were located in Canada.

The main stations were the largest of the DEW Line radar stations, with the largest number of building structures, the most personnel, and the most electronic and communication equipment. These sites also had maintenance and storage facilities. About fifty pre-fabricated building modules comprised the primary structure of DEW Line main station radar site. Two 25-module "trains[b]" were assembled on site in a parallel configuration. The structures were also parallel to the prevailing winds and were connected by an overhead, covered walkway, forming a large letter "H."[6] Each module was 16 feet wide by 28 feet long by 10 feet high. The modules

[a] The three-letter abbreviations is the brevity code for each site, commonly used within the Department of Defense.
[b] A "train" was formed when the modules were connected end-to-end, similar to the look of joined boxcars on a railroad.

were joined along their lengths (the longest side), making a 25-module "train" 28 feet wide by 400 feet long.

Figure 9.1 Aerial view of DEW Line Main station, CAM-MAIN (http://www.lswilson.ca/cam-m-002.jpg)

These sites also had hangars and garages.

The distinguishing characteristic of a DEW Line main station was its AN/FPS-19[a] rotating search radar, housed in a large radome on steel stilts over a set of modules located at the end of one leg of the "H." Each main site also had an AN/FPS-23[b] flutter radar. The main sites could communicate[c] laterally along the DEW Line utilizing the AN/FRC-45 UHF (755-985 megacycles) tropospheric scatter equipment and communicate with rearward communication centers far to the south using the IS-101 VHS (30-50 megacycle) ionospheric scatter equipment. More typical communication equipment were the "conventional [line-of-sight] VHF and UHF

[a] Ratheon produced the AN/FPS-19 search radar set.
[b] Motorola produced the AN/FPS-23 flutter radar set.
[c] "Communication can be multi-channel voice and teletype, for both the ionospheric and topospheric communication systems.

transmitters and receivers [which] enabled voice ground-to-air communications with pilots flying within range of the DEW radar" stations.[7] Helping these sites to transmit and receive information was a whole array of antennae, including some up to 400 feet high.[8]

A final major feature of these sites was an airstrip. The runway at a main station typically measured 150 feet wide and 6000 feet long, a size sufficient to handle the large C-124 "Globemaster" cargo plane.[9] Interconnecting the buildings, storage tanks, runway, and, where applicable, the shore area were snaking, gravel roads.

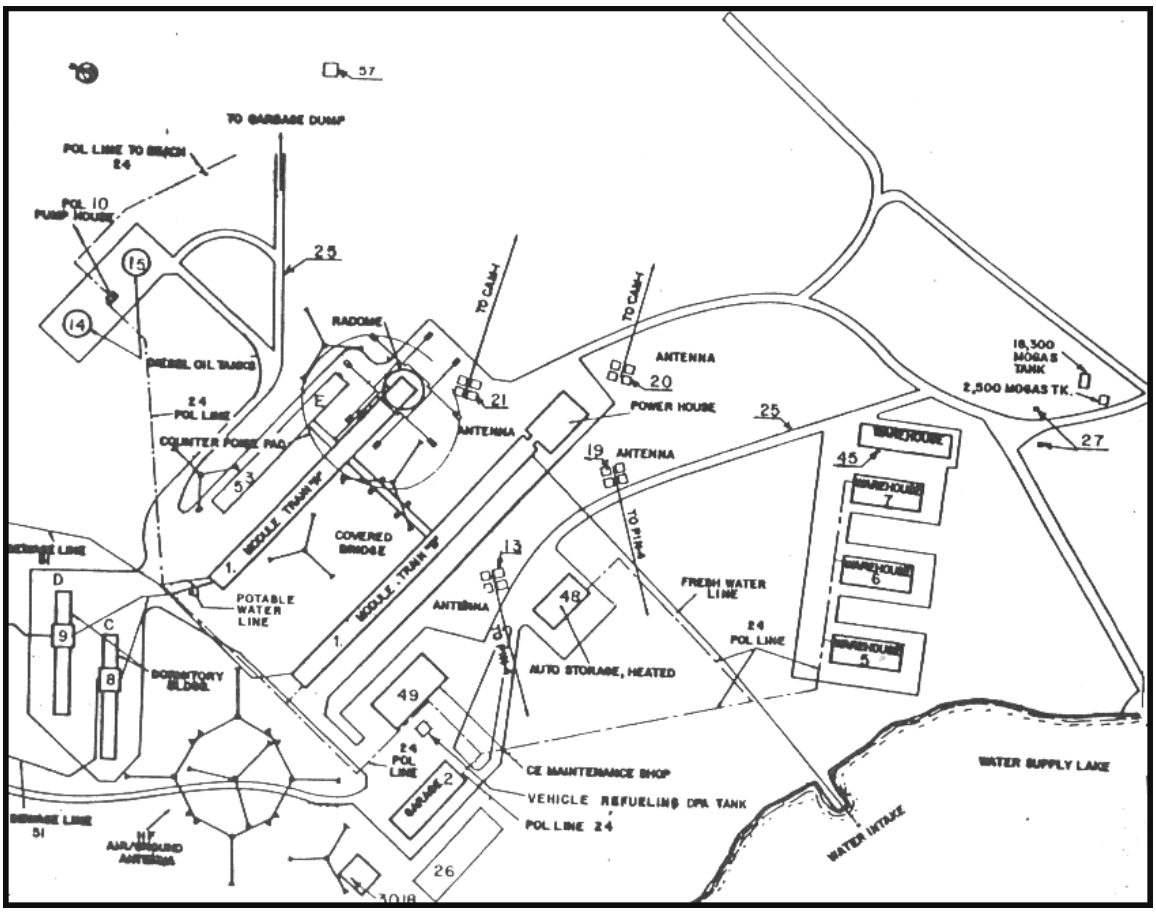

Figure 9.2 CAM-MAIN site building layout diagram (http://www.lswilson.ca/layout-camma.gif)

Each main station served as a process center, analyzing data collected by its own radars and by the auxiliary and intermediate stations in its sector. The original complement of manpower at the main station DEW Line was approximately 45 civilians[a] and six Air Force officers. At Alaskan sites, the officers were all USAF officers; on Canadian sites, a RCAF officer substituted for one of the USAF officers.[10] This arrangement came under scrutiny in 1958 when Canadian Minister of Defence George Pearkes visited the DEW Line and was distressed at the paucity of Canadian military representation on sites on Canadian territory. He advocated that "RCAF officers be assigned a greater share in manning the DEW Line." The formal agreement signed on 5 May 1955, entitled the Canadian Defence Minister to request this change.[11] Section 7 (Operation and Manning) of the "Statement of Conditions to Govern the Establishment of a Distant Early Warning System in Canadian Territory" stipulated that:

> The extent of Canadian participation in the initial operation and manning of the DEW System shall be a matter for later decision by Canada after full consultation with the United States. It is understood that, in any event, Canada reserves the right, on reasonable notice, to take over the operation and manning of any or all of the installations. Canada will ensure the effective operation, in association with the United States, of any installations it takes over.[12]

The National Defence Department initially sought to reverse the ratio of air force personnel. While the U.S. Air Defense Command (ADC) wanted to keep things unchanged, the USAF suggested a compromise, though, that was tipped more to the Canadian government's view: five RCAF officers and two USAF officers at each main station in Canada. The senior RCAF officer had to serve as the DEW Sector commander, one USAF officer would become the director of the sector, or second in command, while the second USAF officer "would act as a liaison officer between the Federal Electric Company[b] and the 4601st Support Wing." This

[a] A new term coined by Federal Electric Corporation for these civilian operators of the DEW Line was "radicians – a contraction of radio, radar, electro-mechanical technicians." See Ray, 26.
[b] The Federal Electric Corporation, a subsidiary (service organization) of International Telephone and Telegraph Corporation, was awarded the operation and maintenance contract for the DEW Line by the USAF on 12 March 1956 to take effect after 31 July 1957.

arrangement was approved by the USAF in January 1959 and went into effect the following month.[13]

The second type of radar station on the DEW Line was the auxiliary station. It was designated by a three-letter code name[a] followed by a numerical suffix.[14] There were to be twenty-three auxiliary sites, spaced approximately 100 miles apart. Seventeen auxiliary sites were located in Canada, and six sites were built in Alaska. These early warning radar sites also had both types of radar found at the main sites: AN/FPS-19 and AN/FPS-23 radars. The primary function of these stations was to alert the main sites of radar contacts.[15] It would be up to the main sector station to analyze, evaluate, identify the target, or "bogie." The major differences between the auxiliary and main stations were logistical responsibilities, communication abilities, and overall function. The auxiliary stations did not require as much manpower as a main station. Each auxiliary station had 20 civilians[b] and no military officers from either country.[16]

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[a] BAR-1 (Komakuk Beach, Yukon Territory) would indicate the westernmost auxiliary station in the Barter Island, Alaska, sector. The next auxiliary station to the east was given the code name BAR-2 (Shingle Point, Yukon Territory), and so on. The westernmost auxiliary station in the Cambridge Bay sector was CAM-1 (Jenny Lind Island, Nunavut), the next auxiliary station to the east was given the code name CAM-2 (Gladman Point, Nunavut), etc.

[b] An early operation plan called for only 12 civilians per auxiliary site and Ray in *The DEW Line*, indicated that the number of civilians was between 16-18 (p. 27).

Figure 9.3 An example of an auxiliary site on the DEW Line (http://ll.mit.edu/about/History/dewline.html

Auxiliary sites had the conventional line-of-sight, ground-to-air VHF and UHF radio, and the tropospheric scatter AN/FRC-45, employed for lateral communication along the DEW Line. Lacking was the ability to communicate with the rearward communication centers. An auxiliary site had a 25-module "train" and the large radome housing the search radar.[17] An airstrip (smaller than those at the main sites) had gravel roads leading up from the coast, where achievable.

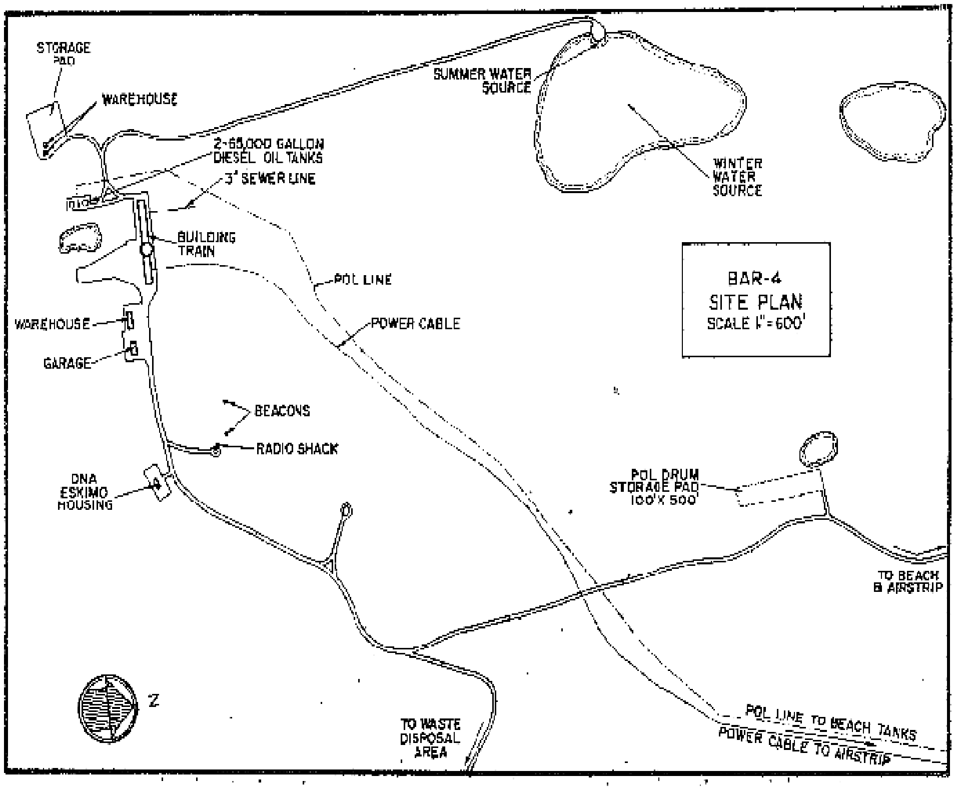

Figure 9.4 BAR-4 auxiliary site plan (http://lswilson.ca/bar4pics.htm

Another important feature of the main and auxiliary DEW Line stations was the audible alarm developed and proved feasible by the experiments at Barter Island, eventually known as the Gate Alarm Radalarm. This invention allowed for a drastic reduction from the original estimates of personnel for operating the early warning radar stations. Lowering the manpower requirements coupled with limiting the number of American officers stationed in the Canadian Arctic went far toward alleviating Canadian anxieties over sovereignty issues.

The third and final DEW Line station type was the intermediate site, whose designation was a three letter code name followed by a letter suffix.[a] The intermediate sites were placed between auxiliary sites or between auxiliary and main stations.[18] The intermediate stations

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[a] BAR-A (Demarcation Bay, Alaska) would indicate the westernmost intermediate site in the Barter Island, Alaska, sector. The next intermediate station to the east was given the code name BAR-B (Stokes Point, Yukon Territory), and so on. The westernmost intermediate site in the Cambridge Bay sector was CAM-A (Sturt Point, Nunavut), the next intermediate site to the east would be given the code name CAM-B (Hat Island, Nunavut), etc.

were approximately 100 miles from one another. This meant the DEW Line had one type of radar station or another every fifty miles. Intermediate sites were furnished with only the AN/FPS-23 flutter radar, operating on a similar principle as the radar on the Mid-Canada Line. Known as "gap-filler" radar, it could detect low-flying aircraft avoiding detection from line-of-sight search radar. The only purpose of the intermediate sites was to detect aircraft breaching the DEW Line. The alert would be sent to the neighboring stations via lateral voice communications utilizing FM mobile radio. Five-man civilian crews[a] staffed these intermediate sites, living and working in a train of only five modules.[19]

Figure 9.5 Aerial view of the POW-A site (http://www.lswilson.ca/powa.jpg)

The use of civilians to man the DEW Line was another point of concern for some in the Canadian government as well as a revolutionary change in policy undertaken by the United States. Canadian Secretary of State for External Affairs Lester B. Pearson raised some questions over the manning of the DEW Line in November 1954, when he learned of USAF plans to staff the DEW Line with civilians rather than military personnel. Pearson contemplated:

[a] The "Operations Plan for the North American Early Warning System, 15 November 1955" originally called for only two men to be stationed at each intermediate site.

> if this were to be done the military role would presumably be limited to command and control, and the number of service personnel involved might be quite small. However there are obvious disadvantages to entrusting remote and important defence installations of this sort to civilians not subject to military discipline and possibly susceptible to labour unrest.[20]

Pearson recommended no action but further consideration for the time being, until the United States made a final decision on the matter.

The United States chose to staff the DEW Line with civilians for different reasons. The first was the growing technological sophistication of the radar and communication equipment. The military had no problems training recruits with the latest technical skills but did have trouble retaining them in the military. After their enlistments were up, they became especially marketable in the private business sector. In fact:

> as equipment grew steadily more complicated and the techniques of operating and maintaining it more difficult to master, a greater proportion of an airman's time had to be devoted to training. This situation presented the Air Force with its greatest manpower problem, for highly skilled men showed the least inclination to remain in military service.[21]

The use of civilians might alleviate the shortage of highly-skilled air force personnel. A DEW Line completely staffed by servicemen might have caused shortages of trained personnel that would have reverberated throughout USAF commands.

Another reason for using civilians was the changing relationship between warfare and civilians throughout the first half of the 20th century. In modern times, international conflict had developed with increasing frequency into "total war," in which the belligerents employed every asset toward victory. By the time of the First World War the distinction between "civilians" and "combatants" was becoming blurred and World War II exacerbated the process. Civilians once relatively safe behind the front lines now found themselves vulnerable and exposed, the result of air power. No longer did distance or defending forces provide safety for a nation's civilian population. Meanwhile, industrialization led to the civilians' contribution to their country's war effort to grow in significance.

Technological sophistication also meant an impressive increase in the number of civilian technological experts working near the front lines. The aircraft companies in particular sent tech reps all around the world where the airplanes were in service. Thus, advancing technology brought elements of the civilian world closer to the front lines and continued to fade the distinctions between military and civilian roles.

The next step in the militarization of civilians thanks to increasing technological sophistication was placing civilians into the first line of defense, albeit early warning, as was the case for the DEW Line. The blending of more sophisticated technology and the changing character of civilians led to the use of civilians in a role that only a few years before would unquestionably have been assumed by the military. In fact, the DEW Line was the first fixed line of defense operated by a civilian contractor. Although civilians were still located on the continental land mass, they could become easy targets in the event the Cold War heated up – the civilian early warning radar operators, or radicians, were in harm's way. Many of the civilians who staffed the DEW Line were Canadian, and as time passed, more Canadians became technically qualified to man the DEW Line. Eventually, around ninety percent of the civilians manning the DEW Line were Canadian.

The DEW Line was divided into two portions, a western and eastern region, for command and operational purposes. The western region was placed under the operational control of the Alaskan Air Command (AAC), and the eastern region was under North East Air Command (NEAC).[22] The western region, divided into four sectors, extended eastward to

92°05’ W longitude. The dividing line ran between the auxiliary station CAM-3 to the west and CAM-D, an intermediate station of FOX Sector, to the east.[23] The eastern region was divided into two sectors.

The DEW Line’s function was restricted to early warning, specifically to the mission of “detection and identification of airborne objects entering and operating within the DEW Line Identification Zone” and determining whether aircraft penetrating the Arctic radars were “friendly,” “unknown,” or “hostile.”[24] Not included in the original operation plan for the Line were “additional requirements for growth potential . . . [W]e do acknowledge the need to bear in mind that the DEW System may eventually by expanded to perform additional functions, and accommodate more people for defense purposes. For example, passive detection and control of weapons functions may be added.”[25] The Department of Defense never favored expansion of the DEW Line’s mission, however, because that would bring more American servicemen onto Canadian soil, which could cause political problems as discussed above and thus complicate or hinder the primary purpose of the DEW Line: early warning.

The November 1955 operational plan for the DEW Line stressed making the identification process as efficient as possible. The DEW Line “main stations” were to handle identification. They would accomplish this by processing information from the auxiliary and intermediate stations along with data from its own radars. The main stations disseminating the analyzed information among “designated points in the operating commands, and to CONAD and RCAF-COC’s by teletype . . . The air defense information must be received at RCAF and CONAN-COC’s within five (5) minutes of transmission time from the Main Station.”[26] Without a quick identification and relay procedure, some of the value of the DEW Line would be lost.

Western Electric was required to begin the preliminary stages of construction immediately after being awarded the DEW Line contract in December 1954. Time could not be wasted if the DEW line was to be operational on 31 July 1957. A major task was to move over 459,000 tons of materials[27] into the desolate Arctic over a period of thirty-two months. The transport of materials was intensely studied and thoroughly planned out, taking advantage of all modes of transportation (air, water, land) and terrain features, and with special awareness of the weather.

The cheapest, most efficient and practical way to transport large amounts of bulky cargo was by water. The Arctic Ocean in the 1950s, however, was not navigable year round. In fact, there was only a two-month summer window (August and September) that the seaways could be utilized, though not without hazard. Something as innocuous as a change in wind direction could force the floating ice sheets into the Arctic shoreline, suddenly closing the sea lanes. The limited period of navigability only allowed two major sealifts, one in the summer of 1955 and one in the following summer. Other forms of transportation were obviously necessary. Supplementing the essential, though limited, sealift were the transportation by airlift, cat train, barge, and helicopter.

Rail lines and waterways were utilized to get the supplies as close to the individual DEW Line sites as possible. From locations, such as Churchill, Manitoba, the cargo often had to be transported by aircraft. Once the freight arrived at collection points along the DEW Line, it was redistributed laterally along the Line by cat trains, airplanes or helicopters. Barges on the Mackenzie River were used to supply six sites in northwestern Canada.[28]

Western Electric hired subcontractors to build and assemble the DEW Line sites. The construction in the Western section (Alaska) became the responsibility of two American firms: Johnson, Drake and Piper (Minneapolis, Minnesota) and the Puget Sound Bridge and Dredging Company of Seattle. The subcontractor for the central section was the Canadian firm of Northern Construction Company & J. S. Stewart, Inc. The Foundation Company, Ltd., also a Canadian company, was the subcontractor for the Eastern section.[29]

Before anything could happen on the ground in the Arctic, "mapping teams traveled more than 1,000,000 miles and reviewed more than 80,000 aerial photos as part of siting and mapping activities."[30] RCN icebreakers spent some time in the spring surveying the Arctic. Much of the Arctic Ocean in these regions, despite bordering on the North American continent, still remained uncharted.[31]

In order to implement the DEW Line in an astonishing 32-month period, intricate timetables had to be devised. A setback during one phase of construction could have had a domino effect, postponing subsequent phases. Certain operations, if not accomplished during the allotted period, might have to wait an entire year to be finished. The weather, the overshadowing factor when operating in the Arctic, always had to be taken into account when planning operations. To make best use of the construction materials slated for delivery arriving in the summer 1955 sealift, many advance activities were required. Siting crews had to plot out the buildings and other structures at the DEW Line sites; Some construction equipment and materials had to be moved to the sites before the summer. Some projects needed to be could be completed ahead of time as well.

In the dead of winter, siting crews arrived in ski planes and began surveying the proposed sites for all the key structures: buildings, runways, oil storage areas and water supply points. Two things were essential for each location: a surface smooth enough and long enough to make a landing strip for cargo planes and adequate amounts of gravel (free gravel or rocks to be crushed). The siting crews worked long hours every day of the week, during the worst part of the Arctic winter, and in the rare bouts of good weather worked “around the clock.” They slept in tents, which were often completely covered by the blowing snow.[32] If the frigid Arctic weather was not enough to worry about, then a wandering polar bear might be.

At each site a construction crew arrived by a small ski-plane or snow tractor in February 1955. The first task was to clear snow off the ice to permit a small transport plane (C-46 or C-47 aircraft) with more supplies and a D-4 tractor to land. The preliminary crew tested for fresh water ice, which made the most dependable surface, because the strength of the ice depended on the amount of salt in the water— water that had less of a salt content made firmer ice. Fresh water lakes were ideal. If fresh water ice was not available, they did make use of the salt water ice, but the thickness of the ice had to be greater.[a] The construction of these strips prepared the way for the landing of larger cargo planes (C-119s or C-124s) that brought the rest of the supplies and materials needed to continue construction.[33] These airstrips were temporary and lasted only until spring.[34]

The air strip had to be 6000 feet long and 200 feet wide to support the C-124 Globemaster planes. Each plane, fully loaded, weighed 90 tons. At one point, on one of the strips, a bigger D-8 tractor was needed to complete the job. Due to miscalculations of tractor weight, strength of salt-water ice, and the effects of extreme cord on the parachute material, a paradropped tractor crashed through the ice and was lost. Perfecting the paradrop calculations and dropping on fresh water ice prevented this from happening again. The lessons learned were taught only once.[35]

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[a] Ice thickness ranged between five and six feet.

Before the ice runways became unusable by mid-Spring (May 1955), while it was still cold, more workers arrived on the larger planes. This airlift was nicknamed the Big Haul, a veritable race against time before warmer weather would make the airstrips unusable.[36] To win the race, planes were secured from every possible source, including commercial and private companies, and ran on a 24-hour schedule. In the first winter airlift, over 30,000 tons of supplies were delivered.[37]

Alaskan Air Command (AAC) was ordered to support the construction on the Western sector of the DEW Line, and "the AAC had less than sixty days between inception of the airlift scheme and its execution for planning purposes." If the time allotment was problematic for drafting an operational plan for the airlift, so too were "severe weather conditions, prior operational commitments, insufficient air support, and inadequate flight facilities."[38] Despite these initial problems, AAC was able successfully to discharge its duties.

With the arrival of building modules, more personnel and the supplies to sustain them, these sites began to become permanent locations. This occurred about the time of the spring thaw in late April, which rendered the ice strips useless. Working in continuous shifts, the crews turned their efforts to preparing the beaches for the sealift, which was ultimately the main supply line. Part of the crew was left to prepare the buildings, foundations, structural bases and storage areas. Paradrops provided food and supplies in the meantime.

In the summer of 1955, after ten months of extensive preparation, back in the continental United States, the first of the two planned amphibious operations was underway. The ships' hulls had been strengthened to withstand ice damage, and standard propellers had been replaced with strengthened alloy ones.[39] These modified ships were deployed into two task groups, one approaching the Arctic sites from the west and the other from the east.

In June 1955, the western task group was comprised of nearly 60 ships operated by the Military Sea Transport Service (MSTS) of the U.S. Navy. Part of the group began their journey in California, loading barrels of petroleum, oil, and lubricants (POL). They joined the rest of the ships in Seattle, Washington, where the equipment[a], supplies and U.S. Army Transportation Corps personnel were loaded.[40] Slower ships left port prior to joining the convoy off Icy Cape, Alaska.

This left only two months to get the ships in and out of the Arctic Ocean. With a shift of the wind, ships could become perilously surrounded with ice floes. If the ships did not make it out of the Arctic in this two-month window, they would become ice-locked and risk a crushed hull, causing serious damage or complete loss of the vessel. Wintering in the Arctic Ocean was perilous and only to be considered in a dire emergency.[41] Not only would this impede the progress of the DEW line, it would potentially damage U.S. national security, as the sealift employed 28% of the Pacific Amphibious Force.

At the same time, the eastern task group was loading POL in Philadelphia, Pennsylvania and construction materials and general cargo in Halifax, Nova Scotia. These ships proceeded to the Eastern Sites in the Baffin Island and Foxe Basin areas.[42] The eastern convey met with more serious water conditions caused a the thicker concentrations of ice. The total cost of the 1955 MSTS DEW Line supply operation was $27,062,003.[43]

A third supply approach was down the Mackenzie River. A Canadian sub-contractor, the Northern Construction Company, manned this effort. The river barges used to transport the materials downstream began the trip at Waterways, Alberta. The entire length of the journey along the Mackenzie River, from Waterways, Alberta to Aklavik, Northwest Territories, was

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[a] Some examples of the equipment were cranes, pre-fabricated buildings, storage tanks, towers, antennae sections, cement mixers, rock crushers (for gravel), tractors, snow mobiles, lumber, and steel pilings.

1500 miles. Three hundred miles into this trek, the Canadians had to unload the barges at Ft. Fitzgerald, Alberta to portage the barges and a tugboat fourteen miles around rapids and steep drops in the river bed, to Bell Rock, Northwest Territories, where the voyage to the Beaufort Sea could be resumed.[44] Once the freight reached Aklavik, sea, air and land methods carried the cargo to the designated sites.

The two ocean convoys encountered similar obstacles. Their courses were largely uncharted and proved treacherous with reefs and shoals. Underwater demolition crews, or frogmen, used dynamite to destroy coastal reefs blocking the beach approach of the lighterage vessels.[45] Another crucial element of each convoy was ice breakers jointly supplied by Canada and the United States.

The ships were able to unload in that two-month window, though there were minor problems. Ships were damaged, cargo delivery slowed more than expected and beach conditions were incorrectly reported by the initial surveying crews, presenting unforeseen complications. However, the 1955 sealift was generally successful. MSTS in carrying out its mission "used every cubic inch of shipping space," even filling LST ballast tanks with "aviation gasoline instead of water."[46] Lessons learned on this lift were implemented on the 1956 sealift, the second of two needed to complete the DEW Line.[47] In the 1956 summer sealifts, there were fewer deep-draft ships used and diesel fuel was delivered in bulk instead of in drums.[48] The latter was done because diesel storage tanks had been constructed between the sealifts.

Once the cargo was deposited, the rapidly approaching winter forced the workers to construct the gravel pads and foundations at the same time the modules were being assembled, mostly in heated tents. In October 1955, the interior work on the modules began with the installation of radio and radar equipment.[49]

Total cargo ferried to the DEW Line in 1955 was 189,000 short tons. Of this total, 50,000 tons were transported by air, 8,000 tons by barge, 4,000 tons by cat train, and 127,000 tons by the sealift. The total amount transported to DEW line sites the following year was 167,183 short tons.[50]

During the winter of 1955-56, concrete was mixed in heated tents so that the foundations for the towers to support the radomes could be laid. In the spring of 1956, the actual search radar antenna and housing were installed, and the roads and beaches were cleared again for the upcoming sealift. By the fall of 1956, communication between sites and back to the continental U.S. was dependable. In addition, autumn saw the completion of the permanent airstrips, allowing for year-round air service. By December, many sites were fully operational and on schedule. During the winter of 1957, Western Electric carried out more than one million tests to check tracking and detection capabilities of the DEW Line.[51]

The importance of gravel in the construction of the DEW Line cannot be overstated. In a film created by Western Electric chronicling its responsibility for building the DEW Line, it reported that the "digging and moving gravel is the start of just about everything in . . . Arctic [construction]." Everything built in the Arctic needed a firm base on which to build. Foundations, permanent airstrips, and roads all required gravel.[52] Howard La Fay also emphasized that "roads, airstrips, building pads—everything depended on its [gravel] availability."[53] If some of the locations were gravel-poor, then a machine for crushing rocks was sent by airlift so gravel could be produced. Some of the building foundations were built on a bed of six feet of gravel, while some of the runways had a layer of gravel twelve feet deep. Western

Electric estimated that nearly 10 million cubic yards of gravel[a] were used in the construction of the DEW Line.[54]

Material transported to the Arctic DEW Line sites totaled 459,900 tons: 281,600 by naval vessels, 140,400 by aircraft, 20,300 by barge, and 17,600 by cat train. Material brought in by the MSTS convoys amounted to over 61% of the total, emphasizing how vital the sea-routes were for building the DEW Line. Over 75,000,000 gallons of "petroleum products" arrived at DEW Line sites in 1955-1957.[55] The construction of the DEW Line was not without its tragedy. Twenty-five men[b] (15 in 1955 and 10 in 1956) lost their lives in aircraft-related fatalities during the construction phase.[56] Despite the lost lives, the DEW Line airlift was deemed the largest and one of the most successful commercial airlifts in history. Melvin Conant in *The Long Polar Watch* states that the DEW Line was:

> the most costly construction task ever accomplished in so short a time. Meeting the engineering, construction, and logistical problems involved in maintaining a system every minute or every hour of every day, week, and month, throughout extraordinary achievement. Never before had there been such a mammoth intrusion into the Canadian Arctic.[57]

The DEW Line required more than 113,000 purchase orders from 4,650 American and Canadian companies, costing $347,000,000. Canadian firms received the lion's share of the orders and funds expended. There were 66,295 purchase orders totaling $198,151,000 placed with Canadian companies, and 47,137 purchase orders totaling $148,849,000 were consigned to businesses in the United States.[58] Companies in the United States furnished most of the technical equipment, including the radar systems. According to historian Jon B. McLin in *Canada's*

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[a] *The DEW Line Story* provides some comparisons of this much gravel. 9,600,000 cubic yards of gravel is "enough to build two replicas of the Great Pyramid" or a transcontinental road in the United States 18 feet wide and one foot deep.

[b] La Fay and Murphy give the total fatalities of airmen at 26.

Changing Defense Policy, 1957-1963, "only about $8.8 million worth of electronic subcontracts were let in Canada in connection with the DEW Line."[59]

On 31 July 1957, Western Electric, having met its contractual obligations, turned the DEW Line over to the U.S. Air Force. The following month the USAF passed the operation of the Line over to the Federal Electric Corporation, the service division of ITT Corporation.[60] Servicing the DEW Line was a continuous process. Civilians became an integral part of maintaining U.S. national defense. The Federal Electric Corporation hired primarily Canadians, including around 100 Inuit for service in the DEW Line sites within Canada.[61]

A logistics plan for the DEW Line, prepared by the DEW Logistics Planning Group in December 1955, incorporated some of the lessons learned from the first year of building the DEW Line. The plan specified three different classifications of re-supplying: an Annual Resupply, Periodic Supply and Lateral Supply. The most elaborate, the Annual Resupply, would involve water and air transportation. Because thick ice renders the Arctic Ocean impenetrable for ten months out of the year, a sealift has to be well organized and committed to a rigid schedule. Also used in the Annual Resupply might be cat train, truck, and barge operations. The interservice nature of re-supplying the DEW Line was evident from the agencies participating, including the U.S. Army Transportation Corps, Tactical Air Command, Military Sea Transportation Service, and private entities. Periodic and Lateral Supply would be conducted with aircraft, civilian or military.[62]

Those who served on the DEW Line were required to undergo Arctic training and to pass a number of psychological tests. Because the Arctic temperatures cause the human body to burn calories ferociously, the diet for DEW workers was 4,500 calories per day.[63]

The DEW Line, even before it was completed, was slated for expansion. Six sites were added in the Aleutian Islands to extend its coverage to the west. USAF elected to man these Aleutian DEW sites with military personnel rather than civilians. In the east, four DEW Line sites (DEW East Project) were built, two on the respective coasts and two on top of the icecap across southern Greenland.[64] Both of these land extensions were operational by the early 1960s.

The Atlantic and Pacific seaborne extensions were also developed to expand early warning to attacks approaching the United States from the northwest and northeast. The original sea extensions were designed to supplement the continental radar network and were approved ahead of the DEW Line. However, when the DEW Line was approved and the early warning perimeter was extended to the north, the over-water extensions had to be re-evaluated. In December 1955, the Navy advocated, along with the USAF, extending radar coverage over the Atlantic from Greenland across the Denmark Strait to Iceland and from there, to Scotland. For the Pacific "Barrier," as the seaward extensions were now called, the Navy wanted the Kodiak Island-to-Hawaii route switched to the more favorable Midway Island-to-Adak (an Aleutian Island) route, allowing the Pacific Barrier to tie more readily into the Alaskan early warning radar system already in place. Ultimately, the Pacific Barrier ran from Umnak to Midway, while the Atlantic Barrier consisted of the route advocated by the Navy (Greenland – Iceland – Scotland) *and* a route from Greenland southeastward to the Azores.[65]

The DEW Line was a completely military system almost entirely manned by civilians. The complexity of the nuclear age had forced the military to become more dependent on non-military personnel.

The construction of the DEW Line was the most expensive, ambitious and complex project ever undertaken in the Arctic to that point in history. This was an "extraordinary engineering achievement. Working in an environment of unprecedented harshness, in two short summers, the DEW project team not only built the radar network across the 70th parallel, but also fashioned the rearward communication links on which timely surveillance depended."[66] The complicated logistical requirements for building, supplying, and manning such an endeavor north of the Arctic Circle presented significant and seemingly overwhelming challenges.

[1]Kenneth Schaffel, *The Emerging Shield: The Air Force and the Evolution of Continental Air Defense, 1945-1960* (Washington, DC: Office of Air Force History, 1991), 215.

[2]Thomas W. Ray, *A History of the DEW Line, 1946-1964* (ADC Historical Study No. 31), 12-13.

[3]*The DEW Line Story.* Western Electric. 1958. Retrieved 24 May 2006 from http://www.bellsystemmemorial.com/pdf/dewline.pdf

[4]*Ibid*.

[5]Document 106, "Preliminary Operational Plan for the Distant Early System, 14 March 1955" in *Continental Air Defense Command and Air Defense Command*, History January – June 1955, Vol II: Supporting Documents, K410.1-6 Jan – June 1955, 00500376. AFHRA, Maxwell AFB.

[6]Howard La Fay, "DEW Line, Sentry of the Far North," *The National Geographic Magazine* 114 No. 1 (July 1958): 136; and Ray, 26.

[7]Ray 25-26.

[8]Charles J. V. Murphy, "The Polar Watch," *Fortune* (December 1957): 250.

[9]Richard Morenus, *DEW Line, Distant Early Warning: The Making of America's First Line of Defense* (New York: Rand McNally & Company, 1957), 74.

[10]"Logistic Plan Land-Based Segment Distant Early Warning System (DEW Line) 1 December 1955" in *History of Alaskan Air Command: July-December 1955, Supporting Documents*, K484.01 Jul – Dec 1955, vol. II, 00507978, AFHRA, Maxwell AFB. [page 1]

[11]Ray, 48.

[12]"Establishment in Canada of Warning and Control System Against Air Attack (May 5, 1955) in *United States Treaties and Other International Agreements* vol. 6, pt. 1 (Washington, DC: GPO, 1955), 766-7.

[13]*Ibid.,* 48-49.

[14]"Explanation of Brevity Code" in "Preliminary Operational Plan for the Distant Early Warning System, 14 March 1955" in *Continental Air Defense Command and Air Defense Command*, History January – June 1955, Vol II: Supporting Documents, K410.1-6, 00500376. AFHRA, Maxwell AFB.

[15]*Ibid*., 27.

[16]*Manning the DEW Line* (International Telephone and Telegraph Corporation) in 168.7053-78, 56/00/00 C, Papers of Balchen B (14), 1007518, AFHRA, Maxwell AFB.

[17]Ray, 27.

[18]"Explanation of Brevity Code" in "Preliminary Operational Plan for the Distant Early Warning System, 14 March 1955" in *Continental Air Defense Command and Air Defense Command*, History January – June 1955, Vol II: Supporting Documents, K410.1-6, 00500376. AFHRA, Maxwell AFB.

[19]"Logistic Plan Land-Based Segment Distant Early Warning System (DEW Line) 1 December 1955" in *History of Alaskan Air Command: July-December 1955, Supporting Documents*, K484.01 Jul – Dec 1955 vol. II, 00507978, AFHRA, Maxwell AFB. [page 1] ; and Ray, 27.

[20]*Documents on Canadian External Relations*, Vol. 20 (1954), Chapter V: Relations with the United States, Part 1: Defence Issues, Section B: Distant Early Warning System and Mid-Canada Line, Document 479, "Enclosure 3 to 6 November 1954 Memorandum from Assistant Under-Secretary of State for External Affairs to Under-Secretary of State for External Affairs" Retrieved 9 October 2003 from http://www.dfait-aeci.gc.ca/department/history/dcer/details-en.asp?intRefid=653

[21]Alfred Goldberg, ed., *A History of the United States Air Force, 1907-1957* (Princeton, NJ: D. Van Nostrand Company, Inc., 1957), 165.

[22]Ray, 24; and Document 107, "Decisions Relative to Operation of the DEW Line, 30 July 1955" in *Continental Air Defense Command and Air Defense Command*, History January – June 1955, Vol II: Supporting Documents, K410.1-6, 00500376. AFHRA, Maxwell AFB.

[23]Document 107, "Operations Plan North American Early Warning System, 15 November 1955" in *Continental Air Defense Command and Air Defense Command*, History January – June 1955, Vol II: Supporting Documents, K410.1-6, 00500376. AFHRA, Maxwell AFB.

[24]*Ibid*., 7.

[25]Document 106, "Preliminary Operational Plan for the Distant Early System, 14 March 1955" in *Continental Air Defense Command and Air Defense Command*, History January – June 1955, Vol II: Supporting Documents, K410.1-6 Jan – June 1955, 00500376. AFHRA, Maxwell AFB.

[26]"Operations Plan North American Early Warning System, 15 November 1955" in *History of Alaskan Air Command: July-December 1955, Supporting Documents*, K484.01 Jul – Dec 1955 vol. II, 00507978, AFHRA, Maxwell AFB. [page 25]

[27]*Manning the DEW Line* (International Telephone and Telegraph Corporation) in 168.7053-78, 56/00/00 C, Papers of Balchen B (14), 1007518, AFHRA, Maxwell AFB.

[28]Ray, 28.

[29]*Ibid.*, 29.

[30]*Manning the DEW Line* (International Telephone and Telegraph Corporation) in 168.7053-78, 56/00/00 C, Papers of Balchen B (14), 1007518, AFHRA, Maxwell AFB.

[31]Ray 29.

[32]La Fay, 139.

[33]Morenus, 96.

[34]Charles J. V. Murphy, "The Polar Watch," *Fortune* (December 1957): 250.

[35]Morenus, 95.

[36]*Army-Navy-Air Force Register* 76 no 7 (May 14, 1955): 9.

[37]Fay, 138; and *The Dew Line Story* 16mm, 28 min. 1958. Record Group 306, Item 6699, National Archives.

[38]History of the Alaskan Air Command, January – June 1955: Narrative Text, K484.01 Jan – June 1955 vol. I, 00507974, AFHRA, Maxwell AFB. [p. 193]

[39]"U.S. Navy Helps Stock DEW Line's 'Deep Freeze'" No. 479 (December 1956): 28. {Journal?}

[40]Action Report to Logistical Plan 2-55 (Operation BAFOX) July — October 1955, Headquarters 7278th GU Transportation Terminal Command (NEAC), U.S. Army, 9.

[41]Memorandum by the Chief of Naval Operations for the Joint Chiefs of Staff on Jointure of Command for Sealift and Unloading Operations in Central Area of Project *572,* Records of the United States Joint Chiefs of Staff Central Decimal File, *1954-56,*413.44 (7-1-48) Sec. 11, Box 129, Records of the United States Joint Chiefs of Staff, Record Group 218, National Archives.

[42]*DEWLine — Part I "Logistical Problem"* 35 mm 1955-1958. Record Group 342, Item 66-56, National Archives.

[43]*Report of MSTS Arctic Operations: 1955*, K 243.0482-45 February 1956, 0485978, AFHRA, Maxwell AFB.

[44]*DEWLine — Part I "Logistical Problem"* 35 mm 1955-1958. Record Group 342, Item 66-56, National Archives; and *Dew Line Story,* 16mm 1958 Record Group 306, Item 6699, National Archives.

[45]*Ibid*.; and After Action Report to Logistical Plan 2-55 (Operation BAFOX) July- October 1955, 26.

[46]La Fay, 141.

[47]After Action Report to Logistical Plan 2-55 (Operation BAFOX) July- October 1955, 9 and 49.

[48]After Action Report: Project 572 West, *1956,* U.S. Army Forces, September 1956, i.

[49]*Dew Line Story,* 16mm 1958 Record Group 306, Item 6699, National Archives.

[50]Ray, 30-31.

[51]*Dew Line Story,* 16mm 1958 Record Group 306, Item 6699, National Archives.

[52]*Ibid.*

[53]La Fay, 136.

[54]*Ibid.* and *Dew Line Story,* 16mm 1958 Record Group 306, Item 6699, National Archives.

[55]*The DEW Line Story.* Western Electric. 1958. Retrieved 24 May 2006 from http://www.bellsystemmemorial.com/pdf/dewline.pdf

[56]Kenneth Schaffel, *The Emerging Shield: The Air Force and the Evolution of Continental Air Defense, 1945-1960* (Washington, DC: Office of Air Force History, 1991), 216; and Ray, 32.

[57]Melvin Conant, *The Long Polar Watch: Canada and the Defense of North America* (New York: Published for the Council on Foreign Relations by Harper, 1962), 40.

[58]*The DEW Line Story*. Western Electric. 1958. (p 24). Retrieved 24 May 2006 from http://www.bellsystemmemorial.com/pdf/dewline.pdf

[59]Jon B McLin, *Canada's Changing Defense Policy, 1957-1963: The Problems of a Middle Power in Alliance* (Batlimore, MD: The Johns Hopkins Press, 1967), 179.

[60]LaFay, 144.

[61]*Manning the DEW Line* (International Telephone and Telegraph Corporation) in 168.7053-78, 56/00/00 C, Papers of Balchen B (14), 1007518, AFHRA, Maxwell AFB.

[62]"Logistic Plan Land-Based Segment Distant Early Warning System (DEW Line) 1 December 1955" in *History of Alaskan Air Command: July-December 1955, Supporting Documents*, K484.01 Jul – Dec 1955 vol. II, 00507978, AFHRA, Maxwell AFB. [page 11, 13]

[63]*Ibid.*

[64]Ray, 33.

[65]Ibid, 18-19.

[66]Cox, David, "Canada and Ballistic Missile Defense," in Joel J. Sokolsky and Joseph T. Jockel, eds., *Fifty Years of Canada-United States Defense Cooperation: The Road from Ogdensburg* (Lewiston, NY: The Edwin Mellen Press, 1992), 242.

CHAPTER 10 - Conclusion

Often relegated to a footnote in Cold War history, the DEW Line actually has a compelling history fraught with international conflict and intra-governmental squabbles. The DEW Line and its place in Cold War history have often been overshadowed by the Korean War, the nuclear striking or retaliatory capability of the Strategic Air Command (SAC), nuclear proliferation in general, the Vietnamese Conflict, and the Cuban Missile Crisis of 1962. The radar defense networks continue to have considerable implications for the modern global community. Defense issues such as the Strategic Defense Initiative and the growing list of nations capable of launching missiles keep continental defense relevant down to the present day.

As national defense became more complex in the 1950s because of the unprecedented "peacetime" pressures of the Cold War, enhanced technology, and the growing nuclear threat from the Soviet Union, the armed forces had to consider new ways to protect the United States. One development was the establishment of the Distant Early Warning Line (DEW Line), a radar system to provide advanced warning against a trans-polar air attack. This dissertation has explored the complicated policy preferences; logistical problems; the impact on international relations; the building, supplying, and manning of such a project; and how the challenges were overcome.

In the early 1950s, the United States found itself in a vulnerable position, as the continental United States was for the first time in its history exposed to a surprising, devastating attack. Previously, the expected manner of invasion had always been amphibious assault, and the principal means for "Continental Defense" were the U.S. Navy, U.S. Army, and coastal defense fortifications. But the mid-twentieth century brought a new means of attack. The Soviet Union's fleet of intercontinental bombers could deliver atomic or thermonuclear weapons to the heart of the North American continent. The principal U.S. service responsible for defense of this "air armada" was the United States Air Force, although the U.S. Army and Navy still had significant roles for defending against aerial attack. The military forces of Canada also had a critical role in defending North America.

Defending the northern hemisphere presented a great many challenges: Canadian sensibilities and negotiations, planning for and managing the effects of severe climate, technology innovations, and infrastructure development. Canadian negotiations became a delicate part of the process, as the Canadians were concerned with too many Americans on their soil and losing sovereignty in the regions with an increased American presence. Jon B. McLin emphasizes in *Canada's Changing Defense Policy, 1957-1963* that

> This general sensitivity perhaps would have been even more acute if it had been more widely appreciated that, as the Canadian government acknowledged as early as 1956 . . . the purpose of the radar networks and interceptor squadrons was not so much the defense of Canada's populace as of the SAC force upon which the policy of deterrence depended.[1]

Another issue that distressed Canada was the escalating cost of defense. While Canadians shared American concerns about continental security, theirs was a small economy capable of only limited allocations of resources for defense. Canadian officials had to be selective about what defense projects they implemented. Canada not only had to worry about its defense but was maintaining forces in Europe as part of its NATO obligation. If continental defense became too expensive, Canada might have to lessen its NATO commitment. Ultimately, Canada submitted under U.S. pressure to the construction of the DEW Line on Canadian territory, though on terms both respectful and favorable to Canada.

One of the more striking features of the DEW Line was the use of civilians in the first line of defense, representing a remarkable change in U.S. defense policy. Advanced technology and strategic bombing had militarized civilians, which contributed to placing civilians in harm's way. Civilians were likely to be drawn into any future conflict regardless of the best efforts of the states involved.

The growing complexity and expense of defense systems, and weapon systems in general, caused changes in the thinking of the armed forces. Trained civilian manpower coupled with managerial skills attained from the private sector began playing an increasing role in U.S. national security. Civilians now encroached into areas that U.S. military planners had once considered strictly military. In fact, the DEW Line was the first major military project operated by a civilian contractor. Designing and operating a strategic defense system such as the DEW Line illustrated the growing intricacy of defense in the early Cold War period.

Science and technology also brought people from outside military circles into the debate on continental defense. Because of the growing complexity and technological nature of modern warfare, military officers no longer held the monopoly on expertise in defense matters. Increasingly, civilian scientists and academics were consulted and participated in defense studies and they contributed to the debates over military strategy.[2] Because of the uncertainties of nuclear war and the erasing of civilian and military boundaries, civilian advisers played an increasingly influential role under the Eisenhower administration.

The twin Soviet developments of atomic weapons and a large intercontinental bomber force made a surprise attack on the continental United States possible and potentially devastating. One of the lessons from World War II shaping military thinking and policies from 1945 through the 1960s was the "psychological impact" of the surprise attack at Pearl Harbor.[3] With this fear deeply planted into the psyche of the nation, it was no surprise that the government undertook a major air defense commitment. Although the early Soviet intercontinental bombers

(Tu-4s) could only reach targets in the United States via one-way, suicide missions over the Arctic, the damage inflicted could be terrific. Preventing such a surprise, crippling blow on the United States required tremendous improvements in air defense and warning systems. It took eight years from the time the Soviet Union detonated its first atomic weapon to the establishment of a U.S.-Canadian "defense-in-depth" air defense system.

The Eisenhower administration determined that the United States would not launch a "first strike" against the Soviet Union. SAC, and therefore deterrence, could only be effective if its forces could survive a Soviet surprise attack in enough force to deliver a powerful retaliatory strike. To lower SAC's susceptibility to a surprise attack, stronger air defenses were required, from the passive defense of warning, detecting, and tracking aircraft (largely by radar) to more active defenses such as interceptors and ground-to-air missiles. The most crucial element of air defense was early warning, which translated into additional time. A simple strategic formula developed: the greater the amount of warning time, the greater the number of aircraft that could be launched for a retaliatory strike. Early warning for SAC "assumed top priority"[4] and gained USAF approval when they realized that an improved early warning system would not compete with SAC for funding. Early warning also gained support from those governmental departments concerned with civil defense. The critical element tying together civil defense efforts, interception of hostile aircraft, and the protection of SAC was early warning.

Eisenhower wanted to emphasize in his New Look strategy a retaliatory capability and improved continental defenses, the purported "sword and shield." The DEW Line proved to be critical to both of these aspects of the New Look. Whereas the initial emphasis of the DEW Line was warning against attack to allow both active and passive defense measures to be undertaken, soon there was a definite "counter-offensive" role for the DEW Line as well—the protection of the primary retaliatory capability of the United States: the Strategic Air Command (SAC).

Historians of the Cold War have often dismissed the DEW Line's connection with deterrence. However, the DEW Line was a key component of the strategy of deterrence. Without adequate protection for the retaliatory, nuclear striking capability, the deterrent strategy would have been less effective. By offering greater protection in the form of warning to SAC bombers and the ability to aid in the destruction of the attacker's aircraft, the DEW Line presented the enemy with potentially unsustainable losses (or not being able to inflict the damage deemed critical to success) and a SAC force with most of its retaliatory capability intact. The DEW Line was a critical component of deterrent strategy, which became its principal function.

The first major attempt to provide increased warning was the joint Canadian – U.S. venture that became known as the Pine Tree Line. This chain of thirty-four radar stations along the 50th parallel just north of the U.S.-Canadian border, provided a minimum of warning time along with the ability to track incoming "bogies" and control interceptors from the ground. The initial cost of the Pine Tree Line was $450 million. The United States paid two-thirds of the cost and, supplied over half of the operating and maintenance personnel. This warning line was completed in 1954.[5]

A second warning line, the Mid-Canada Line as it was eventually known, was established roughly along the 55th parallel. The design, financing, construction, and operation of this line were solely the responsibility of Canada. Canada completed the Mid-Canada Line in 1958. The Mid-Canada Line and the DEW Line were constructed simultaneously. In fact, it is difficult to imagine the DEW Line being built without prior approval of the Mid-Canada Line. The Canadians believed that assuming the complete cost of the Mid-Canada Line exonerated them from having to help underwrite the more expensive DEW Line, with its estimated cost of $600 million.[6] While these costs seem extremely high for military expenditures in the 1950s, so too were the costs of other elements of deterrence and defense. In 1956, Congress was slashing the budget, yet "despite financial problems elsewhere, the DEW Line and Semi-Automatic Ground Environment (SAGE) (except for the Congressional anxiety about communication charges) proceeded without fiscal hindrance" [7] All other areas of continental air defense experienced reductions. With a demonstrated, compelling need for a continental defense system, particularly early warning, the DEW Line enjoyed priority and protected status.

The DEW Line debate was a frequent topic of conversation among the inner circles in Washington, D.C. during the years 1952-1954. Because of its place of primacy during certain periods of the Eisenhower presidency and Admiral Radford's time as Chairman of the Joint Chiefs of Staff, it is quite remarkable that neither devoted much space to it in his memoirs. Other Cold War topics are discussed extensively throughout both of their memoirs. It might be easier to understand the omission by Admiral Radford, since the landed segment of the DEW Line was in the realm of another military service, but his nearly complete neglect of ignoring the subject is still perplexing.

Eisenhower, in his memoirs spanning two volumes, did not even *mention* the DEW Line, nor did he spend much time on continental defense in general. He devoted a chapter to the New Look, but made no mention of the DEW Line, nor did he spend any pages discussing continental defense improvements, which scholars have cast as "a cardinal feature of the New Look."[8]

Eisenhower concluded his chapter on the New Look with the following short paragraph: "Our military structure and equipment were changing so rapidly that even the comforting old slogan 'Tried and true' was gone. In its place had sprung up a disquieting new one: 'If it works, it's obsolete.'"[9] Was the DEW Line, in Eisenhower's mind, illustrative of many Cold War military programs? Thanks largely to the costs of developing new technology, these defense programs have a way of becoming horrendously expensive, and when complete, soon rendered impotent by more recent technological breakthroughs. For these reasons, the historical participants as well as later scholars tended to under-emphasize or ignore programs that were at one time key to continental defense.

The Truman *and* Eisenhower administrations recognized the importance of the DEW Line. While the DEW Line had its conception during the Truman administration, it was not started until after Eisenhower reevaluated U.S. defense policy and elected to strengthen continental defense. Because of its genesis, the DEW Line cannot be classified solely as a New Look program. However, the DEW Line became a major component of not only the New Look, but continental defense.

The implementation of the DEW Line illustrates a new form of American diplomacy, one of the first examples of peacetime cooperative defense. Because of this successful cooperation between Canada and the United States, the establishment of the DEW Line helped to pave the way for closer defense relations. Cooperation on the DEW Line, along with agreements on the Pinetree and Mid-Canada Lines, set the stage for the formation of the North American Air Defense Command (NORAD), an unprecedented relationship in which both countries agree to "protect each other's air space and sovereignty."[10]

The technology and materials employed in constructing the radar net had to survive prolonged exposure to extremely cold temperatures along with the accompanying snow, rain, ice and high-velocity winds common to polar latitudes. Learning to use the technology in Arctic temperatures was a trial and error process.

Supplying the building materials and equipment for the DEW Line presented serious obstacles. Economic and logistic considerations dictated that the bulk of the materials and supplies be sea lifted, but a water route was only available for a two-month period per year. Extensive planning was necessary to get the ships in and out of the Arctic Ocean before ice prevented the ships from finishing their mission. In conjunction with the sealift, a complex airlift schedule had to be maintained throughout the year to bring in the less bulky—but equally essential—supplies and manpower. The airlift occurred even during the harsh winter months, when the weather and short periods of daylight were especially problematical.

The stated intention of this doctoral dissertation was not to over-emphasize the DEW Line's significance but rather to bring an often ignored subject into proper perspective and historiographical consciousness. This work contributes to the academy of history by illuminating a critical part of U.S. military defense policy. The DEW Line buttressed overall U.S. defenses, even strengthening the offensive arm by furnishing SAC with protection through warning. The DEW Line was a cardinal feature of the New Look. All elements of continental defense improved with the introduction of DEW Line. The DEW Line remained vital to U.S. nuclear deterrent strategy for nearly six years, and some DEW Line sites were still in use in 1988.[11] The concept of an early warning system reverberates into the 21st Century with the growing proliferation of nuclear-capable nations hostile to the United States.

This dissertation has explored the evolution of policy for Canadian-United States joint continental defense. It has also examined the policy debate in the United States, both within the government and military and in the public forum, where non-military professionals, scientists and scholars deliberated on national defense policy. Also examined were the technology enhancements required to defend the continent, and the step-by-step implementation of the DEW

Line itself. The missions to deter enemies, detect bombers, and defend the continental U.S. were fulfilled, with periodic modification and modernization for decades. Building and operating the DEW Line, an arduous task, was a testament to the innovation, ambition and will power of scientists, military and defense policy planners, and the soldiers and civilians who labored on the DEW Line during its formative years.

[1]Jon B. McLin, *Canada's Changing Defense Policy, 1957-1963: The Problems of a Middle Power in an Alliance* (Baltimore, MD: The John Hopkins Press, 1967), 28.

[2]Donald J. Mrozek, "The Cold War," in John E Jessup and Louise B. Ketz, *Encyclopedia of the American Military: Studies of the History, Traditions, Policies, Institutions, and Roles of the Armed Forces in War and Peace* (New York: Scribners Book, Company, 1994), 986.

[3]Jonathan M. Nielson, *Armed Forces on a Northern Frontier. The Military in Alaska's History, 1867-198 7* (Westport, CT: Greenwood Press, 1988), 186.

[4]George Linsey, "Canada-U.S. Defense Relations in the Cold War," in Joel J. Sokolsky and Joseph T. Jockel, eds., *Fifty years of Canada-United States Defense Cooperation. The Road from Ogdensburg* (Lewiston, NY: The Edwin Mellon Press, 1992), 66.

[5]J. L. Granatstein and Norman Hillmer, *For Better or Worse: Canada and the United States to the 1990s* (Toronto: Copp Clark Pittman, Ltd., 1991), 134.

[6]Kenneth Schaffel, *The Emerging Shield. The Air Force and the Evolution of Continental Air Defense, 1945-1960* (Washington, DC: Office of Air Force History, 1991), 210.

[7]Richard F. McMullen, *Air Defense and National Policy, 1951-1957* (ADC Historical Study No. 24), 82.

[8]Robert J. Watson, *The Joint Chiefs of Staff and National Policy, 1953-1954*, Volume V: History of the Joint Chiefs of Staff, (Washington, DC: Joint Chiefs of Staff, 1986), 146.

[9]Dwight D. Eisenhower, *Mandate for Change, 1953-1956: The White House Years* (Garden City, NY: Doubleday & Company, Inc., 1963), 458.

[10]From a statement by USAF General Victor "Gene" Renuart in http://www.norad.mil/50/index.html (Retrieved 17 September 2008)

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Appendix A - Acronyms

ADC	Air Defense Command
ADSEC	Air Defense Systems Engineering Committee
AEC	Atomic Energy Commission
AEW	Airborne Early Warning
BAR	Barter Island, DEW Line Main Site
BNSP	Basic National Security Plan
BSP	Basic Security Plan
CAM	Cambridge Bay, DEW Line Main Site
CINCLANT	Commander-in-Chief, Atlantic
CINCPAC	Commander-in-Chief, Pacific
CNO	Chief of Naval Operations
CONAD	Continental Air Defense Command
CUSDPG	Continental United States Defense Planning Group
CUSSAT	Canada-United States Scientific Advisory Team
DER	Radar Picket Destroyer Escort
DEW	Distant Early Warning
DRB	Defence Research Board
DYE	Cape Dyer, DEW Line Main Site
FOX	Hall Beach, DEW Line Main Site
GLOBECOM	Global Communication System
GNP	Gross National Product
GOC	Ground Observer Corps
IFF	Identify, Friend or Foe
JOPEWS	Joint Outline Plan for an Early Warning System
JSPG	Joint Strategic Plans Group
JSC	Joint Chiefs of Staff
LORAN	Long Range Navigation
LSG	Location Study Group

LST	Landing Ship Tank
MCC	Military Characteristics Committee
MSG	Canada-United States Military Study Group
MSTS	Military Sea Transport Service
NATO	North Atlantic Treaty Organization
NDRC	National Defense Research Council
NORAD	North American Air Defense Command
NSC	National Security Council
NSF	National Science Foundation
PIN	Cape Perry, DEW Line Main Site
PJBD	Permanent Joint Board on Defense
POL	Petroleum, Oil and Lubricants
POW	Point Barrow, DEW Line Main Site
RAF	Royal Air Force
RCAF	Royal Canadian Air Force
SAC	Strategic Air Command
SAGE	Semi-Automatic Ground Environment System
USA	United States Army
USAF	United States Air Force
USMC	United States Marine Corps
USSR	Soviet Union

Appendix B - National Defense Spending (Millions of Dollars)

Year	1948	1949	1950	1951	1952	1953
Military Defense	10,937	11,573	11,891	19,764	38,897	43,604
Military Assistance	261	415	130	991	2,442	3,954
Atomic Energy	475	622	550	897	1,670	1,791
Defense Related Service	106	316	447	819	1,028	1,093
Total	11,779	12,926	13,018	22,471	44,037	50,442

Table B.1 National Defense Spending (1948-1953)

Year	1954	1955	1956	1957	1958
Military Defense	40,326	35,531	35,791	38,436	39,070
Military Assistance	3,629	2,292	2,611	2,302	2,187
Atomic Energy	1,895	1,857	1,651	1,990	2,268
Defense Related Service	1,136	1,015	670	582	708
Total	46,986	40,695	40,723	43,360	44,234

Table B.2 National Defense Spending (1954-1958)

Adapted from *Congress and the Nation, 1945-1964: A Review of Government and Politics in the Postwar Years.* Washington, DC: Congressional Quarterly Service, 1965. p. 390

Appendix C - Department of Defense Personnel

30 June	Army	Air Force	Navy	Marines	Total
1945	8,267,958		3,380,817	474,680	12,123,455
1946	1,891,011		983,398	155,679	3,030,088
1947	685,458	305,827	498,661	93,053	1,582,999
1948	554,030	387,780	419,162	84,988	1,445,910
1949	660,473	419,347	449,575	74,279	1,615,360
1950	593,167	788,381	381,538	192,620	1,460,261

Table C.1 Department of Defense Personnel (1945-1950)

30 June	Army	Air Force	Navy	Marines	Total
1951	1,531,774	788,381	736,680	192,620	3,249,455
1952	1,586,419	982,261	824,265	231,967	3,635,912
1953	1,533,815	977,593	794,440	249,219	3,555,067
1954	1,404,598	947,918	725,720	223,868	3,302,104
1955	1,109,296	959,946	660,695	205,170	2,935,107
1956	1,025,778	909,958	669,925	200,780	2,806,441
1957	977,944	919,835	677,108	200,861	2,795,798

Table C.2 Department of Defense Personnel (1951-1957)

Adapted from *Congress and the Nation, 1945-1964: A Review of Government and Politics in the Postwar Years.* Washington, DC: Congressional Quarterly Service, 1965. (p. 265)